



South Australia's

Freight and Supply Chain Strategy

June 2024



Government of South Australia
Department for Infrastructure
and Transport

Build. Move. Connect.

We acknowledge the Traditional Custodians of the Country throughout South Australia and recognise their continuing connection to land and waters.

We pay our respects to the diversity of cultures, significance of contributions and to Elders past, present and emerging.



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This Strategy forms part of our overarching

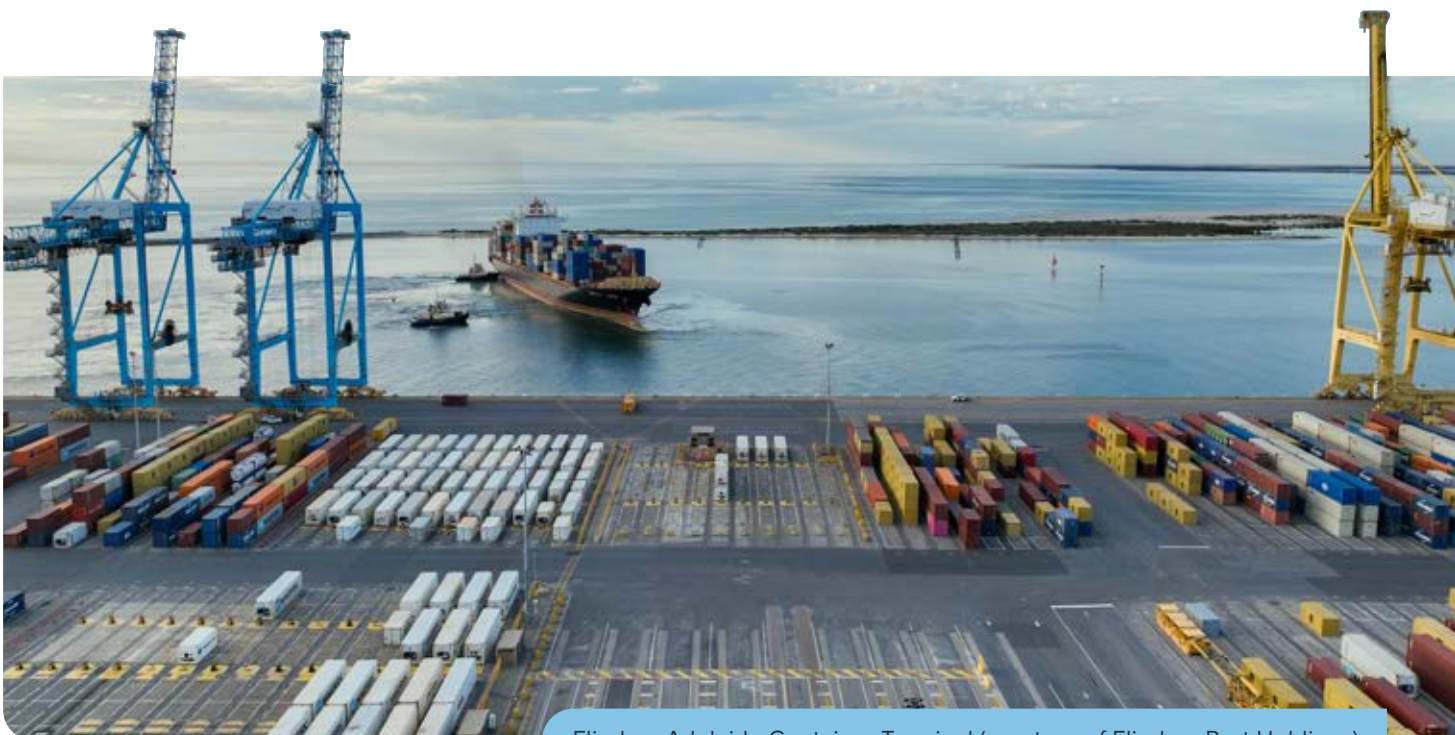


- Road Safety Strategy
- Active Transport and Personal Mobility Strategy
- **Freight and Supply Chain Strategy**
- Public Transport Strategy (under development)
- Future Transport Technology Strategy (to be developed)

Glossary

Term	Definition
AgInsight SA	Department of Primary Industries and Regions' interactive agricultural, economic and infrastructure information tool.
ARTC	Australian Rail Track Corporation.
AUKUS	Trilateral security partnership between Australia, the United Kingdom and the United States.
BITRE	Bureau of Infrastructure and Transport Research Economics.
Blockchain	Distributed ledger technology that facilitates data to be shared within networks, requiring data validation by consensus, thereby improving transparency and data integrity.
DFAT	Department of Foreign Affairs and Trade.
DITRDCA	Department of Infrastructure, Transport, Regional Development, Communications and the Arts.
First mile	Refers to the start or the collection portion of the supply chain.
GAV	General Access Vehicle – A vehicle that has general access to the road network and does not require a notice or permit if complying with maximum dimension limits. Refer: www.nhvr.gov.au/road-access/mass-dimension-and-loading/general-access-vehicle
HPV	Higher Productivity Vehicle – A Restricted Access Vehicle (RAV) that exceeds prescriptive dimensions or mass and has been assessed and certified under the Performance Based Standards (PBS) scheme. HPVs may also have additional safety features (not mandated by PBS) and be fitted with telematics. HPVs are regulated by the NHVR's PBS scheme.
KPI	Key Performance Indicator.
Last mile	Refers to the delivery portion at the end of the supply chain.
Linehaul	The efficient transport of goods between two specified nodes (cities, ports, warehouses, distribution facilities). Linehaul services are scheduled transport operations for journeys which require defined departure and arrival times.
LocationSA Map Viewer	Government of South Australia's location-based insights map tool, which includes land, property and infrastructure data.
Long-haul	The transport of goods over long distances, often interstate.
NHVR	National Heavy Vehicle Regulator.
ONRSR	The Office of the National Rail Safety Regulator.
OSOM	Oversize Overmass – A vehicle or vehicle combination that exceeds mass or dimension limits set out in a gazette notice. Typical examples include agricultural machines such as harvesters and grain augers.

Term	Definition
PBS	Performance Based Standards – PBS vehicles fall into different levels (PBS Levels 1A, 2A, 2B, 3A, 3B, 4A or 4B) and have corresponding levels of road networks they can access. Refer: www.nhvr.gov.au/road-access/performance-based-standards/the-standards
RAV	Restricted Access Vehicle – A vehicle that exceeds one or more of the GAV mass or dimension limits and may operate on the road network under a relevant authorisation including an access notice or permit. RAVs include OSOM vehicles, SPVs, PBS certified vehicles and prescriptive non-PBS certified vehicles such as standard B-Doubles or AB Triple Road Trains.
Short-haul	The transportation of goods over short distances within local or regional areas.
SPV	Special Purpose Vehicles – A vehicle or vehicle combination that does not comply with mass, dimension or operating requirements set out in a gazette notice. Typical examples include articulated steering cranes or concrete pumps.
Telematics	The technology used to monitor a vehicle and other assets by gathering vehicle location, driver behaviour, engine diagnostics and usage. Telematics combines GPS systems, onboard vehicle diagnostics, wireless telematics devices and black box technologies to record and transmit vehicle data, such as speed, location, maintenance requirements and servicing, and cross-reference this data with the vehicle's internal behaviour. This information can be used in real-time analysis to improve overall driver safety, and reduce costs and improve performance for commercial vehicles. Refer: www.heavy.ai/news/real-time-analysis-of-massive-vehicle-telematics-datasets-at-gartner
VET	Vocational Education and Training.



