

# 5

## Transport

Transport is critical to our everyday lives. Our transport networks connect us to the opportunity to work, learn and socialise. They move the products we buy and use, from what we eat to what we wear. Our transport networks are vital to our collective economy and productivity, as well as to the quality and cost of living we experience as individuals.

For ease of analysis, this chapter treats passenger and freight transport sectors separately. In practice, the two are closely linked. Passengers and freight operators share road, rail, airport and port infrastructure.

**Passenger transport** connects people and places. This section discusses a broad range of modes, from active transport, such as walking and cycling, to private cars, public transport, aviation, cruise ships, ferries and emerging modes like rideshare.

**Freight transport** includes the complex array of supply chains that carry imported and locally produced goods for domestic consumption. This section also analyses

our export supply chains, with a particular consideration of agricultural and mineral exports and the key facilities, such as ports, intermodal terminals and airports, that service our international trade.

Our principal focus in this chapter is on the challenges and opportunities arising from a changing sector. The transport sector is undergoing a period of rapid transition, coinciding with the increasing congestion experienced by our cities as they undergo rapid growth.

Innovation in the transport sector has historically driven economic development and shaped the way we live. The impact of current and coming transport evolutions will be equally significant. Electrification, automation and rapid improvements in communications technology have the potential to transform the way people travel and our supply chains. However, these changes also present uncertainty for the transport sector and governments.





Next steps

Water

Telecommunications

Energy

Social infrastructure

Transport

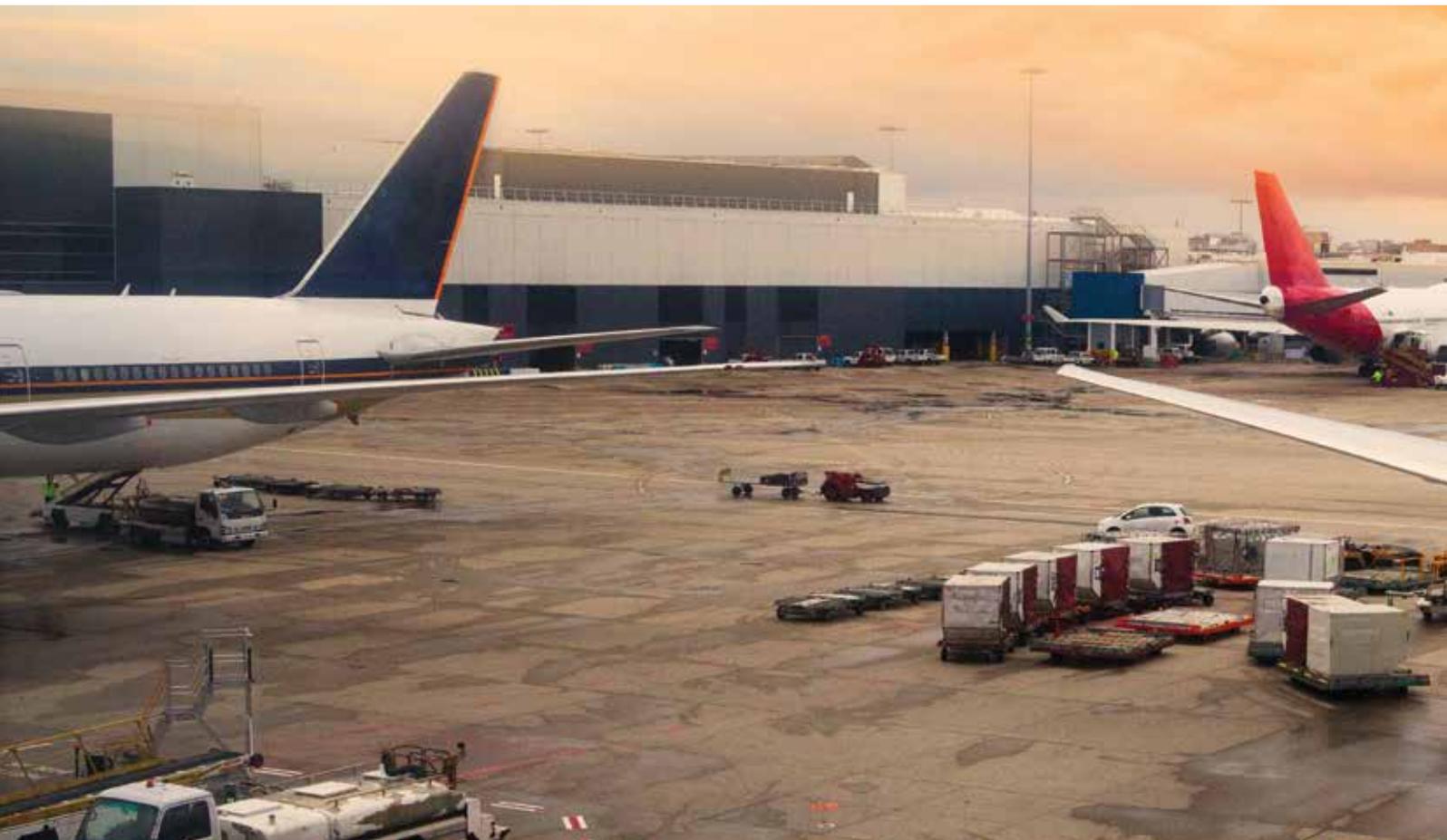
Industry

Users

Future trends

Introduction

Executive summary



# Freight transport

## 5.9 Introduction



### The state of the freight transport sector

Australia’s freight transport task is diverse and growing. Global demand for our exports, particularly from Asia, has resulted in unprecedented growth. This is coupled with increasing demand for imports and a growing expectation that consumer items are delivered to our homes or offices. Our geography and varied climate also mean that Australia continues to produce a broad range of agricultural products, each with a unique supply chain.

The performance of our freight networks varies across the country. Australia is home to some world-leading mineral supply chains, particularly in the Pilbara, Central Queensland and Hunter Valley. However, our urban and agricultural supply chains in particular are experiencing challenges.

Our cities are key centres of demand, supply and the processing of high-value and containerised freight. However, too often they act as bottlenecks

on our national supply chains, limiting access to key markets for exporters and increasing costs for consumers. Congestion on key routes, and land-use planning that does not consider freight and regulatory constraints on our gateways, are common challenges.

Agricultural supply chains also suffer from constraints. Local infrastructure is often poorly maintained and lacks capacity. Infrastructure constraints are coupled with inefficient regulation in our regions, where freight operators often cross jurisdictional boundaries and have to deal with a myriad of access permits.

Australia is well positioned to take advantage of Asia’s economic development. But to do so, we need to ensure our freight and supply chains operate efficiently and minimise costs for business and consumers.



### Australia's freight task is diverse, and growing fast

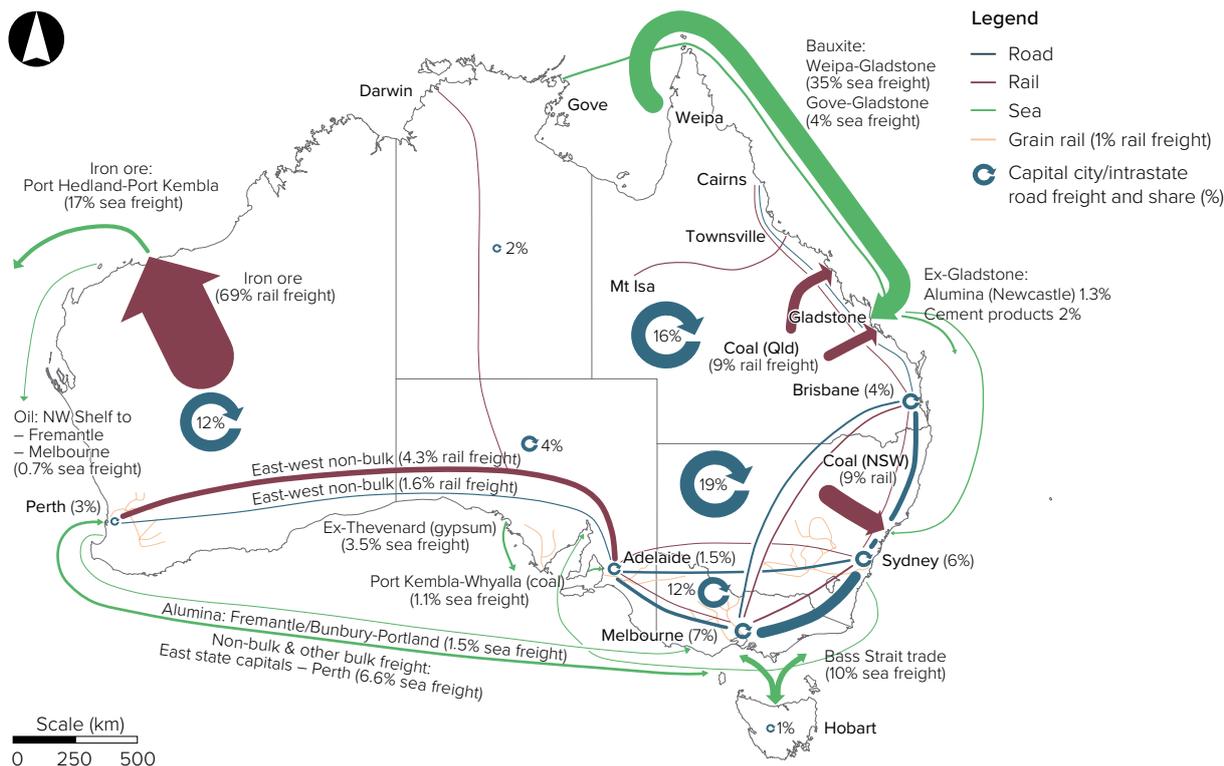
Australia's population is increasing rapidly, but the freight task is growing even faster. In the 10 years to 2016, the domestic freight task grew by 50% while our population grew by 18% over the same period.<sup>271</sup> In 2015-16, Australia's freight network moved about 726 billion tonne kilometres of freight. That is almost 30,000 tonne kilometres moved for every person in Australia in just one year.<sup>272</sup>

Australia's freight task is expected to continue growing at a faster rate than population growth, as our exports grow and consumers demand not only more goods, but increasingly expect goods to be delivered quickly and to their door. The freight task is forecast to grow by another 26% between 2016 and 2026.<sup>273</sup>

The freight task in Australia is diverse and the needs of individual supply chains can vary substantially. Freight transport therefore requires nuanced policy, regulation and strategic infrastructure investment to ensure different supply chains can operate effectively. Figure 27 provides a snapshot of freight flows, which broadly encompasses:

- The movement of bulk commodities, largely for export, such as iron ore, coal and liquefied natural gas (LNG)
- The transport of agricultural produce including grains, cotton, rice, sugar and livestock
- The import and transportation of manufactured goods, machinery and motor vehicles
- The transport of largely imported consumer items to retail outlets and, increasingly, direct to people's homes and offices
- Construction-related traffic
- Waste transport, disposal and recycling.

Figure 27: Major freight flows in Australia are diverse



Source: Bureau of Infrastructure, Transport and Regional Economics (2019)<sup>274</sup>

### The performance of our freight networks is varied

This Audit assesses the performance of our freight networks through the lens of access, quality and cost. Australia is home to some world-leading supply chains. Our large iron ore and coal supply chains in the Pilbara (Western Australia), Central Queensland and the Hunter Valley (New South Wales) are some of the most efficient in the world. These supply chains allow for enormous quantities of minerals to be mined, transported and exported. Western Australia alone accounts for close to 40% of global iron ore production and 57% of seaborne exports,<sup>275</sup> and the Port of Newcastle is the largest coal port in the world.<sup>276</sup>

However, our agricultural, non-bulk and urban supply chains face challenges. Access to supply chains and markets are hindered by inconsistent regulation between jurisdictions and levels of government. Due to the variable standards to which roads are constructed or maintained, road operators in particular face restrictions on the weight, height, width and axle configuration of vehicles they use on different roads. This means access to routes can be inconsistent, confusing and can increase their administrative burden.

The quality of our infrastructure can also impact on access for these supply chains. Grain railways and local roads generally have lower technical specifications than state-significant and interstate routes. This means, in bumper harvest years, they lack the capacity to carry goods to market. Our urban supply chains can also hinder access to markets when they become congested. In Sydney and Melbourne in particular, delays on access routes to key facilities such as ports, intermodal terminals and airports are common.

Costs are incurred at different points on the supply chain, as different businesses sell, process, store and transport a product before it is finally sold. Ultimately, freight costs account for a proportion of the final cost a consumer pays for a product. The costs of freight declined sharply in the second half of the 20th century due to increasingly efficient vehicles, containerisation and industry reform.<sup>277</sup> Costs have remained largely stable since the 1990s,<sup>278</sup> but could be lowered in the near future by technological developments such as automation and further mechanisation.



### There has been progress since the 2015 Audit, but it is slow

Many of the challenges identified in Infrastructure Australia's 2015 Audit remain today. Freight demand continues to grow quickly, congestion remains on key urban freight routes, inconsistent regulation hinders efficiency and key regional bottlenecks still constrain agricultural supply chains.

There has been some progress on key reforms, but they remain incomplete. In 2011, Australian governments agreed to establish a national system of freight regulation, with the establishment of national regulators and the transition from state laws occurring progressively. Since the 2015 Audit, the transition to national rail safety regulation has been completed.

Progress has also been made with heavy vehicle regulation, with jurisdictions progressively transitioning to the National Heavy Vehicle Regulator (NHVR). However, progress has been slow, and heavy vehicle regulations remain inconsistent and difficult for industry to understand. The Western Australian Government has not agreed to participate in the NHVR, so operations in the state are covered by a separate system of rules and regulations.<sup>279</sup>

Technology has progressed and begun to improve the efficiency of key freight facilities since 2015. For example, the introduction of automatic straddles at numerous ports means that the transfer of containers from ships to trucks and trains, which in 2015 was largely carried out by dock workers, is now automated. The impact of technology is likely to

grow in the freight sector, with automation potentially reducing freight costs into the future.

Finally, safety has improved since the last Audit, as the number of fatal crashes and other causes of death involving heavy vehicles has declined. However, change remains slow and the road freight sector still has the highest fatality rate of any industry in Australia.<sup>280</sup>

### Our freight networks are crucial to capitalising on Asia's growth

Asia's growth is leading the world economy and driving demand for Australian commodities. The OECD estimates that 66% of the world's middle class will be living in Asia by 2030, compared with 28% in 2009.<sup>281</sup>

Australia is well placed to take advantage of this development. The vast majority of our exports, close to 70%, are already delivered to East Asia.<sup>282</sup> The majority of our imports also comes from Asia, as China in particular has become a global manufacturing hub.

However, our ability to capitalise on Asia's growth relies on an efficient and effective freight network. The vast size of the Australian continent presents a challenge to the competitiveness of Australian producers, who not only must export to distant markets but also negotiate the distance from paddock, pit or plant to port. Improvements in the way goods are moved domestically will reduce the costs of exports as well as benefiting local consumers.



Freight is a key component in costs for Australian exporters and the price paid by consumers for imported items. The Australian economy can receive a significant boost from growing international trade, but ensuring our supply chains are efficient is critical.

### Our cities are bottlenecks for freight

Our cities are central to the freight network and international trade. Many of our most important freight facilities are located in our four largest cities, Sydney, Melbourne, Brisbane and Perth. About 96% of Australia's air freight passes through our four largest airports, and these cities are also home to our largest container ports.<sup>283</sup>

The location of these facilities is no accident. About 60% of Australia's population lives in our four largest cities. This means they are our major market for domestic and imported goods. For example, about 87% of containers imported into the Port of Melbourne have a final destination that is within metropolitan Melbourne.<sup>284</sup> Our urban ports and airports are also critical to regional supply chains. About 90% of New South Wales container exports move through Port Botany in Sydney.<sup>285</sup>

However, our cities are too frequently bottlenecks in our supply chains. Freight often shares road and rail infrastructure with passengers, and congestion on key access routes are common. Land-use planning is also poorly coordinated with freight operations, leading to operating restrictions on key facilities. For example, Sydney Airport is our largest air freight handler but is subject to a curfew between 11pm and 6am. In addition, intermodal terminals and warehouses can be limited in their operating hours by local governments due to concerns about noise impacts on residential areas.

There is also a growing micro-freight challenge in our cities. As people increasingly shop online, they expect goods to be delivered to their home or office within a short timeframe. This can exacerbate congestion on our roads and in loading zones. In Sydney, light commercial vehicles, or delivery vans, make up about 15% of traffic, which is about 6% more than heavy freight vehicles.<sup>286</sup>

As our freight task grows and we become more urbanised, it is increasingly critical that we recognise and address the key challenges facing our urban freight transport networks.

### Agricultural supply chains face infrastructure and regulatory constraints

The quality and efficiency of our regional supply chains vary enormously. Our large mining supply chains are world-leading, while our agricultural supply chains often struggle with bottlenecks, and low-quality or poorly maintained infrastructure.

The scale, diversity and seasonal nature of Australia's agricultural activity make these supply chains complicated from a governance and infrastructure provision perspective. Infrastructure is expensive to build and maintain, and governments and infrastructure managers are incentivised to invest when infrastructure is consistently and heavily used.