Flinders Adelaide Container Terminal (courtesy of Flinders Port Holdings)

Foreword

South Australia's Freight and Supply Chain Strategy is central to the continued economic prosperity of the State.

The Strategy has been developed in strong collaboration with an 18-person committee that represented all facets of the sector – Road, Rail, Sea, Air, Regulators, peak industry bodies and Unions. The Strategy has been co-designed with industry and key stakeholders so that it reflects and addresses the issues and opportunities experienced on the ground.

The Government's vision for the Strategy also encompasses a focus not only on productivity, but on safety outcomes and envisages working closely with industry to harness innovation and technological advancement within the logistics sector. This will ensure South Australia remains freight competitive in a rapidly evolving global economy with an ever-increasing focus on reducing carbon emissions.

The Strategy outlines our vision for the freight and supply chain sector and expands on the specific outcomes, responses, and strategic actions that are critical to meeting South Australia's growing and evolving freight task.

The South Australian Government is committed to growing the economy through a strong and effective freight and supply chain system that helps businesses succeed, boosts employment opportunities across our state and supports our economy over the coming decades.

We look forward to continuing collaboration with industry and all tiers of government on our shared vision of delivering a world-class freight and supply chain network that drives prosperity and opportunity for South Australia.



Hon Tom Koutsantonis MP
Minister for Infrastructure
and Transport



South Australia's Freight and Supply Chain Strategy

South Australia's Freight and Supply Chain Strategy outlines our vision for the commercial freight and supply chain sector and the strategic outcomes that are key to the future success of the sector in supporting the South Australian economy. It provides a suite of strategic responses and strategic actions that will guide policy, planning and investment over the coming decades.

The Strategy has been developed in partnership with representatives from the freight and supply chain sector, including peak bodies, unions, state and local government.

Vision

A commercial freight and supply chain network that is safe, productive, sustainable and valued by the community, delivering prosperity to South Australia.

Strategic outcomes

The following four outcomes are of critical importance for the freight and supply chain sector as it facilitates economic growth now and into the future.



Safe

Stakeholders recognise and manage safety risks, engaging collaboratively to adopt systems that facilitate safe operations for all.



Productive

An optimised supply chain that best utilises the network, technology and infrastructure to efficiently deliver the freight task.



Sustainable

A sustainable supply chain that supports future growth and adaptability through financial viability, social license, resilience to shocks and decarbonisation.



Stakeholder-centric

Stakeholders are engaged appropriately and recognise the value produced by the freight and supply chain sector.

Strategic responses

Eight strategic responses will guide the delivery of the Strategy's vision and strategic outcomes.



1. Safe and connected network

Develop and maintain a safe and fit-for-purpose freight and supply chain network that provides efficient connectivity to serve an evolving freight task, considering all modes and sectors.



2. Long-term planning

Facilitate transparent and long-term planning across infrastructure and land-use, identifying and protecting freight network and supply chain assets, to support informed decision making and user safety.



3. Net zero pathway

Facilitate and enable a holistic and integrated approach to decarbonisation, supporting a path towards net zero.



4. Resilience and redundancy

Embed resilience and appropriate redundancy across the network to protect freight and supply chains from shocks including climate events, pandemics and cyber risks.



5. Technology integration

Support the safe and efficient integration of emerging technologies in South Australia's supply chains.



6. Skilled workforce

Support the timely addressing of skill gaps and shortages to meet current and future needs, with a focus on diversity, training, and career pathways in the sector.



7. Data sharing

Support data sharing between industry and government, including through effective standardisation and regulation, to enable better business and policy outcomes.








8. Regulation and policy harmony



Facilitate a harmonised regulatory and policy environment that is streamlined, customer driven, and facilitates optimal freight movements and safer outcomes.



Strategic actions

The following strategic actions will drive future initiatives and investment to be outlined in an implementation plan.

Strategic responses	Strategic actions
<p>1. Safe and connected network</p> 	<p>1.1 Minimise the potential for conflict between different freight transport modes and road users across South Australia’s transport network so far as reasonably practicable, given the need to balance safety, place outcomes and freight efficiency.</p> <p>1.2 Respond to constraints and the changing freight task to improve connectivity between modes, regions and jurisdictions and enhance South Australia’s capacity for economic growth and onshore capabilities that support access to markets.</p> <p>1.3 Improve infrastructure and access to increase supply chain productivity while appropriately optimising safety and anticipating industry needs.</p> <p>1.4 Expand the higher productivity vehicle network, where safe and viable.</p>
<p>2. Long-term planning</p> 	<p>2.1 Look for opportunities to support global energy transition for South Australia.</p> <p>2.2 Engage early with the community, stakeholders and industry throughout the planning and development process to ensure impacts on supply chain networks and nodes are considered.</p> <p>2.3 Preserve and improve supply chain networks and nodes through integrated transport and land-use planning, working closely with other relevant planning bodies.</p>
<p>3. Net zero pathway</p> 	<p>3.1 Establish a baseline of current decarbonisation performance and build industry and government understanding of the benefits and challenges of decarbonisation pathways in freight and supply chains globally and locally, including clarity of current sector emissions to support strategic planning.</p> <p>3.2 Provide direction and strategic support, including through regulatory frameworks, to promote sector-wide decarbonisation that aligns with net zero commitments, coordinating with industry to identify needs and challenges and ensure commercial viability.</p>
<p>4. Resilience and redundancy</p> 	<p>4.1 Plan for supply chain infrastructure to minimise the risk of disruption from shocks and vulnerabilities across supply chain networks, with consideration to labour, infrastructure and digital assets, and alignment to national plans and strategies.</p> <p>4.2 Support continuity in response to disruptions across supply chain networks, including the supply of critical inputs.</p> <p>4.3 Manage network shocks to effectively coordinate activity across industry, agencies and other stakeholders.</p>
<p>5. Technology integration</p> 	<p>5.1 Work with industry to understand current and emerging technology and innovation developments, including potential barriers and appropriateness to South Australia’s sector.</p> <p>5.2 Support the increased use of appropriate technological enhancements where suitable, to improve efficiency and safety, and future-proof the supply chain and infrastructure network.</p>

Strategic responses	Strategic actions
6. Skilled workforce 	<p>6.1 Understand the evolving scale, nature and distribution of workforce shortages and skill gaps across supply chain networks, considering the differing needs of specific regions and industries.</p> <p>6.2 Support the review and development of formal and informal training pathways in collaboration with other key skilling entities, while also supporting upskilling programs.</p> <p>6.3 Improve understanding of, and access to, career pathways in the freight and supply chain sector within the community, and the education sector.</p>
7. Data sharing 	<p>7.1 Engage with the National Freight Data Hub and other sources to understand opportunities for South Australia to engage with and use available disaggregated and de-identified data.</p> <p>7.2 Improve the insights from available data and tools such as the NHVR Portal and the Resource Sector Heatmap to support supply chain networks planning and development.</p> <p>7.3 Improve the integrity (e.g. through regulation and data certification) of data sharing systems and build transparency about how shared data can be used.</p>
8. Regulation and policy harmony 	<p>8.1 Support a fit-for-purpose regulatory system, as well as a modernised heavy vehicle national law, in collaboration with other jurisdictions, industry, state and local government road managers and the National Heavy Vehicle Regulator.</p> <p>8.2 Plan for seamless cross-border freight and supply chain operations in coordination with other jurisdictions, regulators and industry to enhance interstate freight movements.</p>



Road trains passing through the Barossa Valley, South Australia



South Australia's freight task and network

South Australia has a thriving freight and supply chain sector that comprises a network operating across diverse industries. This section provides a snapshot of the freight and supply chain sector and its broader contribution to South Australia's economy and our daily lives.