However, the geographic spread and seasonal nature of a lot of agricultural activity means that expensive infrastructure can be underutilised for months and sometimes years before receiving significant traffic. This means local roads and branch railways in particular are of a lower structural standard than main freight routes which have more consistent traffic flows. The result is that bumper crop years can overwhelm local infrastructure, meaning farmers and business are unable to get their product to market within an optimal timeframe.

## In this chapter

**5.10 Freight gateways supporting international trade** explores Australia's ability to capitalise on world growth, especially Asia's, through efficient domestic and international freight networks. Specifically, we look at the performance of and challenges faced by our main container ports and international airports.

**5.11 The urban freight challenge** analyses the problems that our freight networks face in our major cities. We look at poorly coordinated land use and transport planning, the impact of congestion and the unique challenges posed by the growth of micro-freight.

**5.12 Ensuring the national freight network is effective and efficient** investigates the impact of inefficient regulatory structures, the potential benefits of technology for the freight sector and the importance of safety for road freight.

**5.13 Unlocking regional economic development through freight** explores the diversity of regional supply chains and some of the challenges of providing sufficient infrastructure for seasonal agricultural flows. We also look at the potential for freight investments to act as catalysts for regional development.

**5.14 Transporting, storing and making the most of our waste** explores the challenges faced by Australia's waste sector. Specifically, we look at the growing pressure on the sector due to population growth, export bans and heightened environmental awareness.

# Performance of the sector

Access



Australian exporters spend five times more than Canadian exporters on border compliance costs <sup>287</sup>

Quality



Delivery times could

# reduce by 40%

with autonomous vehicles <sup>288</sup>

Access

# 100%

of regional air freight is carried in the base of passenger planes <sup>289</sup>



Cost



Autonomous vehicles could reduce trucking costs by 47% <sup>290</sup>

Quality



50% of people rate postal services as good <sup>291</sup>

Cost



37% of people rate postal services as costly <sup>292</sup>

Access

# 30,000 tonne kilometres

moved for every person each year <sup>293</sup>

Quality

# 1 in 5 people

do not have an opinion on the quality of their freight services <sup>294</sup>



Cost

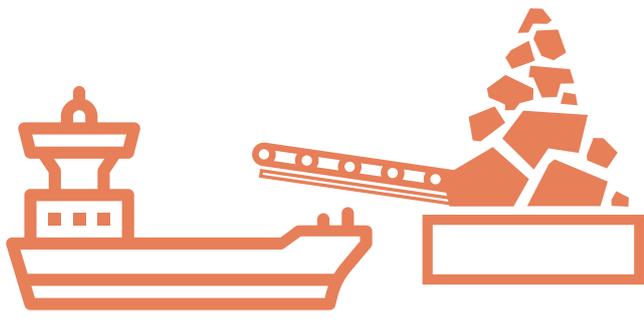


# Freight is 5%

of the retail cost of doing business <sup>295</sup>

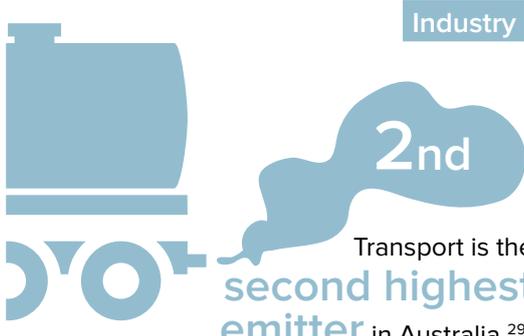
# Scale of the sector

**Asset**



Port Hedland, the world's largest bulk export port, handled **519,000,000 tonnes** in 2017–18<sup>296</sup>

**Industry** **Customer**



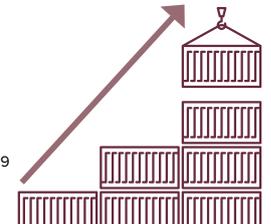
Transport is the **2nd** highest emitter in Australia<sup>297</sup>



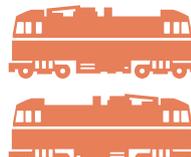
Every year, **three** truckloads of freight is moved per person<sup>298</sup>

**Customer** **Asset**

From 2016 to 2026, freight will grow by **26%**<sup>299</sup>

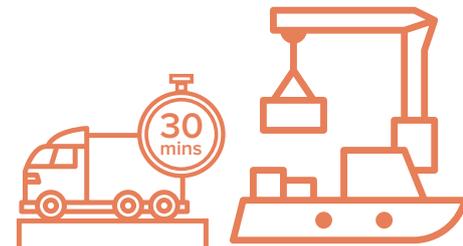


There are almost **2,000** operational locomotives in Australia<sup>300</sup>



**Asset** **Customer**

On average, trucks wait **30 minutes** to pick up cargo at major ports<sup>301</sup>



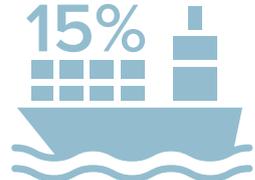
Each year, Australians spend about **\$1,000** each on online shopping<sup>302</sup>



**Industry**



29%



15%



56%

About **1/3** freight tonne kilometres carried by trucks  
 About **1/6** of freight tonne kilometres is carried via coastal shipping  
**1/2** of freight tonne kilometres is carried on rail<sup>303</sup>

## 5.10 Freight gateways supporting international trade

### At a glance

Efficient domestic and international freight networks are critical to helping us capitalise on world growth, especially in Asia. This section looks at the key freight infrastructure directly supporting these networks:

- Ports are our main international trade gateways, supporting our largest industries. But the shipping and logistics industries are changing fast, and our ports must adapt to keep up.
- Airports move a small but high value portion of freight, including sensitive or perishable goods. Freight will soon outstrip passenger growth, so the sector must balance that conflict of interest.

Our large cities contain some of our most important gateways to sea and air trade routes. These gateways are vulnerable to congestion and are reliant on direct investment in freight-specific assets.

### Asia's growth presents freight and trade opportunities for Australia

Australia is heavily reliant on trade. Our exports make up about 21% of GDP,<sup>304</sup> and the vast majority of our commodities are exported, with 77% of agricultural produce, 75% of coal and 98% of iron ore going to international markets.<sup>305</sup>

The rapid development of Asia's middle class, and associated changes in consumption patterns, present both challenges and opportunities for Australia's freight sector. In 2017, about 66% of Australia's exports were for East Asia, with China's share of those exports having doubled in the last 10 years to account for 30% of total exports.<sup>306</sup>

Asia's growth has resulted in increased steel production and energy demand. As a result, demand for Australian iron ore, coal (metallurgical and thermal) and more recently LNG has accounted for most of Australia's export growth since 2006-07 (Figure 28).<sup>307</sup>

Australia's freight network is also critical for ensuring imports are delivered to Australian consumers at the lowest possible price and in a timely fashion. Australia is part of an increasingly globalised economy, meaning that many of our daily needs, including food, consumer goods and manufactured items, are imported. Some of Australia's largest imports, by value, are motor vehicles, refined petroleum, computers and medication.<sup>308</sup>

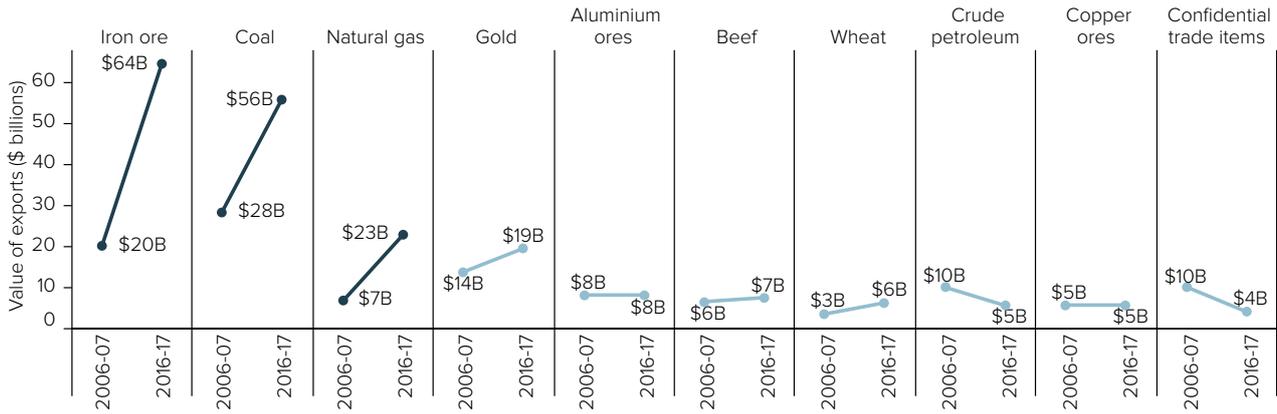
Australia's network of freight infrastructure assets has handled rapid growth in domestic and international demand. There has been significant expansion of our freight networks in recent years, with the largest capital projects being the expansion of private rail and port infrastructure for the export of iron ore and coal. Stevedores, logistics companies and port operators have also continued to invest in new capacity in containerised transport to ensure consumer goods reach their markets efficiently.

Capital investment has been accompanied by reform. There has been a widespread push by state governments to privatise capital city ports, providing these assets with a stronger commercial focus and generating capital to fund new and improved infrastructure. Since the 2015 *Australian Infrastructure Audit*, the ports of Darwin and Melbourne have been transferred to the private sector under long-term leases.

However, despite the progress, there remain significant challenges for our freight sector. These range from regulatory competition and pricing concerns, to infrastructure capacity constraints, particularly in regional areas and around our ports. Collectively, these challenges reduce access to our networks and increase costs across our supply chains, ultimately reducing our competitiveness.

The key will be to ensure freight infrastructure markets are operating as efficiently as possible, and our infrastructure networks are fit for purpose, to ensure Australia can take advantage of Asia's growth.

**Figure 28:** The value of iron ore, coal and natural gas exports has grown substantially in the last decade



Note: Values are inflation adjusted to September 2018.

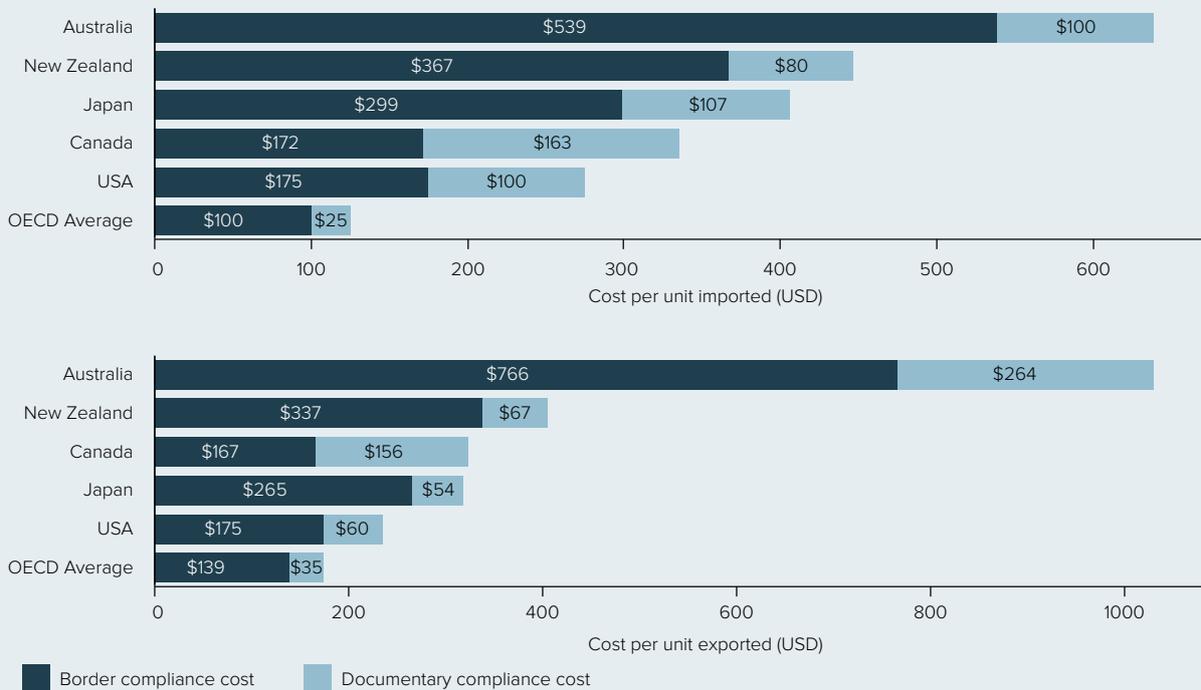
Source: Department of Foreign Affairs and Trade (2018)<sup>309</sup>

### Australia's costs for exporting and importing are high

The World Bank has found that Australia's international trade costs are higher than for many other high-income OECD countries.<sup>310</sup> The report measures the cost for documentary compliance (obtaining, preparing and submitting documents) and border compliance (including customs and inspections).

Australia performs worse than the OECD average against virtually every metric, with the cost for exporters particularly high. While the OECD average is dragged down by European Union countries, Australia still struggles to compete with countries outside Europe (Figure 29).

**Figure 29:** Costs for Australian exporters and importers are higher than in comparable countries



Note: All values are for 2018. The World Bank's methodology applies an extensive range of assumptions to allow for comparability across economies.<sup>311</sup> Import and export costs assume different traded products. Import costs are based on a standardised shipment of 15 metric tonnes of containerised auto parts from each country's largest provider of auto parts. Export costs are based on a shipment of each country's product of its comparative advantage to the economy that is the largest purchaser of this product.

Source: The World Bank (2019)<sup>312</sup>



## 72. Opportunity

**Growth in Asia and an increasingly globalised economy means the volume and value of Australia's trade is increasing.** Enhancing, adapting and realigning freight networks will allow Australian producers to capitalise on opportunities presented by growing global markets, and Australian consumers to access imported goods as cheaply as possible.

**When this will impact:**



**Where this will impact:**



### Our ports are becoming more efficient, but there is room for improvement

Ports are our principal gateways to international trade. Ports and related land-side supply chains are critical to the competitiveness of Australian businesses, which rely on these gateways to import raw materials and manufactured goods, and to take our mineral and agricultural products to the global market. They support some of our largest industries, such as mineral extraction, agriculture and manufacturing.

Australian port activity can be split into two primary functions:

- Specialised bulk export ports, with the largest focusing on iron ore and coal, and located largely at regional centres
- Mixed (import and export) ports, handling containerised, bulk and so-called roll-on/roll-off cargo, located in our capital cities and some regional centres.

Our specialised bulk ports are some of the largest in the world and their supporting supply chains are considered world leading. For example, Australia has the largest iron ore and coal export ports in the world in Port Hedland and Newcastle, respectively, with equivalently scaled rail infrastructure networks.<sup>313</sup>

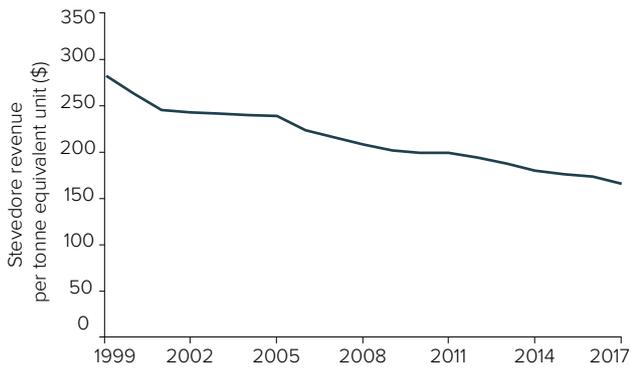
The value of exports through Australia's ports in 2015-16 was almost \$220 billion while imports stood at \$202 billion.<sup>314</sup> Fluctuations in market conditions over the last decade, particularly in coal and iron ore prices, have meant that import and export volumes at bulk ports have varied. Nevertheless, Australia's bulk export ports are broadly well positioned to accommodate future demand shifts, either at the wharf edge or in the supply chain. They are anticipated, therefore, to require little direct support from government.

Our mixed freight container ports, however, are faced with both challenges and opportunities due to rapidly evolving international shipping and logistics industries. These industries are in a state of transition, with changes impacting the operation and pricing practices of ports in Australia. These changes include:

- The shipping industry has undergone consolidation and larger shipping lines have been able to use their market strength and bargaining power to improve port rates, including docking and freight handling fees.<sup>315</sup>
- Three stevedores now operate at each of Australia's east coast capital city ports. When combined with a general increase in costs (particularly property), this has driven growth in competition between these stevedores.
- There has been significant investment and expansion of our major container ports, helping to accommodate growth and increase port productivity.
- There is a trend towards larger ships. This is impacting on quayside infrastructure, requiring port managers to augment waterside facilities through projects such as deepening and widening channels, expanding turning areas and removing height restrictions.<sup>316</sup>
- The impact of technology on port and freight handling activities has increased and is being used to improve productivity and reliability, reduce costs and improve convenience for freight customers.

The result of these trends can be positive for consumers. Costs paid between different segments of the supply chain contribute to the final price paid by the customer. Prices paid by shipping lines to stevedores at Australia's major capital city ports have declined over the past 20 years (Figure 30). Decreases in the last five years in particular can be attributed to growing competition between stevedores at our ports and the improved bargaining position of shipping lines as they have become larger.<sup>317</sup>

**Figure 30: Stevedore revenue per Tonne Equivalent Unit has been declining at Australian capital city ports**



Source: Australian Competition and Consumer Commission (2018)<sup>318</sup>

However, the decrease in costs paid by shipping lines has coincided with significant increases in charges paid by land transport operators (truck and train companies) for collecting or delivering laden containers to and from the port (Table 4). In other words, costs may have shifted from shipping lines to land transport operators, where they have more market power.

However, the Australian Competition and Consumer Commission has raised concerns that, if left unconstrained, stevedores may have the ability to continue to increase charges imposed on land transport operators beyond what is necessary to recover costs and make an adequate return. The Commission’s concern is that land transport operators are unable to choose between stevedores because they simply pick up or drop off the cargo owners’ consignments. In other words, land transport operators do not benefit from competition between stevedores in the same way shipping lines do.

High costs met by land transport operators are passed on to cargo owners, who also face practical constraints to choosing different stevedores. The nature of the supply chain means costs are ultimately passed on to Australian consumers (or exporters and cargo owners), so that the benefits of increased competition between stevedores may not be realised equally across the supply chain. The challenge for government will be to know if and when a regulatory response is required.<sup>319</sup>

**Table 4: Stevedores have increased charges per container for train and truck operators**

Port	DP World			Patrick		Hutchinson	
	2016-17	2017-18	2018-19	2016-17	2017-18	2016-17	2017-18
Brisbane	\$32.74	\$38.75 <b>+18.4%</b>	\$65.15 <b>+68.1%</b>	\$32.55	\$38.25 <b>+17.5%</b>	\$32.00	\$32.60 <b>+1.9%</b>
Fremantle	\$8.22	\$8.22	\$8.22	\$4.76	\$7.50 <b>+57.6%</b>		
Melbourne	\$32.50	\$49.20 <b>+51.4%</b>	\$85.30 <b>+73.4%</b>	\$32.00	\$47.50 <b>+48.4%</b>		
Sydney	\$21.16	\$37.65 <b>+77.9%</b>	\$63.80 <b>+69.5%</b>	\$25.45	\$41.10 <b>+61.5%</b>	–	\$10.45

Note: The table excludes the Victorian international container terminal, as charges remained constant between 2016-17 and 2017-18.

Source: Australian Competition and Consumer Commission (2018)<sup>320</sup>

## 73. Challenge

Charges for truck and train operators accessing our major ports have increased and could be passed on to customers. It is challenging for governments to know if and when a regulatory response is required. Stevedores may have the ability to continue increasing charges, which may lead to growing costs for Australian exporters and consumers.

When this will impact:



Where this will impact:

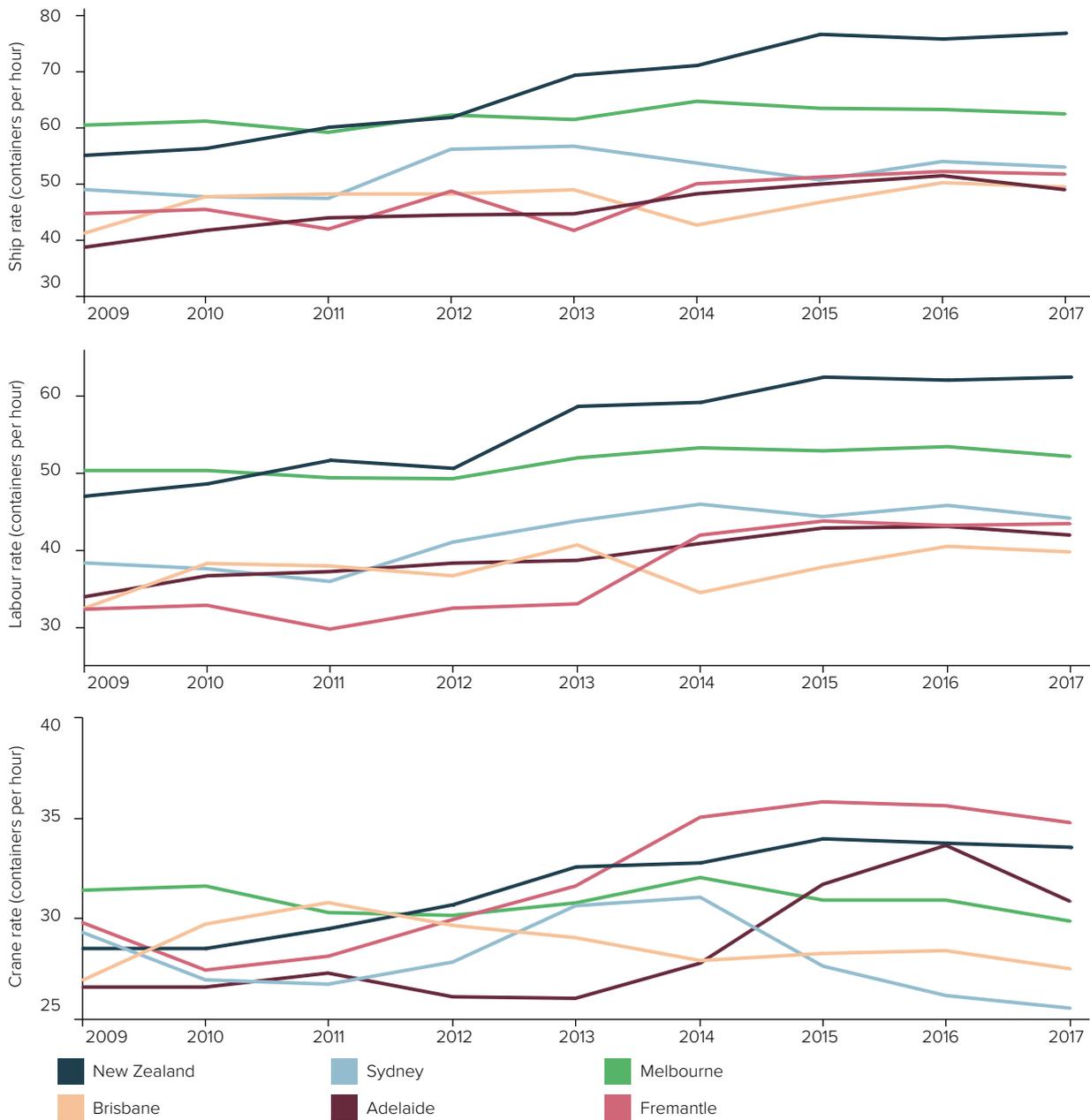


Our ports also face productivity challenges. Recent changes in shipping and technology, as well as investments in infrastructure at our ports, have likely contributed to gradual improvements in port productivity in recent years. However, our ports continue to lag behind other industrialised countries.<sup>321</sup>

Based on the most recent available and relevant inter-country comparison, Figure 31 shows three common port efficiency indicators – labour rate, ship rate and crane rate – at major Australian ports compared to ports in New Zealand. Australian ports remain behind those in New Zealand, for all indicators.

Efficiency is significantly higher than benchmarks established in 1998-99 (although consistent time series data are not available) and remains close to record levels. However, progress in recent years has been more gradual, and in the case of crane productivity has declined slightly. The challenge for port operators, stevedores and governments will be to ensure that Australian ports continue to make efficiency improvements in the face of an evolving international industry and rapidly changing technology.

**Figure 31: Australian ports are less efficient than New Zealand’s in most productivity metrics**



Note: Ship rate records the average number of containers transferred to and from ships by cranes and labour. Labour rate measures the number of containers handled for the period of time between labour first boarding a ship to leaving the ship. Crane rate reflects the number of containers handled per crane hour while cranes are in operation.

Source: Bureau of Infrastructure, Transport and Regional Economics (2019)<sup>322</sup>



## 74. Challenge

Our major container ports are becoming more productive, but continue to lag behind our trading partners for key indicators. Our ports will need to continue to improve to ensure Australia is globally competitive. Without improvement, our ports will continue to be uncompetitive, potentially increasing the time taken to import and export goods and add to costs for Australian exporters and consumers.

When this will impact:

0-5

5-10

10-15

15+

Where this will impact:



### Airports are critical for the movement of high-value freight

Air freight represents a small proportion of Australia's freight task by mass, a mere 1.5 million tonnes or 0.1% of freight moved in 2016-17. This, however, obscures the critical importance of air freight to Australia:

- It represents over 21% of trade by value.<sup>323</sup>
- 70% of air freight has an international origin or destination and therefore contributes significantly to Australia's international trade and its trade relations.<sup>324</sup>
- Goods most suited to air freight are those that are time-sensitive, compact, perishable or high value.

Significant increases in freight trade are forecast for Australian airports over the next 20 years. Melbourne Airport forecasts its international air freight will grow by 57% between 2013 and 2033,<sup>325</sup> and total freight at Sydney Airport is forecast to grow by 58% to one million tonnes between 2017 and 2039.<sup>326</sup> Indeed, growth in Sydney's air freight is predicted to outstrip passenger growth over the same period.

Despite the potential for growth, however, the air freight sector is faced with major challenges.

The first of these relates to managing competing land uses. Two airports, Melbourne and Sydney, carry by far the greatest share of air freight (Table 5). Both airports have experienced ongoing development in surrounding areas.

In Sydney, the city most significantly affected in this way, non-aviation development around the Kingsford Smith Airport has been a challenging consequence of its position less than 8 km from the Sydney CBD. This location is well within the ring of inner suburbs which, as in all large Australian cities, has become a highly attractive location for governments and developers seeking to increase residential density.

While this location may deliver the airport significant benefits in terms of passenger access, it comes at the cost of increasing constraints on other airport users. Here, as in Melbourne, non-aviation-related development has resulted in increased road congestion at airport access points, impacting the efficiency of air freight distribution.<sup>327</sup> As an illustration, 52% of the traffic movements during the morning and evening peaks on Airport Drive, the primary feeder road around Sydney Airport, is non-airport through-traffic.<sup>328</sup>

**Table 5: Sydney and Melbourne account for the majority of Australia’s air freight**

Airport	Exports (tonnes)	Imports (tonnes)	Total (tonnes)	Share
Sydney	255,173	205,065	460,238	47.3%
Melbourne	166,233	114,346	280,579	28.8%
Brisbane	67,740	40,818	108,558	11.2%
Perth	54,302	30,317	84,619	8.7%
Adelaide	14,621	7,941	22,562	2.3%
Cairns	4,677	516	5,193	0.5%
Darwin	900	897	1,797	0.2%
Other	4,578	5,363	9,941	1.0%
<b>Total</b>	<b>568,225</b>	<b>405,265</b>	<b>973,490</b>	

Note: Values represent tonnes imported or exported in 2016.

Source: Inquiry into National Freight and Supply Chain Priorities (2018)<sup>329</sup>

The development of the new Western Sydney Airport provides a unique opportunity for integrated and long-term land-use and freight infrastructure planning. Given Sydney is so critical to Australian air freight, improvements in that city could help improve the efficiency of the network across the country.

The second challenge relates to the fact that most air freight is carried in the hold of passenger flights (with only 17% of international and 44% of domestic cargo movements being made on dedicated air freighters).<sup>330</sup> As a result, freight and passenger activities overlap.

Rapid growth in passenger numbers in recent years at major airports has led to the expansion of passenger-oriented facilities and placed pressure on freight facilities that are located near runways and terminals, such as hangars, freight aprons and cargo bays.<sup>331</sup> Moving freight facilities to less accessible parts of an airfield or off-airport can increase delays and handling costs. This is particularly an issue for the movement of air freight in Sydney, which has constraints on its land footprint, and is located in close proximity to Port Botany and has shared road networks. Businesses involved in air freight operations have noted they would like to see airports better balance the needs of freight services with passenger demands.<sup>332</sup>

The third issue relates to regulatory controls and operational limitations on flight arrivals and departures. Curfews are in place between 11pm and 6am at Adelaide, Sydney, Gold Coast and Essendon airports. These were introduced in 1995, primarily to limit noise impacts on surrounding residential areas. Additionally, Sydney Airport is subject to a cap on hourly movements during the hours when it is operating.

Recognising that Sydney carries approximately half of Australia’s air freight, these restrictions significantly reduce the volume of landed air freight. Relaxation of operational restrictions could add significant capacity. The Sydney Business Chamber has pointed out, for instance, that relaxing the cap by five flights per hour would increase capacity by 16,425 flights per annum.<sup>333</sup>

Agricultural producers are among the exporters potentially benefiting from reduced restrictions on operating hours at our airports. Supplying the growing Asian middle class with high-standard Australian produce could be facilitated by opening up overnight air freight pathways for perishable goods to reach time-sensitive markets. The planned curfew-free operation of Western Sydney Airport will help New South Wales producers to access such opportunities.

Regulatory controls on cargo can also add significant costs and delays. Air freight is subject to a range of customs and security procedures for both international and domestic freight. From March 2019, requirements for air cargo security measures increased substantially. All Australian cargo travelling overseas now needs to be examined at piece level (box, carton or similar item) or to originate from a

pre-approved list of exporters called the ‘known consigner’ list. The requirement was initially in place from July 2017 on all freight bound for the United States, but it is being expanded to cover all exports. The trend towards tighter security on air freight has the potential to negatively impact the productivity of our airports unless carefully managed.<sup>334</sup>

## Western Sydney Airport – an opportunity to improve air freight efficiency and planning

The demand for flights in the Sydney region is forecast to double over the next 20 years and Sydney Airport cannot accommodate this demand alone. The Australian Government has committed up to \$5.3 billion in equity over 10 years to develop Western Sydney Airport (WSA), to open by 2026. WSA will be a full-service airport capable of catering for domestic and international services, including freight, with 24/7 operations.

Land use and ground transport planning for the area surrounding the new airport has aimed to minimise conflicts, to optimise integration with compatible activities in the innovative technology and export-oriented ‘Aerotropolis’ precinct, and to deliver land-side connectivity. Protection of the land around the airport has ensured that the distance from the south-western end of the WSA

runway to the closest suburban area will be over 10 km. This will allow WSA to operate without a curfew.

The Australian and New South Wales Governments are constructing new and upgraded roads around the future airport under the \$3.6 billion Western Sydney Infrastructure Plan. The governments have also committed to a long-term rail network to support Western Sydney, including a North-South Rail Link from Schofields to Macarthur. To ensure compatible land uses continue to develop across the region, WSA planning is deliberately aligned with the New South Wales Government’s Western Sydney Employment Area, the Western Sydney Airport Growth Area (including the Aerotropolis) and the primarily residential South West Growth Area.

## 75. Challenge

**The need to balance passenger and freight services, operating restrictions and constraints on airport land and surrounding roads reduces the efficiency of our airports.** The efficiency of our airports could decline further as demand grows, potentially leading to delays and higher costs for high value, time sensitive air freight and passengers.

When this will impact:



Where this will impact:



## 5.11 The urban freight challenge

### At a glance

As cities grow and demand for living space increases, governments must find ways to successfully integrate freight needs into their urban planning.

This section looks at how congestion, shared infrastructure and operating restrictions impact our urban freight networks. Cities typically prioritise passenger movement and local amenity over freight-related activities, but governments are increasingly looking for ways to balance these needs.

Micro-freight poses another challenge. This section explores how online shopping changes how our networks operate.

### Land-use planning is critical for freight

Australia's largest cities are growing rapidly, and demand for land in the inner suburbs in particular has increased substantially.<sup>335</sup> Increasing developer demand and land values place pressure on governments to zone land according to its highest possible return, which is generally residential and retail.<sup>336</sup> This often means there is a shortage of strategically located and suitable land for industrial, freight and logistics purposes in cities.<sup>337</sup>

Conflicting demand for land in our cities is inevitable. Many of our most significant ports and freight facilities, such as Port Botany and the Port of Melbourne, are located near the historical centre of our cities, close to employment and retail nodes as well as residential areas. The challenge for governments is to get the balance right in planning for different land uses.

Land for consignment processing, for warehousing, for intermodal terminals and for container parks needs to be located near, or have high-quality transport links to, ports, airports and local manufacturers.

This is particularly important given the increasing role of e-commerce. Online shopping is changing the way purchasers and consumers interact with sellers. However, to ship goods efficiently and effectively means all parties need to be connected by clearly defined, protected and accessible road and rail networks.

Historically, integrated land-use and transport planning has been done poorly in Australian cities,<sup>338</sup> and is likely the most significant factor in freight delays and congestion in our fast-growing cities. It can lead to:

- Unnecessary, long and expensive trips for trucks and light commercial vehicles, resulting in extra costs which are then passed on to consumers.
- Unnecessary handling of freight if key facilities are in separate locations.

- Inefficient use of infrastructure resulting from a lack of access to designated freight routes, leading to the use of 'rat runs' on roads that are not appropriate for freight traffic.
- Restrictions being imposed on operations to ensure surrounding residents are not disturbed, such as curfews and other time restrictions.
- Limited available space for industrial purposes, leading to inefficient container park and intermodal terminal layouts.

Despite the importance of more effective land-use planning for freight, governments have historically struggled to implement effective reforms to address these challenges. Lack of freight knowledge and conflict between proactive strategic planning and the regulatory role played by most planning agencies is likely to contribute to this. While freight planning issues are recognised in most strategic freight plans, actions to address them are often generic in nature, and do not sufficiently target specific and complex issues.

Infrastructure Australia's 2017 paper *Corridor protection: Planning and investing for the long term*, advocated the early identification and acquisition of transport corridors and industrial land. Not only does corridor protection save government funds, it is also critical in ensuring the positioning of industrial land is well planned and balances different functions.

While action to protect areas of land for different uses, and connecting corridors, will help improve future outcomes, the efficiency of existing facilities can also be enhanced by freight-oriented planning. Urban encroachment on existing facilities has the potential to result in operating restrictions and can also mean operators spend time and resources challenging development applications.