It is comprised of four parts:

1. Freight and supply chains and the economy.
2. Commodity supply chains.
3. Overview of South Australia's freight modes.
4. South Australia's freight network.

Freight and supply chains and the economy

Freight and supply chains are the foundation of South Australia's successful economy. From the cars we drive, to a meal shared with friends, supply chains are essential to our everyday lives. They are the journeys that raw materials take to be transformed into products that are then distributed to consumers.

Freight and supply chains play an integral role in enabling outputs from almost all industries. The general value of these outputs is measured in Gross State Product (GSP) reporting, which captures the value of all goods and services produced within the state.

South Australia's GSP in 2022-2023 was \$142 billion¹, with average annual GSP growth of 6.1% over the five years to 2022-23.

Improving freight and supply chains will enable greater productivity, and therefore contribute to greater economic growth.

South Australia will require a continued improvement in freight and supply chains to capitalise on and facilitate growth opportunities. For example, a resources sector digital heatmap currently in development will help to inform the creation of future infrastructure corridors for the resources sector.

South Australia's central geographic location means that it is often a critical part of national supply chains. Continued collaboration across borders will support growth in state and national economies, as well as attracting opportunities for additional industry activity within and through the state.

Freight demand will continue to grow as population and industry grows. Australia's population is projected to grow at an average of 2.2% per year², whilst Greater Adelaide's population could grow by up to 670,000 people over the next 30 years³. That would be a 46% increase on the population recorded in the 2021 Census.

As shown in Figure 1 and Table 1, South Australia's export market value of goods and services has grown to \$21.3 billion⁴ in 2022-2023, driven by strong demand from Asia for Australian commodities. The major export destinations driving this economic performance are China, the United States, Malaysia and the Philippines, with agriculture and metal commodities the major contributors to export value.

The primary import sources are from China, Singapore, Malaysia and Japan with refined petroleum and passenger motor vehicles the major commodities by import value⁵.

The domestic market demand for consumer goods also continues to increase, paired with consumers expectations for choice of when, where and how goods are delivered, as a result of the trend towards online shopping.

Nationally across all modes of transport, the freight task is projected to grow by approximately 26% between 2020 and 2050⁶.

Freight and supply chains will support the growth of industries in South Australia, i.e. establishment of a global defence manufacturing industry, renewable energy and hydrogen to support the transition to net zero greenhouse gas emissions, agriculture, forestry and fishing, mining, manufacturing and construction, amongst others.

South Australia's freight and supply chain infrastructure also supports critical economic activity in other states and territories.

Figure 1: South Australia's Trade, 2022-23 (Source: DFAT, South Australia Trade and Economic Fact Sheet)



Table 1: South Australia's Trade, 2022-23 (Source: DFAT, South Australia Trade and Economic Fact Sheet)

South Australia's trade, 2022-23			
A\$m			
	Goods	Services	Total
Exports:	17,804	3,518	21,322
Imports:	15,755	3,598	19,353
Balance:	2,049	-80	1,969
% share of Australian trade			
Exports:	3.0	3.8	3.1
Imports:	3.6	3.4	3.5

Commodity supply chains

South Australia has a diverse and critical network of supply chains that support a variety of key industries.

Figure 2 depicts generalised supply chain elements for key commodities. These are simplified and illustrative only, representing a sample of many potential journeys.

Figure 2: South Australian key commodity supply chains



Overview of South Australia's freight modes

South Australia's freight task is managed through intrastate, interstate and international supply chains, with most of the freight travelling via road, followed by sea, rail and air.

Each freight mode performs a critical function in moving goods within and through the state. The efficiency of each freight mode, and strategic connections between modes, will need to evolve into the future to meet changing freight demands. Each of South Australia's freight modes are briefly outlined below.



Road freight

Road is the predominant mode of transport for freight in South Australia, accounting for approximately 77% of freight movements in the state by volume⁷ as shown in Figure 3. This predominance means road movements are important to most sectors of the economy⁸. South Australia's road freight network extends across the state and provides critical long-haul, short-haul and first and last mile linkages for producers and consumers nationally. Adelaide's urban road network is critical to the transportation of freight throughout the Greater Adelaide Region and to key intermodals such as Flinders Adelaide Container Terminal at Outer Harbor, the Adelaide Freight Terminal at Regency Park and Adelaide Airport.



Sea freight

Sea freight accounts for the vast majority of the State's inbound and outbound international freight by volume, and approximately 17% of total freight movements by volume⁹ as shown in Figure 3. The Port of Adelaide is South Australia's largest port. In addition to the Flinders Adelaide Container Terminal and Viterra's bulk grain facility at Outer Harbor, the inner harbour supports a wide range of bulk and other import and export movements. Other ports in Spencer Gulf and on the Eyre Peninsula support regional grain, minerals and bulk liquids and general freight movements.



Rail freight

South Australia's rail network is critically important for the local and national freight task, linking the east coast, Western Australia and the Northern Territory. Rail is particularly competitive for long distance, bulk or high-volume freight movements. In addition to supporting interstate general freight movements, rail supports grain and bulk minerals exports, particularly iron ore and gypsum. Rail carries approximately 5% of the total South Australian freight task by volume as shown in Figure 3.



Air freight

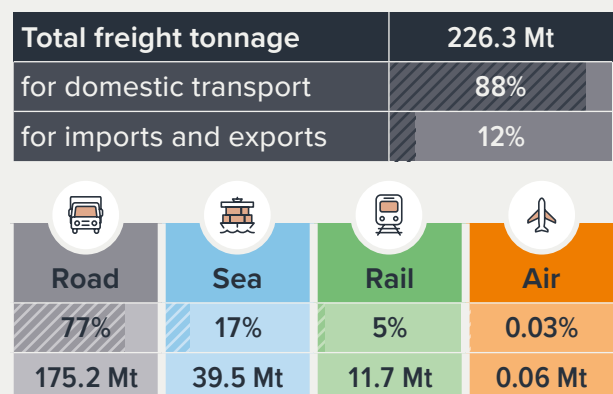
Air freight transports only 0.03% of the state's total freight task by volume¹⁰ as shown in Figure 3. However, it plays a critical role in the export of time-sensitive, perishable and high value goods, while also supporting freight connections to regional and remote locations of the state. South Australia has a network of airports supporting the transportation of freight, with the largest being Adelaide Airport. The re-introduction of direct daily flights between Adelaide and Dubai in 2024 is expected to generate \$98 million in additional freight export value per year. 2023 saw 21% of air freight imports and 70% of air freight exports moved via road links to interstate airports to access direct flights. The generation of increased passenger demand through Adelaide will be central to activation of more direct air freight for South Australia.