## Urban encroachment at the Port of Melbourne

The Port of Melbourne has been operating for more than 140 years and is a nationally significant facility. However, the port's operators spend a great deal of time and resources challenging development applications for incompatible land uses on its borders. For example:

- Residential dwellings on the border of Webb Dock, with frontages to Todd Road and Williamstown Road (both are designated trucking routes), have been approved.
- A residential tower immediately west of Bolte Bridge has been proposed. The frontage of the building is on Lorimer Street, another designated trucking route. It is also near a port cement facility and existing reservation for the Webb Dock Rail Link.

- A café has been approved near the Coode Island petrochemical precinct. Initially a restaurant was approved for the site, but it was changed to a smaller café following a challenge from the Port of Melbourne to the Victorian Civil and Administrative Tribunal.<sup>339</sup>

Conflicts over land uses are inevitable, especially in high-density areas like central Melbourne. In addition, there will always be a need for negotiation and engagement by the Port of Melbourne with the community about surrounding land uses.

However, freight operators also raise legitimate concerns about regulations and restrictions being imposed on their operations due to nearby and newly approved incompatible land uses. It is an area where government has a clear role to play in balancing the needs of different parties.

## 76. Challenge

**Conflict between land uses, particularly in the inner areas of our fast-growing cities, decreases the efficiency of our urban supply chains, particularly warehousing. Conflicting demand for land is inevitable, and governments face a challenge in balancing the needs of different parties.** Failure to address land use conflict will result in more operating restrictions on key facilities, inefficient layout of facilities, and additional freight trips on out transport networks.

When this will impact:

0-5

5-10

10-15

15+

Where this will impact:



### The impact of congestion, shared infrastructure and curfews

Growing congestion on our roads and railways, particularly in our major cities, impacts the timeliness and costs of moving freight. This problem is only set to worsen with the forecast doubling of Australia's freight task over the next 20 years.<sup>340</sup> Most congestion of our urban transport networks occurs on infrastructure that is shared between passenger and freight transport, with passenger cars and trains taking up the vast majority of network capacity.

About 80%-90% of freight transported in our cities is carried by road.<sup>341</sup> This means freight needs to share road space with cars and buses. The roads around container ports are increasingly congested. Many major cities have historically developed around their port, spreading along the coast or inland from that point of early European settlement. This means capital city ports are often based near parts of the

city that have high employment and population densities and, therefore, busy roads.

Our two largest container ports, Sydney and Melbourne, are near areas with very large volumes of passenger traffic (Sydney Airport and Melbourne CBD, respectively). Over 80% of freight passing through both ports is transported to or from warehouses and terminals within their respective capital city, meaning urban congestion has a significant impact on the cost of moving freight. Figure 32 shows congestion in 2016 around Port Botany and the Port of Melbourne. The mapping shows very heavy congestion on key arterial access routes to the ports.

Road congestion also has an impact on the movement of freight to and from our airports. Air freight is usually high value and often time sensitive, and commonly includes fresh foods as well as consumer items ordered online. This freight is often flown between Australia and overseas markets because customers place a premium on reliable and timely delivery.

The problem is particularly pronounced at Sydney Airport. It is Australia’s largest air freight terminal, accounting for 24% of domestic and 47% of international air freight tonnes.<sup>342</sup> Figure 32 shows the volume of vehicles on roads surrounding the airport. Southern Cross Drive and Airport Drive, in particular, are operating well in excess of design capacity.

Shared railway infrastructure can also be a challenge for the movement of freight as passenger services are generally given priority on metropolitan networks. This means freight trains can access few train paths on the network, especially during peak passenger periods. Most jurisdictions have policies to increase the amount of freight carried on rail in their cities, to reduce growth in the number of trucks on roads. However, rail mode share remains stubbornly low and in some cases has even worsened over the past 20 years, averaging about 10% of total twenty-foot equivalent units carried to and from our capital city ports (Figure 33).

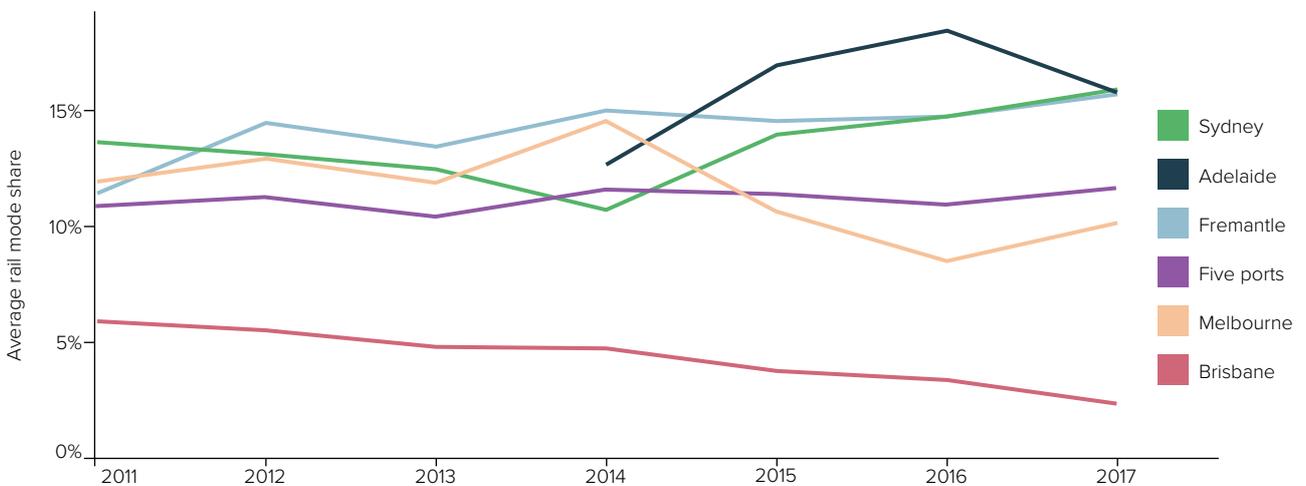
**Figure 32:** There is heavy congestion on key access roads to the Port of Melbourne and Port Botany



Note: Volume / capacity ratios show the quantity of traffic relative to a road’s capacity. Any link operating at a VCR above 1.0 is coloured red, indicating that more vehicles are using the road than it was designed to accommodate under free flow conditions.

Source: Veitch Lister Consulting (2018)<sup>343</sup>

**Figure 33:** Rail mode share at Australian ports has remained low



Source: Bureau of Infrastructure, Transport and Regional Economics (2019)<sup>344</sup>

There are numerous reasons for this low mode share, with one major contributing factor being a lack of dedicated freight rail infrastructure. In Sydney, in particular, this means freight trains share tracks with passenger trains, with the latter being given priority, particularly in peak periods. Other reasons include rail pricing structures that incentivise long-distance over shorter-distance freight, and the inefficient layout or operation of rail yard infrastructure at ports and terminals.<sup>345</sup>

In addition, our urban freight networks often have curfews and operating restrictions imposed on them, limiting their capacity, flexibility and reliability. These time restrictions can be imposed for numerous reasons, including the impact of noise on surrounding suburbs and the decision to prioritise passengers during peak periods. While curfews impact the entire freight network, they are usually focused on specific modes or facilities, including:

- In Sydney, only 74 freight take-offs and landings are allowed each week during the curfew period, with only specific older aircraft allowed to operate despite the fact that larger and more modern aircraft emit less noise. In Adelaide, only aircraft generating noise at 95 decibels or less when landing are permitted.<sup>346</sup>
- While Sydney has a dedicated rail freight network, many freight trains also need to travel on shared passenger and freight tracks. Freight trains are not permitted to enter parts of the network during peak periods and are generally given lower priority than passenger trains.

- Restrictions on the operating hours of freight terminals, heavy vehicle access to certain roads connecting to freight precincts, and delivery times. The noise generated by freight terminals and trucks mean that local governments may place restrictions on operations, access routes and delivery times to avoid disturbance to surrounding residents.<sup>347</sup>

The impact of congestion, shared infrastructure, curfews and operating restrictions has been a focus for governments. The New South Wales Government has signalled its interest in working with the Australian Government to develop an outcomes-based approach to managing noise emissions from freight aircraft operating during the Sydney Airport curfew period.<sup>348</sup> There have also been significant infrastructure investments, such as the recent commencement of construction of Western Sydney Airport (which will operate 24 hours per day), as well as targeted investment on separate passenger and freight infrastructure.

Finally, governments have increasingly sought to couple infrastructure investment with regulations to force the separation of freight and passenger traffic. In Victoria, there are plans to ban trucks from suburban streets in Melbourne's inner west, forcing them to use the West Gate Tunnel once it is constructed.<sup>349</sup> Similarly, the New South Wales Government plans to force trucks to use the NorthConnex tunnel once this is complete.<sup>350</sup>

## 77. Challenge

**Freight transport in our fast-growing cities is impacted by congestion leading to increased costs.**

If this is not addressed, delays in our urban supply chains will become more common and costs will increase as our cities grow.

**When this will impact:**

0-5

5-10

10-15

15+

**Where this will impact:**



### Meeting the micro-freight challenge

Growth in high-value freight and parcel delivery is being driven by online shopping and an increasingly competitive retail environment. In 2017, online retail sales were valued at \$24.2 billion and were 10.1% higher than the year before.<sup>351</sup> Online sales are projected to continue to grow rapidly, and could double in value every five years.<sup>352</sup>

Customers increasingly expect delivery to their front door or office within a short timeframe. These expectations, combined with growth in the range of courier and delivery businesses aiming to meet

customer preferences, mean there has been significant growth in small freight vehicle movements in higher-density urban areas.

Growth in light commercial vehicles has contributed to increasing traffic congestion. As a proportion of total vehicle kilometres travelled, light commercial vehicle use has grown from about 17.4% (39.3 billion kilometres annually) in 2007-08 to 20.4% (54.0 billion kilometres annually) in 2017-18 (Figure 34).<sup>353</sup>

This growth not only leads to more traffic on our roads, but causes congestion of kerbside parking and loading zones, particularly in high-density areas like CBDs.

A key challenge for local and state governments is to balance the growth in micro-freight with other important policy initiatives. For example, local governments are rightly putting greater emphasis on improving the liveability and walkability of urban centres. This can impact the movement of freight, as improving liveability often means giving priority to pedestrian movements over vehicles.<sup>354</sup>

There is also a challenge in ensuring statutory and strategic planning frameworks are aligned. Local planning guidelines and development assessment processes may not encourage strategic approaches that consider solutions across broader areas and/or multiple land use functions. This means that opportunities are being missed to deliver improved spaces for freight operations, such as off-street loading zones. Planning reforms and initiatives to provide information and advice on freight to land-use planners can therefore have a big impact on long-term freight efficiency.<sup>355</sup>

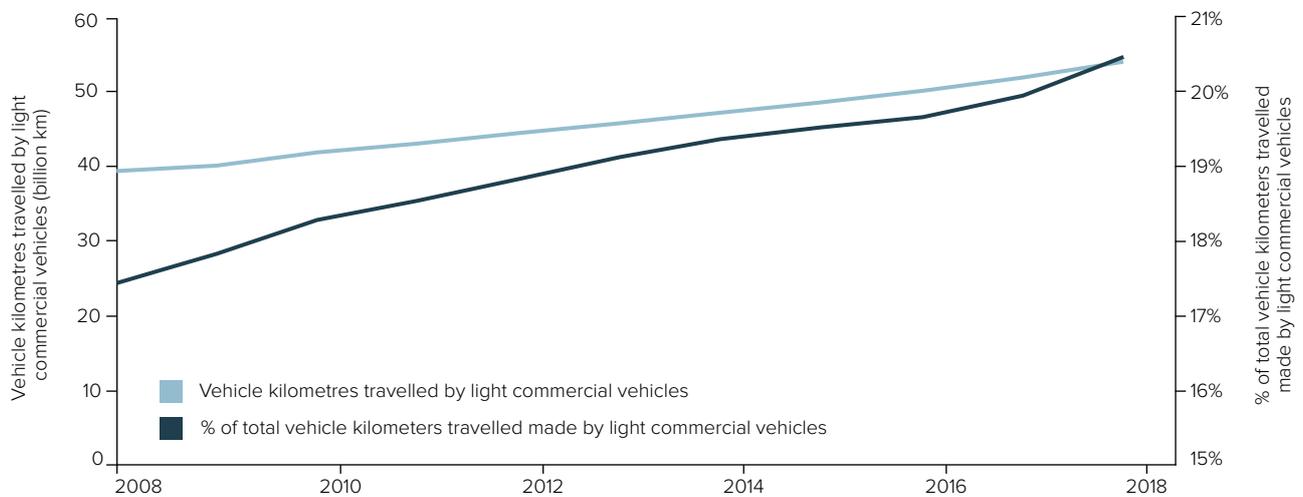
The rapid growth in micro-freight activity has also led to challenges for storing and warehousing. Logistics companies increasingly look for strategically placed land to ensure quick and effective delivery from warehouses to key centres of demand, but this land is often scarce.

In eastern Sydney, for example, the proximity of the airport and port to the CBD and inner city suburbs makes the area an ideal location for distribution centres and warehousing. However, only 3% of industrial or urban services zoned land in the area is undeveloped, and vacancy rates are at record lows.<sup>356</sup> The result is that logistics companies are forced to move further away from their key demand and supply centres, placing more pressure on the transport network.

Governments have recognised the growing challenge of catering for micro-freight. Some jurisdictions have recently investigated or trialled courier consolidation centres and the forced retiming of deliveries to support the more efficient servicing of local businesses, including in areas disrupted by the construction of major infrastructure projects.<sup>357</sup>

In addition, the potential role of technology in addressing micro-freight issues is substantial. Drones are already being explored by freight operators, logistics firms, Australia Post and even fast food restaurant chains as a mode to deliver small consignments quickly. Regulatory issues remain a potential roadblock, but there is potential that this mode will become an important part of the freight mix, particularly in micro-freight, in the future.

**Figure 34: Vehicle kilometres travelled by light commercial vehicles grew over the last decade**



Source: Bureau of Infrastructure, Transport and Regional Economics (2018)<sup>358</sup>

## 78. Challenge

An increase in deliveries by light commercial vehicles is contributing to road and kerbside congestion, particularly in inner urban areas. This is driven by growth in online shopping and changing consumer expectations about timely and door-to-door deliveries. Without action, light commercial vehicles will make a growing contribution to congestion in major employment centres.

When this will impact:

0-5   5-10   10-15   15+

Where this will impact:

## 5.12 Ensuring the national freight network is effective and efficient

### At a glance

This section covers:

- Stalled progress in the move towards further uptake of high productivity vehicles
- New technologies that the sector can take advantage of in coming years
- Fragmented network regulation and how it affects transport operators
- Truck safety issues and how governments can act to reduce road fatalities.

These issues are interconnected. While new tools such as in-vehicle telematics can greatly improve safety outcomes, regulation governs the uptake of new technology.

### Freight network regulation and access conditions are fragmented

Regulations controlling access to Australia's freight network are fragmented, inefficient and confusing for transport operators. Australia's freight networks have historically been managed and regulated by different levels of government. State governments have traditionally played the greatest role by regulating access to road networks as well as urban and most regional railways. However, the role of the states intersects with Commonwealth regulation of the interstate rail network, airports and some functions at ports. Local governments also have an important role to play in managing heavy vehicle access to local roads, particularly in regional areas. The result is inconsistent access regimes, standards and safety regulations across jurisdictions and between different levels of government.

In 2011, the Australian Government and states and territories agreed to establish a national system of freight regulation encompassing the uniform regulation of rail (safety), maritime (domestic commercial vessel safety) and heavy vehicles (access and safety). National regulators commenced operation in 2012 and relevant regulatory services that were historically performed by the states have been progressively transferring to national bodies.

Despite the progress, accessing our freight networks and crossing jurisdictional boundaries continues to be a complicated and at times costly task for transport operators.

Heavy vehicle safety and access regulation is in a slow state of transition. The Heavy Vehicle National Law commenced in 2014, and in its current state is not so much a single national law as a merging of various highly prescriptive, jurisdictional laws with many variations in requirements. These law is as a consequence currently inconsistent in its approach and difficult to read and interpret for both industry and the regulator.<sup>359</sup> These issues have been recognised by governments, and in May 2018 transport ministers agreed to a review of the Heavy Vehicle National Law, led by the National Transport Commission.<sup>360</sup>

Inconsistency in regulations can have significant impacts on costs for road transport operators, which are ultimately passed on to consumers. It can also lead to a limited take-up of higher productivity vehicles, meaning road transport becomes less efficient than it could be.

While the rail industry, with its different track gauges, is traditionally used as an example of inconsistency between states, it is arguably more advanced than the road sector in regard to harmonisation. Australia now has a standard gauge national network and a single national rail safety regulator. Nevertheless, operational and regulatory inconsistencies remain.

The rail networks themselves are managed by various government and private sector organisations. In New South Wales, for example, rail operators transporting containerised freight from regional New South Wales to Port Botany typically travel over networks managed by three separate network managers.<sup>361</sup>

Both standards and forms of technology vary across networks. This can result in costs and inefficiencies for train operators. Costs can be associated with duplicated effort in meeting various standards, additional training of staff for different geographical areas, and more time spent complying with the requirements of each network.<sup>362</sup>

The task for governments is to ensure that the regulatory, access and operational environment across our land transport networks achieves an optimal level of harmonisation. This does not necessarily mean consistency across all contexts in all circumstances. In the case of roads, it is perfectly reasonable that some roads will not be able to handle the same weight and size vehicles as others. Similarly, for rail, the costs to operators of inconsistent regulation or standards may be outweighed by the costs of achieving full consistency across the network.<sup>363</sup> The challenge for governments and regulators is to strike a balance between the costs and benefits of regulation to transport operators, taxpayers and the community.

Finally, the regulation of coastal shipping creates a range of administrative issues for logistics companies, including licence applications and restrictions on the number and type of journeys that can be undertaken by ships, and the working rights of international

seafarers.<sup>364</sup> Coastal shipping currently moves about 15% of Australia’s domestic freight task and, given Australia’s vast distances and extensive network of ports, has the potential to be more competitive with road and rail.<sup>365</sup>



## 79. Challenge

**Inconsistent regulations, standards and technologies across our road and rail networks increase costs for transport operators and agricultural producers, which are ultimately passed on to customers.** Without action, costs and time spent complying with regulation will remain unnecessarily high, reducing the productivity of our supply chains.

**When this will impact:**



**Where this will impact:**



### High productivity vehicles have limited access to our road network

Domestic supply chain productivity is vital for both Australian consumers and exporters. High productivity vehicles are truck and trailer combinations that carry more mass or volume than traditional smaller freight vehicles. When transporting more volume these vehicles can reduce total required vehicle movements (and, in turn, congestion growth), lower the costs of freight and enable faster delivery times, with wide overall productivity benefits.<sup>366</sup> The need to maximise freight volume is a major driver for the use of high productivity vehicles on long-haul routes delivering consumer goods, while additional mass is a priority for the transport of liquids and other bulk goods. A major consideration for the regulators of these vehicles is their impact on the life of road assets, traded off against productivity benefits.

Regimes governing the use of high productivity vehicles also extend to the use of specialised equipment such as mining, farming or construction vehicles. While these may have fixed dimensions beyond the limits generally imposed on vehicles given unlimited access to the road network, their controlled access is essential for them to reach their place of use.

Compared to conventional trucks, high mass and volume vehicles have the potential to be safer, quieter and less emissions-intensive.<sup>367</sup> Austroads found that high productivity vehicles had 76% less accidents compared to conventional trucks.<sup>368</sup> High productivity vehicles generate cost savings to operators and customers. These benefits have been forecast to deliver flow-on economic benefits to the community of around \$5.7 billion between 2014 and 2030.<sup>369</sup> Benefits are particularly on offer to smaller

cities and regional centres and between sites of primary production, regional manufacturing facilities and ports.<sup>370</sup>

Despite their benefits, the use of high productivity vehicles on our roads has been limited. Their access to metropolitan roads is restricted. They face community concerns about the length of the vehicles, the need for infrastructure upgrades to facilitate their use,<sup>371</sup> and regulation that safely and quickly permits their operation. Community concerns are often based on incomplete or incorrect information. The use of new safety technology, such as fatigue and blind spot monitoring, could further improve the performance and community acceptability of high productivity vehicles.

Beyond safety improvements, high productivity vehicles stand to also benefit from technological advancements in vehicle propulsion. New hydrogen-powered heavy duty trucks can operate at a ranges of up to 1,200 km, and are currently in development for markets in the United States and the United Kingdom.<sup>372</sup> Currently electric vehicle technology is available for small trucks but not suited to high mass vehicles.<sup>373</sup> Recent advancements have led to the limited roll-out of this technology for specialised uses, such as waste vehicles, and indicated the potential for its future application to higher mass vehicles.<sup>374</sup>

There is demand from industry for governments to facilitate the more widespread use of high productivity vehicles. Heavy vehicles are regulated by national Performance-Based Standards, which set requirements for a vehicle’s on-road performance. To apply these standards, regulators are tasked with assessing each vehicle type for its impact on road assets, such as road pavement and intersection infrastructure, and its compliance with a common set of safety standards.

In 2014-15 applications for Performance-Based Standards enabling the use of high productivity vehicles rose up by 115% over 2013, while Performance-Based Standards applications for all heavy vehicles rose by 82%.<sup>375</sup> A series of challenges need to be considered by operators requesting Performance-Based Standards vehicles. For example, if the road network is not designed for use by high productivity vehicles, available rest bays may be too small for them.

There are broader benefits and risks associated with high productivity vehicles. For instance, a larger prime mover may allow larger sleeping

accommodation behind the driver's seat. Making use of this can reduce driver fatigue and improve safety outcomes.

While progress has been made by the National Heavy Vehicle Regulator, there are concerns about the lack of coordinated policy initiatives to promote high productivity vehicles' access to the road network. Time-consuming and costly case-by-case decision-making on access permits can discourage the uptake of high productivity vehicles as well as imposing costs on the operators of over-dimension specialised equipment needing regular and timely access to the road network.<sup>376</sup>

### High productivity vehicles face barriers to adoption

The Heavy Vehicle National Law defines how heavy vehicles can access road networks in all jurisdictions with the exception of Western Australia and the Northern Territory. Heavy vehicles can be broadly categorised as either a General Access Vehicle or a Restricted Access Vehicle.

General Access Vehicles are trucks which comply with dimensions set by the national law. Restricted Access Vehicles exceed national law dimensions. These vehicles include a wide variety of longer and/or heavier high productivity vehicles, including B-doubles and B-triples as well as non-standard vehicle types.

Many Restricted Access Vehicle operators are required to apply to road network managers for access on a case-by-case basis. The National Heavy Vehicle Regulator now manages this process in the eastern states and South Australia, coordinating with state and local government network managers. However, even under the national regulator, there are long-standing

differences in state and territory rules about permissible weight limits.

Inconsistent regulations can limit the efficiency of operators, either by making them take circuitous routes, or by forcing them to use inefficient vehicle combinations. Indeed, heavy vehicle operators report having to choose between using vehicles which meet all standards along the different sections a route (thereby meeting the most restrictive of standards) or decoupling high productivity vehicles outside restricted areas and moving trailers separately.<sup>377</sup>

The additional costs under either approach can be substantial. For example, cattle producers in Longreach, Queensland, when transporting their cattle to Brisbane need to break their vehicles into smaller combinations twice, once at Roma and again at Toowoomba. If they were able to use a B-double for the entire journey, transport costs could be reduced by about 37%.<sup>378</sup>

## 80. Challenge

**High productivity vehicle use is limited by community sentiment as well as physical and regulatory impediments to access to our road network.** Restricted use of high productivity vehicles will lock in high freight costs for businesses and consumers, and limit benefits to road safety, air pollution and amenity.

When this will impact:



Where this will impact:



## Supporting freight innovation and new technology

Freight transport and logistics are particularly well positioned to take advantage of technological developments, because the sectors handle many repeated and predictable movements of cargo between established origins and destinations (such as ports and intermodal terminals). These sectors also undertake repetitive warehousing, storage and administrative tasks that can be digitised and automated.

Automation is already important to the industry and digitisation is playing a growing role in record-keeping and the streamlining of operations. In the United States, through improved use of data and analytics, some shippers have reduced warehousing costs by up to 30% and administrative costs by 80%.<sup>379</sup>

However, perhaps the most significant technological development for the freight transport sector is the roll-out of autonomous vehicles. In Australia, driverless trains started operations in 2018 in the Pilbara,<sup>380</sup> and governments are undertaking trials of autonomous passenger road vehicles around the country.

Although the public's focus is often on the impact of autonomous vehicles for passenger transport, it may be felt most profoundly in freight. In Europe, it is estimated driverless technologies and digitisation could reduce trucking costs by up to 47% and

delivery lead times by 40% by 2030.<sup>381</sup> Similarly, fully autonomous trucks in the United States could reduce operating costs by 45%.<sup>382</sup> These decreases in operating costs could lead to significant reductions in the retail price of consumer items as well as improved profits for exporters.

Key existing and emerging technologies and their potential impact on the freight and supply chain sector are summarised in Figure 35.

It is uncertain which innovative transport technologies will be most successfully scaled up for freight use and how they will impact on supply chains. One of the few certainties is change itself. The key for governments in Australia will be to ensure that we remain internationally competitive by enabling and encouraging a greater use of technology, while deploying appropriate regulations to minimise the negative impacts of new technologies on safety, the environment and other transport activities.

Another important role for government will be to ensure that those currently working in the freight sector are not left behind by technological advances. Government has a key role to play in not only providing a safety net to protect existing workers who are experiencing the effects of transition, but also in ensuring our education system prepares future workers to take advantage of technological change. The challenge for governments will be in defining their role in relation to changing labour and production markets during this period of rapid and even exponential change.



### 81. Challenge

The pace and impact of technological change on our supply chains is uncertain. Governments face dual challenges of enabling private sector innovation while also regulating to ensure change does not harm the community. If governments do not intervene appropriately, innovation could be stifled or, alternatively, technological development could pose safety and environmental threats.

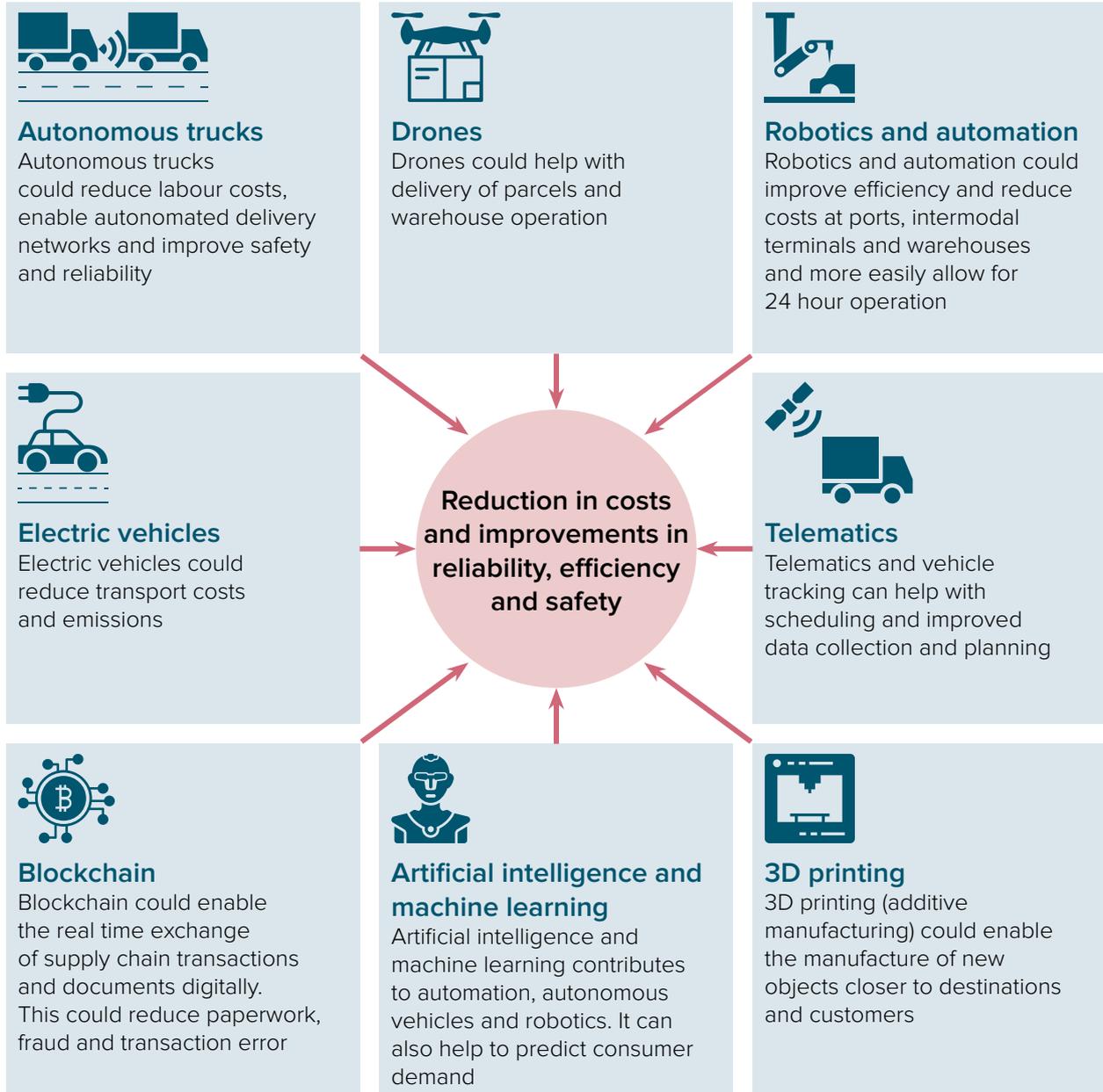
When this will impact:



Where this will impact:



**Figure 35: The potential impact of existing and emerging technologies on freight transport and logistics**



Source: Based on Transport for Victoria (2018)<sup>383</sup>

**Safe trucks can save lives and money**

Road freight has the highest fatality rate of any industry in Australia, and the highest rate of serious injury claims.<sup>384</sup>

The rate of fatal crashes involving heavy trucks decreased by an average of 4.1% per year over the three years to March 2019.<sup>385</sup>

The recent decline in the overall number of fatal crashes involving heavy vehicles is a positive development, but the absolute number of lives lost on our roads remains a major concern.<sup>386</sup>

During the 12 months to the end of March 2019, 163 people died from 147 fatal crashes involving heavy trucks.<sup>387</sup>

In the absence of other changes (such as safer vehicles, roads and drivers), growth of the freight task increases the general risk of crashes involving heavy vehicles. Safety risks associated with rigid trucks and light commercial vehicles will be a particular challenge given continued growth of the urban freight task, including micro-freight driven by e-commerce.

State and territory governments invest significantly in road safety initiatives including campaigns targeting trucks.<sup>388</sup> There is also a high degree of coordination between jurisdictions on road safety. In September 2017, the Australian Government announced the commencement of an independent Inquiry into the effectiveness of the National Road Safety Strategy 2011–2020. The Inquiry panel provided its report and recommendations in September 2018. Key recommendations included:

- Establishing a national road safety entity to report to a Cabinet minister with specific multi-agency responsibility to address road trauma
- Committing to a minimum \$3 billion a year road safety fund
- Accelerating the adoption of speed management initiatives that support harm elimination.<sup>389</sup>

Transport ministers have agreed to progress the report’s recommendations and all jurisdictions have agreed to work with the Australian Government to develop an implementation plan.<sup>390</sup>

Many road freight operators are also independently active in improving road safety. Safety technology such as in-vehicle telematics is being used by large sections of the industry.<sup>391</sup> Telematics is a method of monitoring vehicles that combines GPS with on-board diagnostics so that a vehicle’s speed and location, driver hours and other information can be remotely viewed. Numerous transport companies, such as Toll and Linfox, have either fitted telematics to their fleets or will ensure all new vehicles are fitted.

Although measures to improve safety may have a upfront cost, they can lead to substantial efficiencies in other areas. For example, the use of telematics allows companies to monitor and provide feedback to drivers about harsh braking, over-revving and speeding, as well as data on truck fuel consumption, route optimisation and improved fleet maintenance.<sup>392</sup>

Despite the potential benefits of technology, the uptake of telematics and other safety features, such as autonomous early braking and lane departure warnings, remains low.<sup>393</sup> The majority of Australia’s heavy vehicle operators are small businesses. About 70% of operators have only one truck in their fleet, and 24% have two to four trucks. The upfront costs of sophisticated safety technology, particularly for smaller operators with lower margins, is a significant disincentive.

The Transport Infrastructure Council, the key Ministerial forum for the sector under the Council of Australian Governments, is investigating a national approach to heavy vehicle accreditation schemes to improve the capacity and uptake of telematics for businesses.<sup>394</sup> This provides an opportunity to consider outcomes-based regulation, which could improve safety and minimise red tape for industry. The challenge will be to encourage the adoption of technology for safety, while also recognising that different businesses have a varying capacity to meet upfront costs.



## 82. Opportunity

**New technologies can help improve road safety and efficiency, but they have upfront costs that mean uptake rates remain low.** Increased use of technology could improve road safety.

**When this will impact:**



**Where this will impact:**



## 5.13 Unlocking regional economic development through freight

### At a glance

Freight transport is critical for remote and regional communities. Poor infrastructure in some areas can constrain industry and limit economic development.

This section explores how targeted investment in these areas can strengthen industry and open up new markets. It also looks at the issues existing road and rail networks face.

### Freight transport is critical for regional and remote communities

Remote and regional areas make a substantial contribution to the Australian economy. Between 1989 and 2018, regional New South Wales, Victoria, Queensland, South Australia and Western Australia, together with Tasmania and the Northern Territory, collectively contributed 32% of Australia's GDP growth.<sup>395</sup>

The primary production (pastoral activity, horticulture and agriculture, carbon farming, fisheries and aquaculture) and mining sectors are critical to Australia's economy, and especially to remote and regional communities. The mining sector alone

accounts for about 8% of Australia's gross value added (the contribution to our economy before accounting for taxes), having grown its share by a third in the last 10 years. While agriculture, forestry and fishing have not experienced the same growth, they remain a crucial part of the economy, accounting for about 3% of GDP.<sup>396</sup>

Despite this significant contribution, the relatively poor standard of transport infrastructure in some remote and regional areas can constrain mining and agricultural operations and their access to markets, and therefore is likely to limit long-term economic development in remote and regional areas,<sup>397</sup> and the Australian economy as a whole.