Intermodals

South Australia's multimodal network relies on intermodal facilities to support the transfer of freight between different modes as required. The strategic use of intermodal exchanges can greatly improve the efficiency and effectiveness of freight transport by maximising the ability to combine freight modes based on the most appropriate mode for each leg of a freight journey¹¹. South Australia has intermodal terminals located at Bowmans, Penfield, Gillman and Islington, as well as multiple distribution centres in northern Adelaide precincts such as Edinburgh Parks.

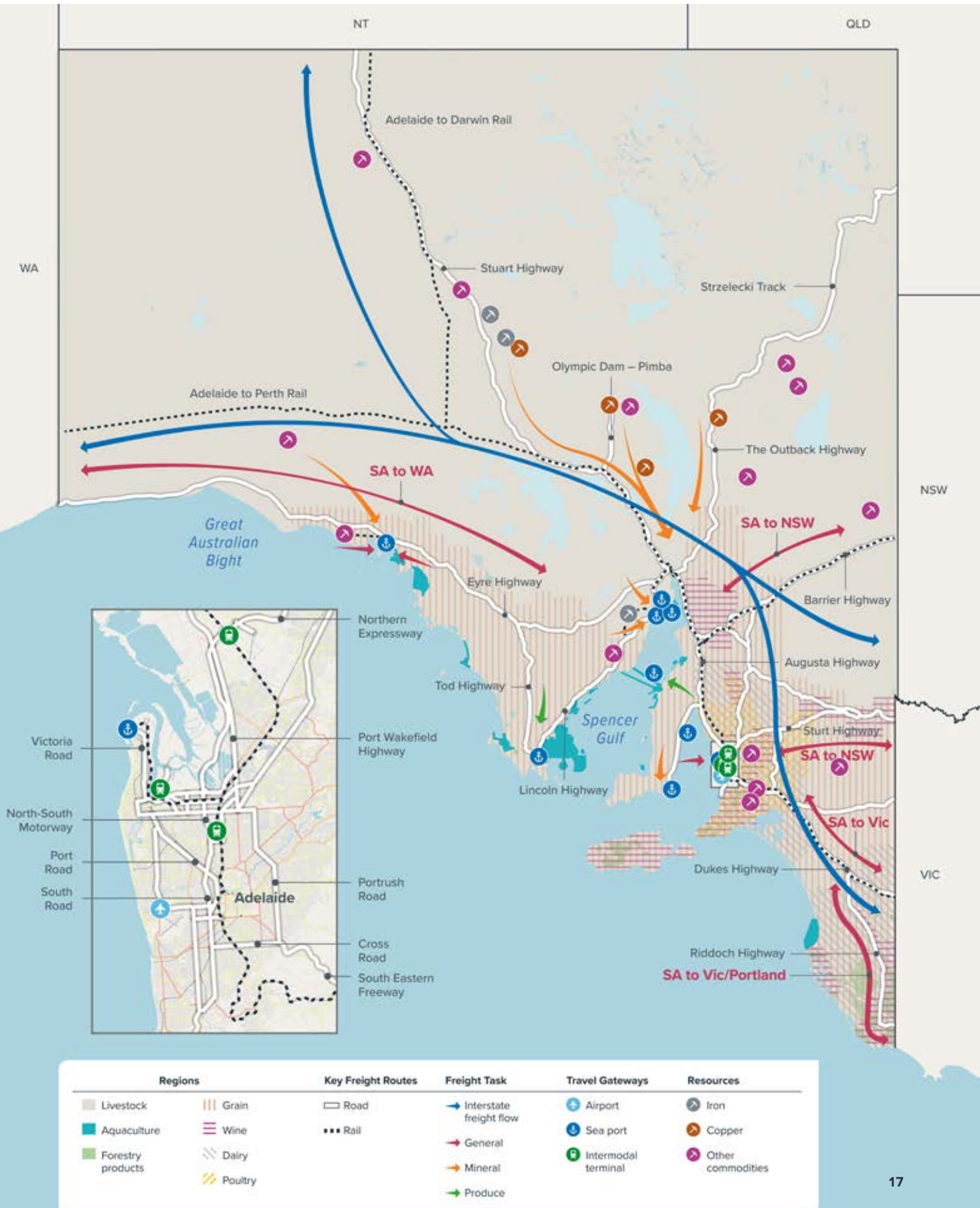
Figure 3: South Australian Freight Movements¹²



South Australia's freight network

Figure 4 below displays South Australia's freight network with critical routes, hubs and industry concentrations across the state.

Figure 4: South Australia's Freight Network (Sources: DITRDCA; AgInsightSA; and LocationSA MapViewer)





The outlook for freight and supply chains

Trends and drivers of change at a national and global level will provide challenges and opportunities for local freight and supply chain operations over the coming years and decades.

The key trends are:

1. **A growing and evolving freight task** relies on a productive freight and supply chain sector.
2. **Changing consumer behaviours** are creating new pressures on urban freight.
3. **Workforce shortages and emerging skills demands** will require corresponding changes in the freight and supply chain's workforce.
4. Rapidly **evolving technologies** offer opportunities for the sector to meet current and future needs.
5. **Decarbonisation** of an emissions-intensive sector is an objective of governments and communities.
6. **Resilience** and risk mitigation is needed in the face of more frequent and severe weather events and cyber-attacks.
7. Fit-for-purpose **infrastructure and policy settings** to support safe and productive operations.

A growing and evolving freight task

From health care to weekly groceries, the daily lives of South Australians are a core driver of freight demand. South Australia's industry concentration in agriculture, forestry and fishing, and resources drives commodity freight use now and is expected to into the future. However, the emergence of new industries such as hydrogen production or distribution will create new freight demands.

Continued strength in traditional industries

Freight and supply chain activities in South Australia reflect and enable the state's economic composition and nature of its industry activity. The output of our traditional industries will continue to generate freight demand which relies on national and international connectivity. Agriculture, forestry, fishing and resources are major contributors to our economy. South Australian food and wine is world-class, with local producers and businesses creating significant export and value-add opportunities¹³. Forestry is also an important industry for our state, with efficient connectivity for the Green Triangle region in the state's south-east being strategically important¹⁴. The resources sector is also expected to continue to drive future freight demand as the sector continues to grow, supporting the transition to electric vehicles.

New and evolving industries

South Australia continues to transition away from a reliance on traditional manufacturing in favour of higher value advanced manufacturing and defence industries. As these newer industries emerge, the freight and supply chain sector will be a key enabler in supporting their initial establishment by transporting goods and materials needed to establish key sites. The longer-term growth of these industries will also require ongoing support from the freight and supply chain sector, particularly through the transport of products to export nodes.

The emergence of new industries like hydrogen, for example, will need an efficient and in some respects dedicated freight and supply chain network. Further, the decision by the Australian Government to construct Australia's first nuclear-powered submarines in South Australia, as part of the AUKUS partnership, presents a significant opportunity for the State to build on its emerging high-tech manufacturing industry¹⁵.



Road train travelling north on the Stuart Highway

Changing consumer behaviours

Customer demands, both business and consumers, continue to rapidly evolve and drive the sector to make structural and operational changes.

Consumer demands

Evolving consumer demands play a significant role in driving change in the freight and supply chain sector. The continued rise of business to consumer eCommerce has created intense pressure on all aspects of the supply chain¹⁶.

9.4 million Australian households made an online purchase in the 2022-2023 financial year, comprising 82% of the total population¹⁷.

Accordingly, the use of small freight vehicles has increased and will continue to rise, particularly in urban areas. Higher volumes of light commercial vehicles on the road have increased congestion, impacting all freight and non-freight movements¹⁸. These shifts have wide ramifications for the sector, particularly in urban supply chains and first/last mile movements. As perhaps the least efficient aspect of the supply chain process, last mile deliveries are the subject of increasing attention across the world. Innovation in automation and less intrusive transport options, such as the use of e-cargo bikes, are being investigated to reduce freight costs and congestion¹⁹.

Better tracking and transparency

A key comment heard during industry engagement was that businesses along the supply chain are demanding improved tracking (e.g. via telematics) and transparency and verifiability of records (e.g. to certify organic produce or provenance). These demands can have unintended impacts on freight operators imposing additional or duplicated reporting requirements and associated time and cost imposts.

Community perception

Efficient and resilient freight and supply chain networks are essential for communities. They provide access to critical goods, support local businesses and contribute to high living standards. However, the movement of freight is highly visible and can contribute to traffic hazards, congestion and pollution, which impact community amenity. The visibility of these negative aspects can cause tension between the value freight provides to the community, and the community's perception of freight operations.

Freight and supply chain sectors across the world have accordingly had a significant focus on maintaining and improving their relationships with affected communities²⁰.

The Industry Road Safety Alliance South West, in Western Australia, is an organisation comprising local industry, community and government representatives²¹. Its aim is to mitigate the road traffic related risks that local industry generates by collaborating with community stakeholders to advocate for infrastructure and policy improvements, as well as produce local road safety education campaigns.







Emerging skills demands

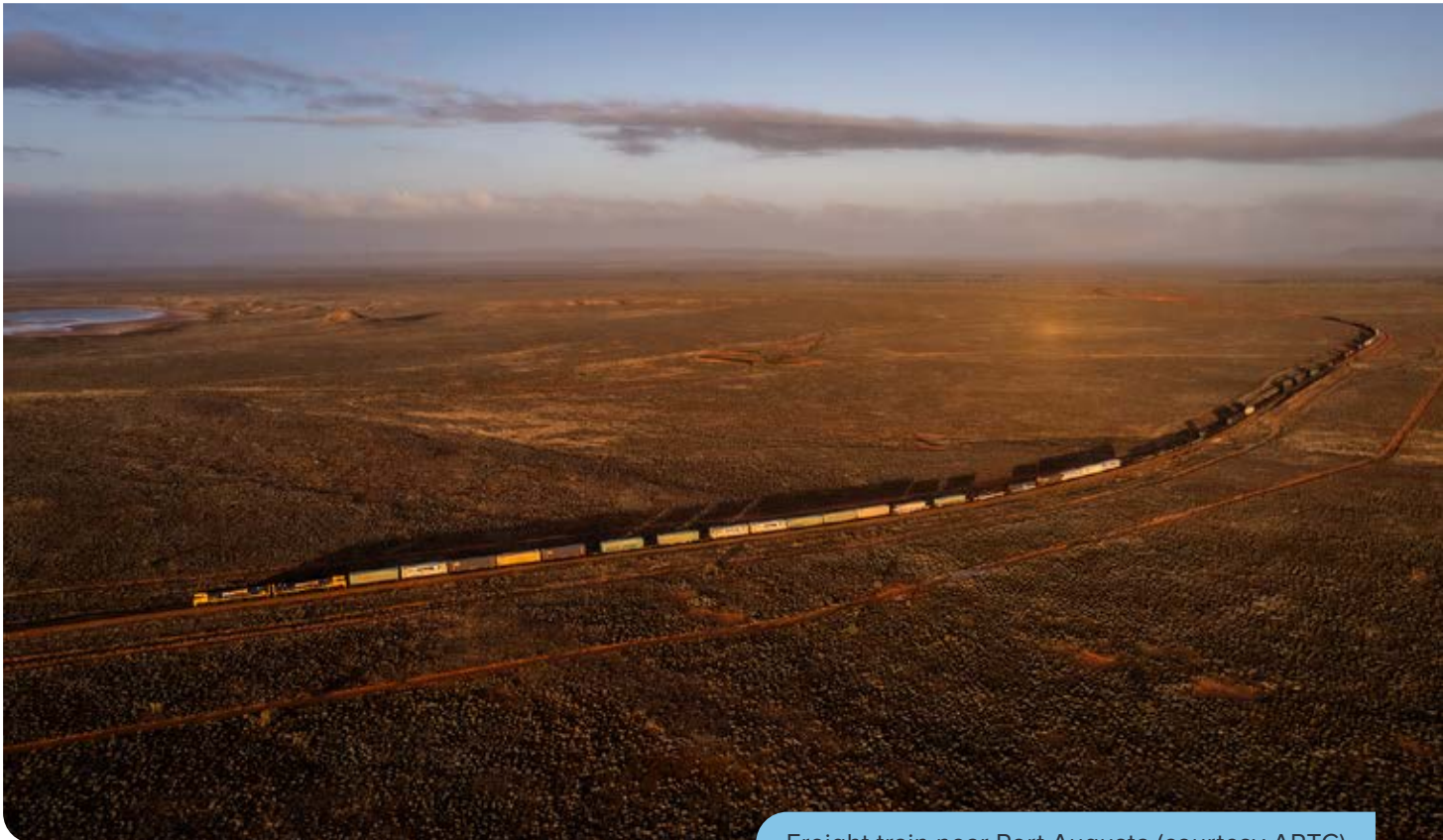
The evolving freight and supply chain sector will demand workforce growth and change, driving a need for the skills sector to provide new pathways and better access to prospective employees.

An adequate and effective labour market is a crucial and complementary driver of productivity. The availability of a skilled workforce to support a growing freight and supply chain sector is an area of focus in Australia and globally, with key skills shortages displayed in Table 2.

Initiatives to prepare freight and supply chain workforces around the world for future ways of working are of increasing prominence²². While forward looking policy settings are important, the sector also needs adaptive recruitment, training and qualification frameworks to respond to more immediate skills needs. Growing the workforce and upskilling existing workers in the sector enables short and medium term industry needs to be met, while the future workforce is developed²³.

Table 2: Skills shortages across the freight and supply chain²⁴

Skills shortages	
	Transport planning and new skills for data management
	Driving functions across road and rail
	Warehouse staff
	Heavy vehicle mechanics
	Technical skills for rail and road construction
	Low emissions technology skills



Freight train near Port Augusta (courtesy ARTC)

Evolving technologies

From supporting more efficient and lower emissions freight movements to improving workforce productivity and safety outcomes, the opportunities technology provides are significant.

Technology is increasingly relied on across supply chains to support improved operations. This reliance will only grow in the future and will need proactive engagement between industry, customers and governments to ensure South Australia is able to capitalise on new technologies while effectively addressing the potential challenges of implementation.










Industry has emphasised the core role that technology will continue to have across the sector and the need to capitalise on the opportunity to drive and realise key business objectives such as improved safety, productivity and reduced emissions.

New technologies provide opportunities for innovative and improved ways of working across the freight and supply chain sector. Artificial intelligence, communications and the use of telematics, for example, can help to enhance more efficient processes at each stage of a supply chain.

Collaboration between industry and government is particularly important to align investment in enabling infrastructure and regulatory support²⁵. Similarly, new technologies need new workforce skills, such as digital literacy, which is driving investment and coordination from governments²⁶.