### Parts of northern Australia suffer from low-quality infrastructure

In its report to the Parliament of Australia in September 2014, the Joint Select Committee on Northern Australia identified that industries and communities in northern Australia are heavily reliant on the road network, with few alternative routes in the event of disruption to network links; for example:

- In northern Western Australia, the Great Northern Highway is the only sealed road linking the Northern Territory with other centres in Western Australia.
- The Northern Territory has only five major sealed roads outside Darwin.
- Queensland has a more extensive highway system but there is heavy reliance on access roads that are not highway grade or are frequently flooded.
- Railway networks and port connectivity in the north are considered by many key stakeholders operating in the region to be underdeveloped.

- The Kimberley region does not have railway lines – railways in the north-west region of Western Australia are not connected to the rest of Australia and there is no railway between the Northern Territory and Queensland. Limited rail options can put further pressure on road networks, depending on the size and nature of the freight task.

Similar challenges are faced in outback remote areas of South Australia. The South Australian Government manages approximately 10,000 km of roads in unincorporated areas of the state. The majority of these roads are unsealed and include key outback routes (the Birdsville, Strzelecki, and Oodnadatta tracks) linking key centres in remote and very remote South Australia and providing access for communities, tourism, mining and pastoral activities.

Source: Transport and Infrastructure Council (2015)<sup>398</sup>

The movement of mining products is a key aspect of regional freight. Australia hosts some of the world's largest mining areas, including the Pilbara iron ore province (the Pilbara region is responsible for almost one-third of the world's iron ore production), Bowen Basin coalfields, Argyle Diamond Mine, Mount Isa lead-zinc province and the world's largest manganese mine at Groote Eylandt.<sup>399</sup>

In the Pilbara region of Western Australia, the larger mining companies, including BHP Billiton, Rio Tinto, Fortescue Metals Group and Roy Hill Holdings, own and operate their own railways, which carry iron ore directly from their mines to port for export. In Queensland, the coal rail networks are managed by the privately-owned Aurizon Holdings. The only publicly-owned coal network is the Hunter Valley Coal Chain in New South Wales, government-owned and managed by the Australian Rail Track Corporation but coordinated with the support of strong industry investment.<sup>400</sup>

These supply chains transport some of the largest mineral volumes in the world. For example, Port Hedland in the Pilbara is the world's largest bulk export port. In addition, Newcastle is the world's largest coal export port,<sup>401</sup> and our railways carry some of the world's heaviest and longest trains.<sup>402</sup> These supply chains generally recover their costs and so operate without government subsidy. Governments' role here is to focus on minimising regulatory red tape or other obstacles to the continued efficient functioning of operations, while also ensuring competition, safety and environmental standards are met.

The scale, diversity and geographic spread of Australian agricultural activity, and the large number of operators, means that agricultural supply chains are complex from both an infrastructure provision and a governance perspective. The agricultural supply chain carries large volumes of relatively low-value commodities, such as wheat and barley, as well as livestock, horticultural and dairy products where cool storage and timely transport can be important.

While the supply chains taking producers' goods to market is rightly a focus here, equally important are the transport chains operating in the opposite direction. These supply chains keep our farms and mines working by delivering key inputs such as fuel, construction materials, machinery and spare parts, bulk chemicals, fertilisers and pesticides.

These inward flows of freight are critical to supplying our regional and remote communities with basic needs such as food, clothing and household items. Remote communities can be particularly vulnerable because there are often limited ways to access them. Natural disasters, which can close, and in some cases destroy, remote transport infrastructure can cut off communities from critical supply chains for extended periods.

The complexity and diversity of supply chains, combined with the vulnerability of remote communities, mean government has a role in subsidising supporting infrastructure. This role can be particularly problematic for remote roads and regional airports, where local governments are largely responsible for maintenance costs, but often lack the necessary funding. For example, over 60% of regional airports currently operate at a loss and about 40% expect to continue operating at a loss in the foreseeable future.<sup>403</sup> Similarly for roads, regional and remote networks are extensive, and local governments have limited opportunities to raise enough revenue to fund and maintain them. In New South Wales alone, it is estimated there is a local road maintenance backlog of \$2.2 billion, with regional councils' accountabilities making up 75% of this.<sup>404</sup>

The increased use of drones offers beneficial opportunities. Existing regulation limits drone use beyond visual line of sight from a remote operations centre. In the mining sector, drones can be used for tasks such as surveying, stocktaking, photogrammetry, LiDAR (Light Detection and Ranging) scans and road inspections.<sup>405</sup> For remote towns and villages isolated by floods or other conditions, drones can fulfil the urgent delivery of essential freight such as medication.



### 83. Challenge

**Remote and regional supply chains are critical for industry and to supply communities with basic needs. However, local governments often struggle to fund and maintain critical transport infrastructure.** If this is not addressed, our agricultural supply chains and regional and remote communities will be vulnerable to delays, higher costs and extreme weather events.

**When this will impact:**



**Where this will impact:**





### Freight investment can be a catalyst for regional development

In Australia, supply chain costs represent around 10% of the final cost of a product, a cost ultimately borne by the consumer.<sup>406</sup> Investment in the planning, delivery and management of infrastructure, including its governance, can help to reduce the costs of freight movements. Some of this can be dealt with by actions focused on urban issues but, given the significance of the regionally based mining and agricultural sectors, the importance of programs at the local and regional levels cannot be overstated.

A community's economic prosperity is linked to its access to markets.<sup>407</sup> This allows businesses to reach their customers, as well as attract appropriately skilled labour. Given the size of Australia and the distances between regional and remote producers and their markets, the transport network is central to communities' economic wealth.

If infrastructure investments are appropriately targeted, planned and supported by a robust business case, they can reduce transport times, increase safety and improve reliability. This can reduce the costs of both moving mineral and agricultural produce to market and bringing supplies to farms, mines and regional towns.

### Beef roads program – promoting regional development in northern Australia

The Australian Government announced projects to be funded under the Northern Australia Beef Roads Program in October 2016.

The \$100 million program is making targeted upgrades to key roads necessary for transporting cattle, to improve the reliability, productivity and resilience of cattle supply chains in northern Australia, thereby reducing freight costs and strengthening links to markets.

The CSIRO analysed and modelled different scenarios put forward by state, territory and local governments using its Transport Network Strategic Investment Tool (TraNSIT) to determine the extent of benefits to the movement of cattle and assist in the prioritisation of projects. Through that process, a series of 18 road-sealing and lane-widening projects in northern Queensland, Western Australia and the Northern Territory have been initiated.

At the local level, infrastructure investments can have a major impact, stimulating the growth of existing and new industries and opening access to new markets for those industries.

Various state governments have introduced programs to support the delivery of new infrastructure, targeted at improving economic conditions for regional communities. Queensland has the Building Our Regions Program, providing \$445 million for local government infrastructure projects, and much of Western Australia’s Royalties for the Regions Program is dedicated to localised infrastructure. New South Wales has created the Office of the Regional Infrastructure Coordinator for the same purpose.

However, there are also challenges to leveraging freight investments for regional development. The freight transport sector is complicated, and any infrastructure investment may require the involvement of several levels of government, infrastructure managers and private sector freight operators. As a result, it can be difficult to ensure different organisations and aspects of a project are sufficiently coordinated to maximise the benefits to its region.

For example, a federally funded upgrade to a highway may reduce transport times along a trunk freight corridor. However, it may not help local producers or industry if it is not coordinated with upgrades to local access roads, appropriate regulatory changes and local rezonings to ensure industry and producers can locate nearby.

### Inland rail and Parkes, New South Wales – planning for regional development

The town of Parkes is located in the Central West region of New South Wales. The town is in a strategic position because it is at the confluence of the north-south Newell Highway and the east-west interstate rail line from Sydney to Perth, with links to Adelaide and Darwin. It can handle B-double access on all routes, and road trains or B-triples and double-stacked trains in a westerly direction. It will be the location for a terminal on the Inland Rail line, with the first trains set to be operating in 2024-25.

The Inland Rail Project potentially offers a range of benefits for the Parkes region, including:

- Attracting nearby agricultural products into local storage and supply chains

- Building on the network of existing interstate intermodal freight terminals, establishing the area as an efficient, national distribution hub for specific high-value, low-speed and high-mass goods.

However, the Inland Rail Project alone will not deliver these benefits, and the New South Wales Government is therefore facilitating the development of a Special Activation Precinct, a new industrial area which will concentrate freight and logistics activities, including an inland port west of the town. The Precinct’s design – structure plan layout, infrastructure, incentive structure and governance arrangements – is intended to drive economic development by creating new, high -productivity activities in freight logistics and agriculture.



## 84. Challenge

The complexity of the freight sector means leveraging infrastructure investments to maximise regional development can be challenging. Without improved coordination between jurisdictions, infrastructure managers and freight operators, regional development opportunities will be missed.

When this will impact:



Where this will impact:





## Bottlenecks exist in our agricultural supply chains

Capacity bottlenecks in our agricultural supply chains are common, particularly in bumper crop years, where the volume of commodities to be transported can be well above average.

Our regional rail networks in particular face substantial challenges and capacity constraints. Australia's grain rail lines offer variable infrastructure quality across networks, which can result in slower speeds, choke points and the need to switch from mainline to branch line locomotives.<sup>408</sup>

The poor quality of grain railways, particularly branch lines, means they are not resilient, and are especially vulnerable in bumper crop years, when they can fail to offer sufficient capacity and become unreliable. This can substantially increase costs for producers and result in lost revenue.

Freight rail networks are expensive to build and maintain, and serve highly variable and seasonal traffic. The location of the older grain silos and sub-terminals on a freight rail network make it hard for the network to meet contemporary demands for the provision of just-in-time grain volumes to ports for export. Overall the private sector may find it difficult to financially justify construction and maintenance costs.

As a consequence, most regional grain lines require government subsidy to remain open. In some states,

regional branch lines have had to be consolidated and some lower-capacity rail lines have been closed and replaced by high-capacity trucks, which are considered to be more cost-effective.

Roads are more flexible than rail, and are better able to respond to seasonal variability. They are also usually more cost-effective in servicing freight activities that operate over dispersed geographies and carry lower volumes.

However, the switch to road can be problematic. Trucks also face capacity constraints through regulatory limitations on road access. Rail-based silos and sub-terminals may be relatively inaccessible to larger vehicles. In addition, truck movements pose greater safety risks than rail and produce higher emissions.

While consolidating regional railways may be a reasonable economic decision because of the lower cost of roads, it is often an unpopular choice with local communities.

Closing rail lines also shifts the costs of infrastructure maintenance to the local road manager. In regional areas, this is often local governments, who can struggle to meet the cost of maintaining their networks.<sup>409</sup>

Governments therefore face challenging decisions when it comes to investing in regional freight infrastructure. Financial performance, infrastructure capacity, community expectations, safety and environmental performance all need to be balanced.

## The cost of unreliable rail infrastructure

The 2016 to 2017 grain harvest in Victoria was particularly strong. However, most of the state's grain was transported by road instead of rail that year, reversing a recent trend towards rail carrying about 60% of the state's grain. Hot weather and lower-capacity lines meant restrictions were placed on some of Victoria's grain lines.

The restrictions had significant commercial impacts. Emerald Grain advised that because of 'take-or-pay' contracts, commonly used in the rail industry, they were forced to pay for rail transport that they could not use, as well as paying for additional road transport.<sup>410</sup>

## Lower tonnage grain railways in Western Australia have been closed

Up to half of Australia’s grain exports come from Western Australia, and about 60% of grain in that state is carried to port by rail.

Arc Infrastructure manages the Western Australian grain network as an open access, multi-user asset. The organisation manages track access negotiations with end-users and train operators and is responsible for track infrastructure and train control services. Arc Infrastructure holds a lease over the railways from the Western Australian Government until 2049.

Between 2013 and 2014, Arc Infrastructure (then called Brookfield Rail) made the decision to close about 500 km of ‘tier 3’ rail lines. The closed rail lines were mainly lower tonnage railways that carried trains to main lines and subsequently to ports.

The reason for closing the lines was that they were found to be uneconomic and it was considered cheaper to instead direct funding to roads for grain transport. Arc Infrastructure notes the lines could have remained operational had an above-rail customer been willing to cover the required maintenance costs.<sup>411</sup>

There was significant community opposition to the closure of the rail lines, with community groups claiming roads had not been sufficiently upgraded and maintained. Some farming groups as well as the Co-operative Bulk Handling Group have argued that line closures have increased their costs and reduced access to the grain supply chain.<sup>412</sup>



### 85. Challenge

Highly variable and seasonal traffic can make investment and maintenance of regional grain railways difficult to justify. This results in bottlenecks, speed restrictions, lower capacities and sometimes line closures. If this is not addressed, producers and transport operators will continue to incur higher costs and delays, particularly in high harvest years.

When this will impact:



Where this will impact:



## 5.14 Transporting, storing and making the most of our waste

### At a glance

Australia is one of the world's largest waste producers per capita, but our waste management is often poorly planned.

This section examines the increased pressure on the sector as demand grows and infrastructure shrinks. Key challenges are:

- Inconsistent regulation that has created distinct waste markets in each state and territory
- The need for local governments, investors and researchers to work more closely on innovative infrastructure solutions
- The inconsistent delivery of waste services outside our cities, leading to inefficiencies and higher costs.

The section considers technological change, and how alternative fleets can reduce consumer costs and noise.

### Australia is one of the world's largest waste generators per capita

Waste management is an essential public service, like energy and water. However, the waste infrastructure required is often pushed to the periphery or not well considered in land use planning, zoning and design. Integrated, secure and cost-effective waste infrastructure is required to meet the long-term needs of Australians, who are among the largest generators of waste per capita in the world.

In 2016–17, Australia generated an estimated 54 megatonnes of waste, equivalent to 2.2 tonnes per capita.<sup>413</sup> While on par with other developed countries in total terms, household waste generation per capita is 9% above the average for a selection of 11 European and south-east Asian countries.<sup>414</sup> With a projected population of 37 million people in 2050,<sup>415</sup> our annual waste could rise to 81 megatonnes per annum.

Waste volumes broadly mirror the population in each state and territory (Figure 36), with some variations based on income, economic mix, community attitudes and the availability and cost of waste infrastructure, as well as policy and regulation.

Figure 36: Australians are generating large amounts of waste



Source: Department of the Environment and Energy (2018)<sup>416</sup>

Waste volumes have historically been approximately evenly divided between the three core waste streams of municipal solid waste, commercial and industrial waste, and construction and demolition waste. However, unprecedented levels of investment in housing and civil infrastructure have generated record volumes of construction and demolition waste in recent years.<sup>417</sup> Municipal solid waste, and commercial and industrial waste, have grown more slowly.

At the household level Australians are relatively enthusiastic recyclers and recovered 62% of waste materials through recycling and energy recovery in 2016-17, a modest increase from 55% in 2006-07.<sup>418</sup> However, the strong culture of recycling and reuse seen in some European countries has not developed. For instance, countries such as Denmark (94%) and the United Kingdom (75%)<sup>419</sup> have a significant focus on waste reduction and of reprocessing waste that is created including through energy recovery from waste.

Australia has relies on conventional recycling and exports of recyclables to Asia. As the waste Australia generates increases, our traditional methods of disposing, transporting and exporting waste are being forced to change by market conditions and community expectations.

### Waste management is an essential service under growing pressure

Australia's \$15.5 billion waste industry grew from the need to safeguard public health.<sup>420</sup> Today it also responds to the environmental aspirations of Australians and is a key actor in the transition to a circular economy that reuses materials where possible, and recovers value from other discarded materials.<sup>421</sup>

Each form of waste is associated with varied supply chains, processing facilities, transport methods and regulatory frameworks. Waste is generated in every home, building, business, institution, construction project and public place. Volume and ubiquity make waste management one of the largest freight tasks in any city, with Transport for NSW estimating that waste accounts for more than 10% of Sydney's freight task.<sup>422</sup>

It makes the waste industry, in part, a logistics business that aims to provide efficient collection

and transport services for end-of-life materials. Transport infrastructure is a critical factor in the cost and efficiency of waste service delivery, impacted by congestion, fuel and road toll costs and the growing distances over which waste has to be transported from its point of generation. Away from our cities, the cost of transporting recoverable materials to market can be a significant constraint on diverting waste from landfill.

Closely linked with transport is the network of waste management infrastructure in each city, town or region. Transfer stations aggregate waste into larger trucks to improve transport efficiency. Recycling facilities sort dry, co-mingled materials into separate streams for reprocessing into new feedstocks, with dirtier grades potentially contributing to energy recovery. Organics recovery facilities compost or digest household garden and food waste with commercial organic waste to create soil enhancers or energy-rich biogas.

Landfills backstop the system by accepting materials that cannot be economically or technically recovered. The level of technology and effort that can be invested in diversion from landfill is heavily influenced by the cost of landfill as well as the availability of end markets for recovered materials. The revenue from these offtake streams are a key component of any business case.