Table 3 provides an overview of some of the emerging technologies that are likely to impact the freight and supply chain sector.

Table 3: Potential emerging technologies in the freight and supply chain sector

Technology and potential application	
	Automated / Autonomous vehicles and locomotives to support freight task operations
	Alternative fuel vehicles to support decarbonisation
	Blockchain to enhance traceability
	Telematics to support intelligent transport systems and network visibility
	3D printing to enable more customisable manufacturing to occur closer to consumers
	Artificial intelligence and machine learning to enhance the use of data
	Drones to support last mile deliveries
	Robotics and automation to support efficiency and safety in ports, intermodal hubs and warehousing
	Cyber-physical infrastructure to integrate physical and digital domains, connecting data and automation with physical infrastructure

Decarbonisation

The transition to net zero emissions is happening and industry is looking to partner with government to plan supporting pathways.

The Government of South Australia has set targets to reduce greenhouse gas emissions by more than 50% by 2030 and achieve net zero emissions by 2050. This is in alignment with the Australian Government’s legislated target to reach net zero emissions by 2050. Achieving these targets will need effort and collaboration across all sectors of the economy²⁷.

Industry engagement, as part of this strategy development, indicated that some freight operators are prioritising this transition and view it as a key strategic risk, while others do not expect to make significant changes for over a decade. Balancing the transition to net zero with the economic viability and energy reliability needs of industry will require cohesive planning and implementation in collaboration with government.

The drive to net zero has important implications for the type of fuel freight operators use, and also the mode. Air and road freight are currently more carbon intensive compared to sea and rail freight²⁸. However, historically the cost of carbon emissions has been external to business operations. As this changes, the commercial imperatives for businesses to explore mode shift as a potential pathway towards decarbonisation will increase. For example, industry identified more sustainable aviation fuel as a key opportunity for South Australia, as it could leverage existing strengths in the renewables and hydrogen sector.







Transport is South Australia’s largest source of emissions, accounting for 29% of the State’s total²⁹. Although the transport category in emissions reporting includes emissions from other modes of transport, such as passenger transport, freight transport is estimated to contribute almost 40% of transport emissions nationally³⁰. Decarbonising transport will be crucial to meeting the state’s net zero targets. Programs such as South Australia’s trial for low and zero emissions heavy vehicles, underway at the time of this Strategy’s development, will continue to be needed. Enabling infrastructure changes such as regulatory mass allowances, route access and charging infrastructure, as well as support for early adopters, will also be

important to encourage and provide pathways for the uptake of low and zero emissions vehicles. At the same time, upgrading existing assets so they can accommodate new, lower emissions vehicles can accelerate adoption.

Industry is also taking tangible action to decarbonise, with freight operators collaborating with clean fuel producers and governments to align sustainable freight transformation with clean fuel availability³¹. Likewise, the use of more sustainable materials for the construction of physical networks and facilities, such as recyclable composite materials, are becoming more commonplace.

Table 4 outlines potential technologies that can support decarbonisation in the sector.

Table 4: Decarbonisation Pathways³²

Decarbonisation Pathways	
	Biomass jet fuel to decarbonise air transport
	Hydrogen production, storage, and use in industry and heavy transport
	Mode shift where appropriate to shift towards less carbon-intensive freight transportation
	Technology transfer to leverage international technology innovations
	Green Methanol to decarbonise sea freight
	Electrification of vehicles through the use of battery electric technology

Opportunities for decarbonisation will continue to arise from greater emphasis on resilient supply chains. Digitisation and automation will help to optimise and reduce carbon intensity, while investment in alternative fuel production, distribution and supply infrastructure, and the availability of multimodal solutions, will also provide support. Pathways will need to be tailored to South Australia to address gaps in standards and implementation.



Joy Baluch AM Bridge, Port Augusta

Climate change, globalisation and the increasing digitisation of supply chains present vulnerabilities to the security of supply chain networks.

Climate change

Climate change is driving increases in the occurrence of extreme weather patterns, with longer and more severe fire danger seasons expected, and more intense extreme rain events. Long duration events, such as flooding, can cause significant disruption for industry.

Under a medium emissions scenario, the total cost of natural disasters in South Australia is projected to be \$31 billion between 2020-2060³³.

Industry and governments are investing time and resources into mitigating against potential hazards. This includes extreme weather events, which can have severe impacts on freight and supply chain operations. Technology can offer tools to identify and understand the potential impacts of extreme weather events across the freight and supply chain sector³⁴. Crucially, planning for and making corresponding investments in infrastructure to improve resilience and redundancy capabilities will better support continued operations when disruptive events occur.

For example, flooding in South Australia in early 2022 caused significant road and rail infrastructure damage in the north of the state. Over 300 kilometres of ARTC rail track was impacted, causing a 24-day outage. With no alternative rail routes west of Crystal Brook, and limited intermodal infrastructure to enable land-bridging, East-West supply chains, particularly the delivery of consumer goods to Western Australia, were severely impacted. It's estimated that this disruption cost the national economy approximately \$320 million³⁵.

Globalisation

Countries and consumers are relying less on local production of goods and services as they can be procured from overseas markets at more competitive prices. Australia, for example, imports more than 90% of its medicines³⁶. As a consequence, some supply chains have become less diverse and more vulnerable to disruptions, such as geopolitical events.

The interconnectedness of global supply chains results in shocks and disruptions in one nation rippling through to other nations that do not have alternative sources for affected products. Conversely, disruptions in one nation can create sudden increases in demand for local products, potentially creating bottlenecks³⁷. This interconnectedness was highlighted throughout the COVID-19 pandemic, during which global lockdowns reduced overseas goods production. At the same time, demand for goods rose sharply, creating both supply shortages and transportation bottlenecks³⁸. The impact of this was particularly acute given South Australia's reliance on global shipping hubs, rather than direct routes to north Asia³⁹. This presents an opportunity to explore a direct sea link with north Asian markets and building scale for container freight through the potential use of the Pinnaroo-Murrayville rail link.

Cyber-security

The increasing prevalence of cyber security breaches are a significant risk to supply chains. Cybercriminals are expected to target less secure elements within supply chains as a means of gaining access to more valuable targets.

The November 2023 cyber-attack on one of the Australia's largest port operators, DP World, impacted port operations at Sydney, Brisbane, Fremantle and Melbourne⁴⁰. The attack highlighted the potential vulnerabilities across local freight and supply chain networks. The interconnected nature of global supply chains also result in increased local risk stemming from cyber-attacks on international firms. The 2017 'NotPetya' ransomware attack on global shipping company, A.P. Moller-Maersk, caused severe disruption at 17 ports across the globe, including total shutdowns⁴¹. Attacks such as these are driving investment in industry cyber resilience.

Infrastructure and policy

As populations increase, more goods are moved within close proximity to people and communities. There is a shared government and industry responsibility to carefully manage infrastructure and policy settings to enable efficient freight movements in as safe a way as practicable.

Safety

There is an inherent risk associated with all transport movements, regardless of the mode or vehicle involved. The mass and rigidity of heavy vehicles combined with other road users' potentially limited understanding of how to safely operate around larger vehicles can contribute to the severity of road crashes⁴². Similarly, safety is a critical focus for port and shipping operators, particularly when fishing and recreational sailors are in shared waters⁴³. Accordingly, improving understanding of shared safety responsibilities is a focus of governments.

Pedestrians and cyclists interacting with road and rail operations across the network present a significant safety concern. This is particularly acute on freight routes with level crossings where heavy vehicles and cyclist movements interact. Continued investment in separating these movements will improve safety outcomes.

New Infrastructure, upgrades and maintenance

Governments and industry have invested significantly in infrastructure. Examples include the development of Adelaide's North-South Corridor and many other strategic road upgrades. Future planning will need to continue to consider the need for ongoing maintenance and upgrading of road assets, and improved accessibility of fuel supplies. Road freight operators rank the condition of existing infrastructure and intersection of freight routes with urban areas as one of the highest safety risks in the South Australian network. These issues may increase with the introduction of automated / autonomous vehicles and with the extra mass of low and zero emission heavy vehicles.

To ensure that freight operators and supply chains can be connected efficiently and safely, various infrastructure improvements are needed. These may take the form of new and/or upgraded roads, railways, ports, airports, intermodals, de-coupling yards and regional or last mile freight hubs.

It will be important that long-term planning consider the future capacity and capability requirements of the sector to accommodate and capitalise on future freight demands. For example, the current grain port infrastructure across the State has excess export capacity however lacks access and connectivity to support grain export demand⁴⁴. The development of new ports should be driven solely by market forces and only be built when required capacity and capability is needed. Government's role will be to support the facilitation of any port development at the appropriate time from a policy, access, and approvals perspective.

Protection of freight corridors and operations

Population growth and the associated need for housing and related land use can create conflict with the continued protection and efficiency of highways, airports and ports without good integrated transport and land use planning. For example, master planning for the Le Fevre Peninsula is a priority as this area comprises a growing residential area mixed with significant industry development including the Port of Adelaide, and Defence.

Industry suggests planning should also consider the future requirements of freight and supply chain networks and how these could be protected from new residential and/or industry developments.

Heavy vehicle access

There is a substantial variety in freight vehicle types due to differences in heavy vehicle operations regarding vehicle geometry, loads and routes. Freight vehicles are generally categorised as either General Access Vehicles (GAV) or Restricted Access Vehicles (RAV).

GAVs have general access to the road network without requiring a notice or permit when complying with maximum dimension limits⁴⁵.

RAVs exceed one or more of the maximum dimension limits, and may operate on the road network with a relevant authorisation including either an access notice or permit.

The majority of RAV's are Prescriptive – vehicles such as 26 metre B-Doubles, Double Road Trains, AB Triples etc. The balance are certified PBS vehicles, assessed under the Performance Based Standards (PBS) scheme.

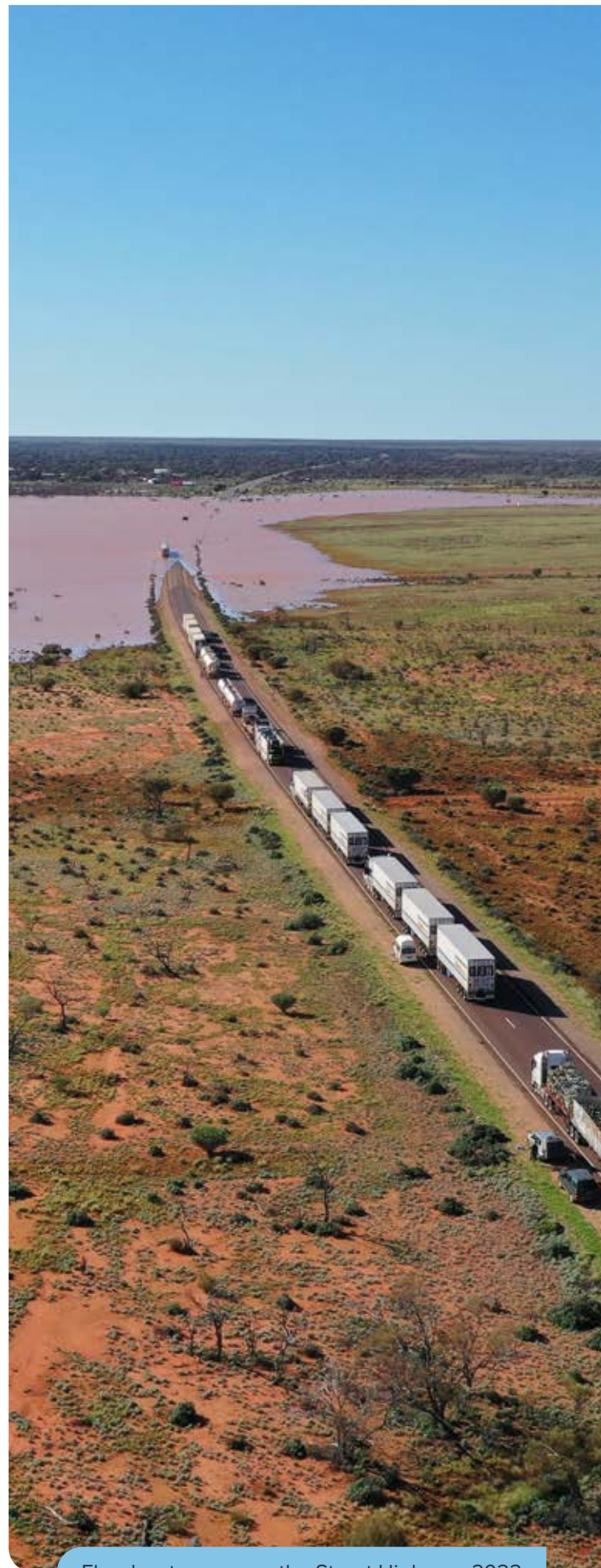
Higher productivity vehicles (HPVs) generally refer to vehicles that exceed prescriptive dimensions or mass, and/or have been assessed and certified as PBS vehicles. HPVs may also have additional features (not mandated by PBS) and be fitted with telematics.

HPVs reduce risk exposure for road users by requiring less heavy vehicles to move the same volume of freight, supporting lower fuel consumption and carbon emissions⁴⁶. This also reduces urban congestion, which costs the South Australian economy approximately \$1.4 billion annually⁴⁷.

Enhancing heavy vehicle access may require road upgrades and investment, while balancing the freight efficiency gains and amenity for surrounding communities.

Expanded and consistent access for heavy vehicles across the National Land Transport Network, as well as first and last mile access can improve freight productivity and the efficiency of freight movements.

Developments in the regulation of heavy vehicles resulting from the Heavy Vehicle National Law Review may have an impact on planning decisions and should be monitored.



Flood waters across the Stuart Highway, 2022



Strategic outcomes – realising our vision

Our vision is for a commercial freight and supply chain network that is safe, productive, sustainable and valued by the community, delivering prosperity to South Australia.

There are four strategic outcomes of critical importance to achieve our vision:



Safe

Stakeholders recognise and manage safety risks, engaging collaboratively to adopt systems that facilitate safe operations for all.



Productive

An optimised supply chain that best utilises the network, technology and infrastructure to efficiently deliver the freight task.



Sustainable

A sustainable supply chain that supports future growth and adaptability through financial viability, social license, resilience to shocks and decarbonisation.



Stakeholder-centric

Stakeholders are engaged appropriately and recognise the value produced by the freight and supply chain sector.

Stakeholders recognise and manage safety risks, engaging collaboratively to adopt systems that facilitate safe operations for all.