This interlaced network of waste transport, facilities and markets is under pressure on multiple fronts. Australia's over-reliance over the last 20 years on international markets to accept our recyclable commodities has left domestic reuse markets under-developed. That vulnerability was exposed in 2018 when China and neighbouring countries including Malaysia imposed import restrictions on lower-quality recyclable materials including mixed plastic, paper and metals. As a result, local governments in several states had recycling contracts cancelled or renegotiated. Queensland councils are expecting losses of revenue of up to \$7 million in 2018-19.<sup>423</sup> The cost impacts are likely to be worse for regional areas.<sup>424</sup> In response, state and territory governments have provided short-term funding to ease pressures on local councils.



## 86. Challenge

Australia has increasing waste generation, a lack of a mature market for private investment and a reliance on waste export. Without action, our disposal, recycling and transportation of waste will become more costly and environmentally damaging.

When this will impact:



Where this will impact:



Waste companies have sought new overseas destinations and prioritised higher-quality materials for export, but have also stockpiled recyclables or sent these to landfill where no markets could be found. This is due to global recyclable commodity prices falling and disposal costs increasing.

Landfills are themselves under long-term pressure. The exact number of existing landfill sites is unknown. There are estimated to be 600 registered sites and potentially as many as 2,000 unregulated facilities (Figure 37).<sup>425</sup> Many landfills have high environmental protection standards, incorporating features such as composite or geomembrane containment liners, landfill gas capture and combustion, and planning for long-term land rehabilitation. However, many smaller regional landfills often do not meet these standards.

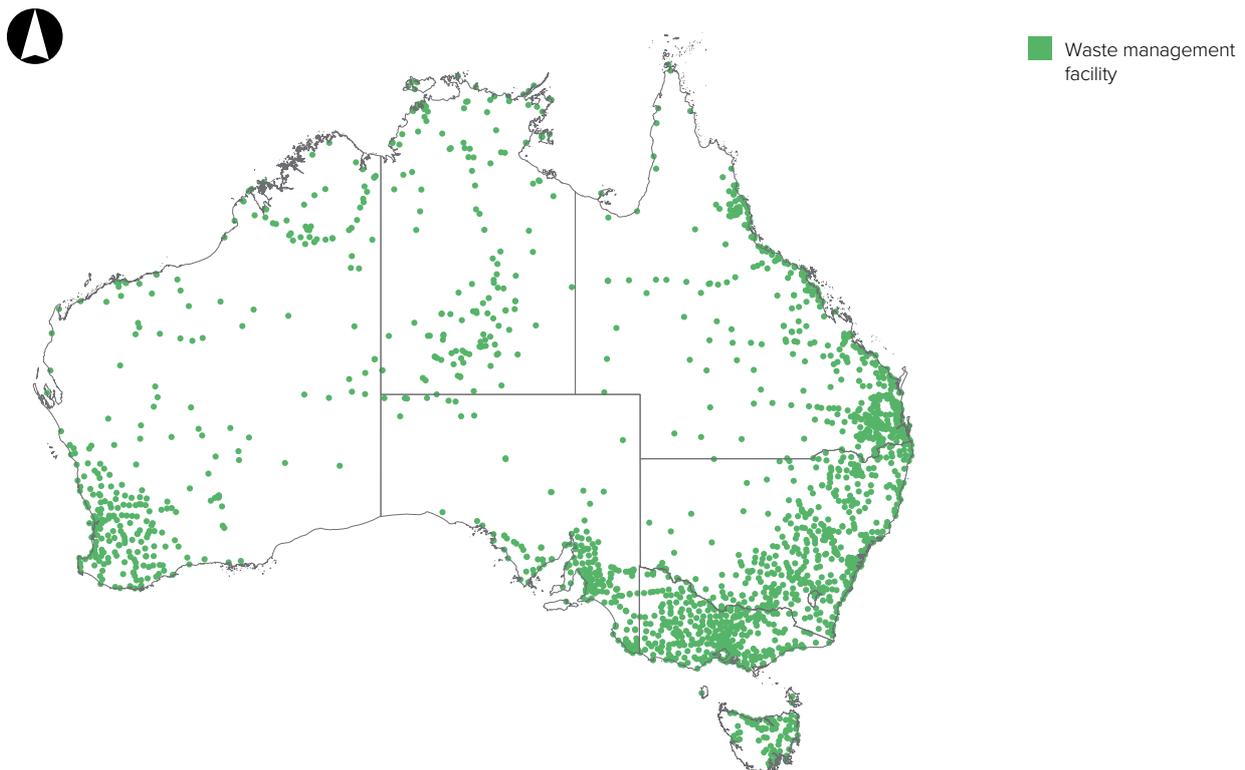
As waste generation continues to increase, few new landfills have been approved and residential development is encroaching on existing sites, threatening their ongoing operation. In Sydney, only one landfill has been approved in the last 20 years, despite the closure of several large landfills in that

time. Major cities are becoming increasingly reliant on a shrinking number of landfill sites, with limited forward planning by governments to identify future disposal capacity. This presents a strategic risk given development approval for a new landfill can take up to 10 years. As accessible infrastructure reaches its end of life, costs are likely to rise and the risks of illegal dumping and stockpiling are likely to grow.

Waste has rarely registered as a major issue for consumers and governments and will be unlikely to do so, as long as kerbside bins have been picked up and affordably removed. For most businesses, waste is a minor cost compared with energy and labour. However, waste has gained prominence in the public conversation since China's recycling restrictions and through television programs such as the ABC's *War on Waste*.

New solutions are needed, yet the market settings required to achieve the best outcomes have been slow to crystallise and more will need to be done to ensure the right mix of waste management and infrastructure assets is deployed.

**Figure 37:** There are a large number of landfill sites in Australia, but they are under long-term pressure



Source: Geoscience Australia (2019)<sup>426</sup>



## 87. Challenge

A limited number of new waste facilities and landfill sites have been approved and residential development is encroaching on existing sites. Without action, waste freight will have to transport their loads further from the waste generation point.

When this will impact:



Where this will impact:

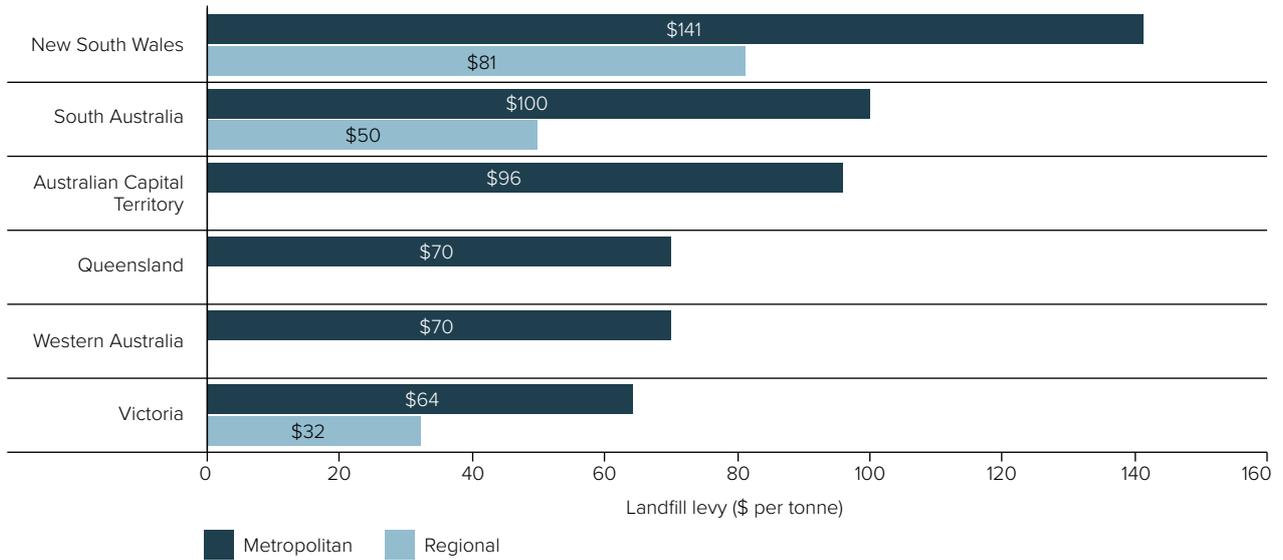


### A patchwork of government waste regulations exists

Responsibility for waste management is divided between all three tiers of government. This patchwork of policies and regulations has created distinct waste markets in each state and territory and a raft of unintended consequences, including motivation for companies to transport waste to cheaper outlets thousands of kilometres away.

In 2016–17, for example, an estimated 690,000 tonnes of waste were transported to Queensland from New South Wales metropolitan areas to avoid the latter state’s higher landfill levy (Figure 38).<sup>427</sup> Significant quantities of hazardous waste are also moved around the country. In some cases this is to receive specialised treatment, but often it is to avoid state levies and restrictive disposal and treatment regulations.

**Figure 38:** Solid waste landfill levies vary between states and territories, causing waste to flow to the cheapest disposal site



Source: Department of the Environment and Energy (2018)<sup>428</sup>

The attempted imposition of a proximity principle in New South Wales and hazardous waste regulations in Victoria, forcing waste to be dealt with as close as feasible to where it is produced, failed legally on constitutional grounds. This was because such interventions were considered to be a restraint on trade between the states. The Australian Government has a limited role in waste policy, which has hampered efforts for the national harmonisation of waste regulation. At a state and territory level, change has been slow. Waste regulations are deeply embedded in the history and practice of each jurisdiction, and an integrated approach has not emerged.

At the local level, the task of managing domestic waste in towns and cities is undertaken by Australia's 537 local councils.<sup>429</sup> These councils implement state policies, approve design and operating conditions for waste collection, and contract municipal solid waste collection. In regional, remote and rural areas, they also operate key waste assets.

Councils stipulate collection times for all waste operators and typically restrict collection to daytime hours due to noise constraints, even though this means collection often coinciding with the commuter congestion peak. Councils also set the design requirements for new buildings, including the size of waste storage and access for collection. This can be a challenge as urban density grows, because the developers of multi-storey residential and commercial buildings are reluctant to lose floor space in order to provide truck access to underground storage, so bins clutter roadsides on collection day and pose amenity and safety hazards.

### The growing need for new infrastructure and innovative solutions

Recognition of the growing pressures on waste infrastructure has prompted action. State and territory governments have commissioned waste infrastructure audits and, in some cases, developed high-level strategies.

Regional councils are exploring and implementing options such as co-collection of food organics and garden organics in a weekly service to produce high value compost. Waste companies are pursuing new commercial opportunities, including the development of processing facilities to create refuse-derived fuel from mixed dry waste. Yarra Valley Water's anaerobic digestion facility is planned to recover energy from 33,000 tonnes of commercial food waste each year.<sup>430</sup> In inner Melbourne, a local government initiative has coordinated, consolidated and reduced the impacts of waste disposal and collection.

Investors have also targeted the waste sector for opportunities in the large-scale processing of mixed waste. The first significant waste-to-energy facility to secure full financing was the 400,000 tonnes per annum Phoenix Energy facility in Perth, which in October 2018 announced it had locked in required agreements and \$668 million in capital funding.<sup>431</sup> The Clean Energy Finance Corporation has estimated that waste-to-energy could provide 800 megawatts of reliable, baseload, low-carbon generation capacity by 2020 and reduce carbon emissions by more than nine million tonnes of CO<sub>2</sub> equivalent per annum.<sup>432</sup>

At the other end of the scale, the University of New South Wales in 2018 launched the world's first micro-factory to transform the components from electronic waste (e-waste) items into useful materials including metal alloys and graded ceramics and plastic filaments for 3D printing.<sup>433</sup>

The primary technologies for processing mixed waste are outlined in Table 6. These are mature technologies that can be deployed at scale. The table does not include emerging technologies or those focused on niche waste streams, or reprocessing facilities that convert recovered material into useable feedstocks.

## 88. Challenge

**Waste is often transported large distances from where it is generated due to a patchwork of government regulation.** Without action, waste will continue to be transported further from the waste generation point adding to congestion and road degradation.

When this will impact:

0-5

5-10

10-15

15+

Where this will impact:



**Table 6: Established waste processing technologies**

Facility type	Description
Clean materials recovery facility	Facilities designed to separate mixed packaging collected from co-mingled municipal and commercial sources
Dirty materials recovery facility	Facilities that mechanically process mixed waste from various sources to recover recyclables and potentially manufacture refuse-derived fuel
Mechanical-biological treatment	Facilities that mechanically separate mixed putrescible waste, then compost the organic fraction
Thermal treatment and energy recovery facility	Facilities that either combust mixed waste directly or first convert it to syngas (an intermediate product in the creation of synthetic natural gas or methanol) through gasification and recover the energy in various forms
Composting	Facilities that compost garden and food organics, clean wood waste, stabilised biosolids and highly putrescible industrial organics via appropriate options of open windrows, covered and aerated piles or enclosed vessels
Anaerobic digestion	Facilities that digest food organics, food processing waste and industrial and liquid organics in enclosed vessels to generate energy via biogas

Export constraints have also sparked renewed interest in the circular economy, where materials, products and recovery processes are co-designed to cycle materials back into productive use at as a local a level as is feasible. High-level circular economy strategies have been developed at national and state scales, while governments and brand owners have jointly established the National Packaging Targets, which include commitments to recycle 70% of Australia’s plastic packaging by 2025 (up from 12% currently) and to ensure packaging contains 30% recycled content (on average).<sup>434</sup> These strategies and targets are voluntary, but they may be effective as waste companies look for new outlets for recycled material.

Whether driven by strategy or the market, significant investment is likely to be required in new waste recovery and reprocessing infrastructure to meet the long-term needs of Australians. Such investment could also stimulate local economic activity through the creation of jobs, new products and tax revenue, while retaining valuable resources within the local economy and reducing reliance on virgin materials. Greater commercial focus on the development of waste markets could encourage greater innovation in the sector, complementing existing priorities of pollution control.

### Reducing the impact of waste collection in the dense inner city

In 2013-14 Melbourne City Council commenced the trial operation of garbage compactors and recycling hub units for the collective use of businesses at two central city laneway locations. The chosen locations had been problem sites for the council due to local amenity impacts from existing bins crowding footpaths or overflowing with waste, leading to garbage being dumped informally. This was at odds with the aspiration to promote Melbourne’s laneways as desirable urban precincts.

As at 2018, Melbourne CBD’s centralised garbage compactors and recycling hubs have benefited local communities. Five laneway locations now

offer these facilities.<sup>435</sup> For commercial users who would otherwise have to contract their own waste removal, the annual cost of using the hub ranges from \$920 to \$7,380 depending on volume.<sup>436</sup>

In addition to local amenity benefits, the centralisation of waste processing has been recognised as reducing pressure on the local road network in central Melbourne. In 2016, 36 different contractors were registered with council to operate in the CBD, meaning that servicing a single centralised compactor six times a week (at an annual cost of approximately \$150,000) could remove the need for up to 100 weekly vehicle movements.<sup>437</sup>



## 89. Opportunity

There is a lack of a mature market for private investment in recycling and waste disposal. There is a chance to capitalise on increased demand for recycled products and larger economies of scale as waste generation increases. Developing a domestic market could improve recycling rates and the sustainability of Australia's waste disposal.

When this will impact:



Where this will impact:



### Major waste infrastructure is being developed outside our cities

Approximately half of Sydney's putrescible waste is now railed 250 km to the Woodlawn landfill outside Goulburn, while much construction and demolition waste is transported 900 km north to Queensland for cheaper disposal. Perth and Adelaide both use major landfills in regional sites around 100 km outside each city, while waste from south-east Melbourne is now hauled across that city to landfills on its north and western fringes, despite increasing urban density and congestion.

The high price of urban land and acute community sensitivity to waste facilities mean new waste infrastructure developments are often on the urban fringe or in regional locations. Landfill and large-scale processing facilities for mixed waste are more likely to be developed in regional areas. While this is subject to some community sensitivity, it can also create economic opportunities.

This trend will reconfigure the freight task. It will require transfer stations to aggregate waste for efficient bulk transport, either by road or rail.

### Outside of cities, services are often inconsistent and not cost effective

The majority of Australians have access to kerbside waste collection and recycling services. However, 123 Australian local councils have no collection or recycling service at all.<sup>438</sup> These areas are overwhelmingly in remote and regional parts of Australia. Regional and remote communities have limited access to recycling schemes and face logistical challenges like poor transport access, seasonal isolation and economies of scale. Large transport distances between regional and remote communities and end-markets also make the recovery of some waste types cost-prohibitive.

Many regional markets for recycled materials do not offer sufficient scale for infrastructure investment. However, coordinating waste collection and transport from several local councils could build enough volume to create the market conditions for recycling investment.

### Transporting Sydney waste for alternative treatment

In 2018 Veolia commissioned the first alternative waste treatment facility for Sydney waste located in a regional area. The mechanical biological treatment plant at its Woodlawn waste precinct near Goulburn, New South Wales has a processing capacity of 144,000 tonnes per annum.<sup>439</sup> Veolia runs two trains daily which carry 1,200 tonnes of putrescible household and commercial waste, destined either for the landfill or for the mechanical biological treatment plant. When the waste arrives, recyclables are mechanically separated and the remaining organic fraction is composted.

Another project in advanced planning is the delivery of waste-derived fuel from Sydney to the Mount Piper Power Station outside Lithgow, in the Blue Mountains. The waste-derived fuel, created from up to 200,000 tonnes per annum of waste, would be trucked to the power station, where it would power a specifically-designed boiler to boost the output of the existing coal-fired power station.<sup>440</sup>



## 90. Challenge

Waste is often transported large distances from where it is generated due to a patchwork of government regulation. Without action, waste will continue to be transported further from the waste generation point adding to congestion and road degradation.

When this will impact:



Where this will impact:



### Alternative fleets to reduce consumer costs and reduce noise

The repetitive stop-start of rubbish collection activities means that rubbish trucks are less fuel-efficient, more costly to run and more emissions and pollution-intensive than other heavy vehicles. There is significant interest in alternative fuel vehicles within the sector, including electric and compressed natural gas (CNG) options. Both are quieter than diesel versions; a key issue for residential areas when collection starts early in the morning.

CNG-heavy vehicles have been on the market for a decade and are becoming more widely available, including from mainstream truck brands. One of the specific synergies available from the use of such vehicles is the possibility of producing CNG from the methane that is generated when rubbish buried in landfill breaks down. Having ready access to this methane supply can offset the cost of cleaning and compressing it into useable CNG, with trucks simply refuelling after tipping a load at the landfill.

In the last few years, competing electric heavy vehicles have also emerged, ranging from small 3.5-tonne models through to a 15-tonne payload. The vehicles are well suited to stop-start collection, with instant torque and regenerative braking that improve energy efficiency and promise a range of up to 200 km. However, the extra weight of batteries needs to be traded off against the potential payload.

Heavy electric vehicles face other barriers to adoption. Problematically, Australian charging infrastructure is inappropriate for heavy vehicles that cannot charge in residential and service station settings. There are also issues with heavy electric vehicles' operation in flatter, less fuel-intensive geography. Melbourne's Moreland Council is taking a different route, converting its waste collection fleet to run on hydrogen.<sup>441</sup>

Looking beyond fuel, waste collection may be well suited to autonomous vehicles, which can drive themselves from one wheelie-bin to the next along a pre-programmed route. In 2017, Volvo unveiled a demonstration model fitted with a sensor system designed to identify, navigate and monitor the vehicle's operating environment.<sup>442</sup>



## 91. Opportunity

Transporting waste can have high impacts on urban amenity. Using new technology could make waste transport more efficient and environmentally-friendly.

When this will impact:



Where this will impact:



# 5.15 Challenges and opportunities

**Changing urban travel patterns**

### 38. Challenge

Urban travel patterns are becoming increasingly complex, driven by economic, social, demographic and technological changes. There is a risk of growing divergence between the way our networks are planned and designed, and the needs of customers. Failure to cater for changing patterns of travel could contribute to growing congestion in our fast-growing cities.

**When this will impact:** 0-5 5-10 10-15 15+      **Where this will impact:**     

### 39. Challenge

Rapidly changing land use and development can place pressure on urban transport networks. Densification in our largest cities places pressure on legacy networks, while greenfield development requires new infrastructure and services. Failure to coordinate land use and transport planning can contribute to congestion and crowding in some areas, or a lack of adequate services in others.

**When this will impact:** 0-5 5-10 10-15 15+      **Where this will impact:**     

### 40. Challenge

Our radial public transport networks are inflexible and have varied levels of service and relatively low mode shares. Unless our public transport networks are designed to cater for a broader range of trips, they will not meet the changing needs of a growing number of customers.

**When this will impact:** 0-5 5-10 10-15 15+      **Where this will impact:**     

### 41. Opportunity

New technology and data sets are increasingly available in the transport sector, that can be used for planning and service delivery. Better information allows governments and operators to better understand and cater for customers' transport needs and expectations.

**When this will impact:** 0-5 5-10 10-15 15+      **Where this will impact:**     

### 42. Challenge

Australia has relatively low rates of active transport, driven by a range of issues including low densities and long distances, insufficient infrastructure and safety concerns. Without action, our transport networks and travel patterns will remain poorly integrated and sustainability improvements will be limited.

**When this will impact:** 0-5 5-10 10-15 15+      **Where this will impact:**     

## Technology and the future of passenger cars

### 43. Challenge

The accessibility and affordability of ride and carsharing could decrease demand for public transport. In these circumstances, demand shifts from space efficient public transport back to cars, potentially increasing congestion.

When this will impact:



Where this will impact:



### 44. Opportunity

Connected vehicles can reduce accidents, improve traffic flow and reduce costs for drivers. Leveraging this new technology could improve access, quality and cost outcomes for users.

When this will impact:



Where this will impact:



### 45. Challenge

Many regional, remote and rural communities do not have the economies of scale to justify private investment in charging infrastructure. Without charging infrastructure, users in these areas will have fewer opportunities for electric vehicle uptake.

When this will impact:



Where this will impact:



### 46. Challenge

There is a lack of appropriate regulation, trials and physical infrastructure to enable the use of many cooperative and autonomous vehicle features. Without action, the benefits offered by cooperative and autonomous vehicles will be missed.

When this will impact:



Where this will impact:



## International, inter-state and inter-regional connectivity

### 47. Challenge

There is congestion on roads around our major airports, particularly in Sydney and Melbourne. Unless addressed, travelling to airports will become increasingly unreliable, leading to longer travel times.

When this will impact:



Where this will impact:



### 48. Challenge

Some of our major airports are subject to operational restrictions reducing airport efficiency however adding to local amenity. Without regular reviews to ensure regulation is fit for purpose, the efficiency of our airports could be unnecessarily compromised.

When this will impact:



Where this will impact:



### 49. Challenge

**Governance and funding of our regional road networks is inconsistent and lack transparency. This means funding and maintenance is subject to budget volatility of different levels of government.** Without change to road network governance, our regional roads will continue to be poorly funded, maintained and safety may decline.

**When this will impact:** 0-5 5-10 10-15 15+

**Where this will impact:** 

### 50. Challenge

**Regional aviation often struggles to be financially viable and customers view it as costly.** Without action, regional and remote communities will lack access to air services and affordable airfares.

**When this will impact:** 0-5 5-10 10-15 15+

**Where this will impact:** 

### 51. Challenge

**Our regional railways generally have uncompetitive travel times with cars and planes. This means they carry a relatively small share of passengers.** Unless travel times are improved, regional rail will continue to play a small role, meaning regional customers have less choice when they choose to travel.

**When this will impact:** 0-5 5-10 10-15 15+

**Where this will impact:** 

### 52. Challenge

**The popularity of cruise ships in Australia is growing, producing important tourism opportunities for fast-growing cities and regional centres. However, there are a lack of berths for international cruise ships, particularly in Sydney.** Without additional berthing capacity, Australia will lose cruise ships and tourist visitation will decline.

**When this will impact:** 0-5 5-10 10-15 15+

**Where this will impact:** 

## Funding and maintaining our transport assets

### 53. Challenge

**Asset maintenance lacks transparency, consistency and accountability. This is particularly the case for sectors that rely on government funding rather than user charges, such as roads and public transport.** Unless addressed, maintenance of our transport networks will become increasingly unsustainable.

**When this will impact:** 0-5 5-10 10-15 15+

**Where this will impact:** 

### 54. Challenge

**There is no clear link between expenditure on roads and usage, which means road expenditure is inequitable, inefficient, unsustainable and lacks transparency.** Without reform, revenue from fuel excise will decline, drivers will not be charged fairly and people will be incentivised to drive, contributing to congestion.

**When this will impact:** 0-5 5-10 10-15 15+

**Where this will impact:** 

## 55. Challenge

Public transport investments and operating subsidies are substantial, but decisions lack transparency. Unless addressed, public transport will continue to be subject to political cycles and budget conditions.

When this will impact:



Where this will impact:



## 56. Challenge

Regional and remote local governments struggle to fund and maintain roads and airports. Local governments often have relatively small revenue bases but are responsible for the maintenance of expensive transport networks. Without addressing funding shortfalls and maintenances practices, regional and remote infrastructure will become increasingly unsustainable.

When this will impact:



Where this will impact:



## 57. Opportunity

There are numerous emerging revenue sources for the transport sector, with many related to technological development and changing patterns of demand for transport. There is an opportunity for emerging revenue streams to improve the financial sustainability of our transport networks.

When this will impact:



Where this will impact:



### Passenger transport sustainability and resilience

## 58. Challenge

Transport sector emissions are increasing. Passenger cars account for the vast majority of emissions, but heavy vehicles and aviation are projected to drive growth in emissions in the next 10 years. Without action, the emissions intensity of passenger transport may cause negative environmental impacts and Australia will fail to meet its emissions reduction targets.

When this will impact:



Where this will impact:



## 59. Challenge

Australian governments often do not incorporate sustainability or resilience into their final infrastructure projects. Without regular action, active and public transport modes will be underutilised and our infrastructure will be less resilient and sustainable.

When this will impact:



Where this will impact:



## 60. Opportunity

If partnered with low carbon intensity fuels hybrid electric, plug-in electric, hydrogen fuel cell and automated vehicles are less emissions intensive than internal combustion engine vehicles. These technologies can be leveraged to transition to a low-carbon transport sector. Reducing transport sector emissions would help Australia meet its international obligations while also improving local air quality.

When this will impact:



Where this will impact:



## 61. Challenge

Climate change is likely to cause increasingly frequent and severe weather events that damage transport assets. Without resilient infrastructure, network functionality could be limited and the costs of upgrades could be more substantial.

**When this will impact:** 0-5 5-10 10-15 15+

**Where this will impact:**     

### Safety in the transport sector

## 62. Challenge

Road safety performance is not on track to meet the objectives of the National Road Safety Strategy. Without action road users will continue to be vulnerable and at risk of serious injury or fatality.

**When this will impact:** 0-5 5-10 10-15 15+

**Where this will impact:**     

## 63. Challenge

Project selection and funding is based on incomplete safety data. Without action, this will inhibit effective cost allocation and understanding of trade-offs with other transport outcomes, such as productivity.

**When this will impact:** 0-5 5-10 10-15 15+

**Where this will impact:**     

## 64. Opportunity

Regional, rural and remote road networks are less safe. There is an opportunity to focus investments and policies on these areas. Identifying, assessing and prioritising sites for upgrades and road treatments on high risk corridors could optimise investment and reduce fatalities.

**When this will impact:** 0-5 5-10 10-15 15+

**Where this will impact:**     

## 65. Challenge

Australians are holding on to their vehicles for longer. Older vehicles often do not meet modern safety standards and are more likely to injure or kill if involved in a crash.

**When this will impact:** 0-5 5-10 10-15 15+

**Where this will impact:**     

## 66. Challenge

Pedestrian and cyclist fatalities are over represented in fatalities and injuries. Without action, active transport users will continue to be injured and killed, and the attractiveness of active transport will remain low.

**When this will impact:** 0-5 5-10 10-15 15+

**Where this will impact:**     

## 67. Challenge

Technological change is driving the collection of valuable data by transport operators and network owners. This information is valuable and can be vulnerable to cyberattacks.

When this will impact:



Where this will impact:



### Transport accessibility and equity

## 68. Challenge

Public transport service levels and access is lower in the outer suburbs and regional centres. This results in lower public transport mode share, and a reliance on cars in these areas. Without action, people who live in these areas will continue to be reliant on their cars.

When this will impact:



Where this will impact:



## 69. Challenge

People on the outskirts of our cities and in regional and remote Australia pay proportionally more for transport. Unless addressed, our transport networks will continue to be inequitable, with people in the outer suburbs and regional and remote Australia paying proportionally more.

When this will impact:



Where this will impact:



## 70. Challenge

There is insufficient funding to make our public transport networks accessible to people with disability. Unless funding shortfalls are addressed, legislated accessibility targets for public transport will not be reached and our networks will not be inclusive.

When this will impact:



Where this will impact:



## 71. Challenge

Emerging point-to-point operators are not subject to the same subsidy schemes and accessibility legislation as taxis, meaning they are not accessible to many people with disability. Without action, people with disability will not share in the benefits of emerging transport modes.

When this will impact:



Where this will impact:



### Freight gateways supporting international trade

## 72. Opportunity

Growth in Asia and an increasingly globalised economy means the volume and value of Australia's trade is increasing. Enhancing, adapting and realigning freight networks will allow Australian producers to capitalise on opportunities presented by growing global markets, and Australian consumers to access imported goods as cheaply as possible.

When this will impact:



Where this will impact:



### 73. Challenge

Charges for truck and train operators accessing our major ports have increased and could be passed on to customers. It is challenging for governments to know if and when a regulatory response is required. Stevedores may have the ability to continue increasing charges, which may lead to growing costs for Australian exporters and consumers.

When this will impact:



Where this will impact:



### 74. Challenge

Our major container ports are becoming more productive, but continue to lag behind our trading partners for key indicators. Our ports will need to continue to improve to ensure Australia is globally competitive. Without improvement, our ports will continue to be uncompetitive, potentially increasing the time taken to import and export goods and add to costs for Australian exporters and consumers.

When this will impact:



Where this will impact:



### 75. Challenge

The need to balance passenger and freight services, operating restrictions and constraints on airport land and surrounding roads reduces the efficiency of our airports. The efficiency of our airports could decline further as demand grows, potentially leading to delays and higher costs for high value, time sensitive air freight and passengers.

When this will impact:



Where this will impact:



## The urban freight challenge

### 76. Challenge

Conflict between land uses, particularly in the inner areas of our fast-growing cities, decreases the efficiency of our urban supply chains, particularly warehousing. Conflicting demand for land is inevitable, and governments face a challenge in balancing the needs of different parties. Failure to address land use conflict will result in more operating restrictions on key facilities, inefficient layout of facilities, and additional freight trips on out transport networks.

When this will impact:



Where this will impact:



### 77. Challenge

Freight transport in our fast-growing cities is impacted by congestion leading to increased costs. If this is not addressed, delays in our urban supply chains will become more common and costs will increase as our cities grow.

When this will impact:



Where this will impact:



## 78. Challenge

An increase in deliveries by light commercial vehicles is contributing to road and kerbside congestion, particularly in inner urban areas. This is driven by growth in online shopping and changing consumer expectations about timely and door-to-door deliveries. Without action, light commercial vehicles will make a growing contribution to congestion in major employment centres.

**When this will impact:**



**Where this will impact:**



### Ensuring the national freight network is effective and efficient

## 79. Challenge

Inconsistent regulations, standards and technologies across our road and rail networks increase costs for transport operators and agricultural producers, which are ultimately passed on to customers. Without action, costs and time spent complying with regulation will remain unnecessarily high, reducing the productivity of our supply chains.

**When this will impact:**



**Where this will impact:**



## 80. Challenge

High productivity vehicle use is limited by community sentiment as well as physical and regulatory impediments to access to our road network. Restricted use of high productivity vehicles will lock in high freight costs for businesses and consumers, and limit benefits to road safety, air pollution and amenity.

**When this will impact:**



**Where this will impact:**



## 81. Challenge

The pace and impact of technological change on our supply chains is uncertain. Governments face dual challenges of enabling private sector innovation while also regulating to ensure change does not harm the community. If governments do not intervene appropriately, innovation could be stifled or, alternatively, technological development could pose safety and environmental threats.

**When this will impact:**



**Where this will impact:**



## 82. Opportunity

New technologies can help improve road safety and efficiency, but they have upfront costs that mean uptake rates remain low. Increased use of technology could improve road safety.

**When this will impact:**



**Where this will impact:**



## Unlocking regional economic development through freight

### 83. Challenge

Remote and regional supply chains are critical for industry and to supply communities with basic needs. However, local governments often struggle to fund and maintain critical transport infrastructure. If this is not addressed, our agricultural supply chains and regional and remote communities will be vulnerable to delays, higher costs and extreme weather events.

**When this will impact:**



**Where this will impact:**



### 84. Challenge

The complexity of the freight sector means leveraging infrastructure investments to maximise regional development can be challenging. Without improved coordination between jurisdictions, infrastructure managers and freight operators, regional development opportunities will be missed.

**When this will impact:**



**Where this will impact:**



### 85. Challenge

Highly variable and seasonal traffic can make investment and maintenance of regional grain railways difficult to justify. This results in bottlenecks, speed restrictions, lower capacities and sometimes line closures. If this is not addressed, producers and transport operators will continue to incur higher costs and delays, particularly in high harvest years.

**When this will impact:**



**Where this will impact:**



## Transporting, storing and making the most of our waste

### 86. Challenge

Australia has increasing waste generation, a lack of a mature market for private investment and a reliance on waste export. Without action, our disposal, recycling and transportation of waste will become more costly and environmentally damaging.

**When this will impact:**



**Where this will impact:**



### 87. Challenge

A limited number of new waste facilities and landfill sites have been approved and residential development is encroaching on existing sites. Without action, waste freight will have to transport their loads further from the waste generation point.

**When this will impact:**



**Where this will impact:**



### 88. Challenge

Waste is often transported large distances from where it is generated due to a patchwork of government regulation. Without action, waste will continue to be transported further from the waste generation point adding to congestion and road degradation.

When this will impact:



Where this will impact:



### 89. Opportunity

There is a lack of a mature market for private investment in recycling and waste disposal. There is a chance to capitalise on increased demand for recycled products and larger economies of scale as waste generation increases. Developing a domestic market could improve recycling rates and the sustainability of Australia’s waste disposal.

When this will impact:



Where this will impact:



### 90. Challenge

A lack of scale and access in remote communities means waste freight is inconsistent and not cost effective for consumers or taxpayers. As our waste generation increases waste services in these areas could become more expensive.

When this will impact:



Where this will impact:



### 91. Opportunity

Transporting waste can have high impacts on urban amenity. Using new technology could make waste transport more efficient and environmentally-friendly.

When this will impact:



Where this will impact:



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