For this Strategy this means:

- Supporting the safety of people wherever they engage with the freight and supply chain sector, e.g. on roads, rail networks, in terminals, depots and distribution centres.
- Improving understanding across all stakeholder groups of shared safety responsibilities.
- Collaborating across the supply chain to adopt safer systems.
- Acknowledging the need to prioritise safety outcomes while balancing commercial considerations.

Why focus on safety?

There is a clear mandate from industry and government at a local, national and global level to prioritise safety across freight and supply chain operations.

Safer outcomes across the freight and supply chain sector are a clear priority for the freight industry across all modes. The Office of the National Rail Safety Regulator (ONRSR), the National Heavy Vehicle Regulator (NHVR), Australian Maritime Safety Authority and the Civil Aviation Safety Authority are the national safety regulators that support safety outcomes across jurisdictions in Australia.

The South Australian Government has committed to a vision of zero lives lost on the road network by 2050, alongside a 50% reduction in lives lost and 30% reduction in serious injuries by 2031⁴⁸. This vision aligns with the Australian Government's Vision Zero, a principle that there should not be any deaths or serious injuries occurring on road networks and a commitment to this vision for 2050⁴⁹.

Meanwhile, Safe Work Australia's Australian Work Health and Safety Strategy 2023-2033 targets a range of safety improvements within workplaces to reduce 'work fatalities, injuries and illnesses'⁵⁰.

Safety is the freight industry's highest priority and it continuously works with government to balance safety and the economic need to maintain a financially viable sector, including optimising the number of truck movements across the network.

Broader stakeholder awareness of safety risks could improve outcomes.

The movement of freight regularly brings freight and non-freight users into the same environment. This means that safety risks can extend beyond those working in the sector. In some cases (e.g. road and rail freight) those working in the sector can also be vulnerable to the risk-taking behaviour of non-freight users. Further safety challenges exist in the diversity of stakeholder groups, and their understanding of potential safety risks.

While industry understands it plays a major role in improving safety, it also identified that all parties have a role in ensuring a safe system. There is therefore an opportunity to improve stakeholder awareness of safety risks and safe practices, thereby improving safety outcomes for all. Community awareness campaigns, such as those produced by the NHVR⁵¹, about the shared safety responsibilities of all road users will continue to be required to support improved broader safety awareness.

South Australia has an opportunity to reduce freight and non-freight interaction and conflict points both in metropolitan and regional areas.

Heavy vehicles will always have a presence in Adelaide to support metropolitan freight movements. RAVs, by necessity, must use Adelaide's network of arterial roads to link producers, manufacturers and suppliers to consumers.

More densely populated areas can create greater safety risks due to increased interactions between freight and non-freight users.

These interactions can also bring large freight vehicles in closer proximity to more vulnerable road users such as pedestrians, cyclists and community

activities such as schools, local shops and parks. There is consequently an imperative to explore opportunities that will optimise both freight movements and safety outcomes.

Level crossings are one of the leading contributors to railway-related fatalities. Infrastructure solutions to reduce the risk that level crossings present to operators and road users, such as grade separations, are high-value investments that improve safety outcomes.

The technical and financial challenges associated with level crossings are a particular constraint on the timely improvement of RAV access at many locations. While there are opportunities to improve collaboration between road and rail infrastructure managers, there will be a need to identify new solutions and funding opportunities.

South Australia's location also makes it an intermediary state for freight movements between other states and territories. RAV access for through freight also requires access to Adelaide's arterial roads, contributing to congestion and safety issues. Through freight routes also use very remote road networks resulting in drivers having limited access to facilities and more unreliable, unconnected telecommunication networks, heightening safety risks⁵².

Technology offers opportunities to improve safety outcomes but must be balanced with appropriate legislation.

Evolving technologies for both infrastructure design and operational equipment and machinery also provide new opportunities to enhance safety outcomes across the sector.

Investment in smart technology and intelligent transport systems provides the ability to improve safety. For example, recent Torrens to Darlington upgrade designs along

the North-South Corridor include multiple intelligent transport systems to improve safety. These include automatic incident detection capabilities, dynamic variable message signage and land use management systems to control and optimise speed limits based on traffic conditions⁵³.

Heavy vehicles assessed and certified under the PBS scheme have innovative vehicle designs that allow operators to achieve improved safety, productivity and sustainability outcomes compared to outcomes of equivalent conventional vehicles such as prescriptive B-Doubles.

Industry engagement highlighted negative community sentiment regarding the safety outcomes of using larger RAVs. However, the NHVR has identified the potential safety uplift that technology is providing in PBS vehicles, outlined below.

A NHVR review found that, over the 5-year period from 2015-2019, the Australian PBS fleet had a 60% improvement in safety outcomes when compared to the equivalent conventional truck configurations on a distance travelled basis⁵⁴.

The speed of technological progression can make it difficult to maintain appropriate legislation to support the safe use of such new technologies. The development of regulatory frameworks that are adaptable to emerging technologies to ensure the safety of those who work with them, and the broader public, will be a continual task.





Flood damaged section of track between Port Augusta and Tarcoola, January 2022 (Courtesy ARTC)

An optimised supply chain that best utilises the network, technology and infrastructure to efficiently deliver the freight task.

For this Strategy this means:

- Optimising end-to-end supply chains through the efficient use of modal solutions.
- Removing barriers between and within modes to enable South Australia to be cost competitive with other markets.
- Making improvements across technology, infrastructure, resilience and emissions reduction that will have the greatest impact and generate competitive advantages.
- Investing in workforce and skills development and technology to meet current and future needs.

Why focus on productivity?

Improving productivity is essential for economic growth.

Improved productivity helps drive improved living standards and a more competitive economy⁵⁵. In the five years to 2021-2022, increased multi-factor productivity was the largest contributor to the state's gross value-added growth⁵⁶.

Improving the efficiency of moving goods throughout the state enables more goods to be produced and distributed and/or costs reduced. Ultimately, increased efficiency will create benefits for communities and consumers. Further, improved efficiency can also support increased international trade, as the cost, availability and feasibility of South Australian produce and goods becomes more competitive. For example, the attraction of more direct international passenger services with wide body aircraft can support more direct export of South Australian freight to markets.

The freight and supply chain sector must operate efficiently to accommodate forecast growth in the freight task and support the development of new industries. This includes efficient access to and from ports, intermodals, key logistics precincts and Adelaide Airport.

Productivity in the transport, postal and warehousing sector has experienced either limited growth or a decline in most years since 2003-2004. While growth of 6.1% in 2021-2022 is encouraging, it is the first year of growth since 2016-2017⁵⁷.

Optimising connectivity within and between modes supports more efficient freight movements.

There are opportunities to improve the complementary use of different modes across the freight and supply chain network. Optimising the mode-mix for each stage of a freight journey can improve cost-effectiveness and boost productivity⁵⁸.

The limited interoperability of rail networks across Australia has been identified as a significant constraint on the productivity of rail freight⁵⁹. Continued efforts to formalise certain standards at a national level, including on-boarding interfaces and rolling stock approvals, will boost operational efficiency and ultimately improve productivity.

First and last mile connectivity between rail freight and other modes, particularly road freight with appropriate RAV access, has the potential to generate significant efficiencies. Strategically located intermodal hubs, where logistics facilities are co-located, can build scale and create more efficient multi-modal movements.

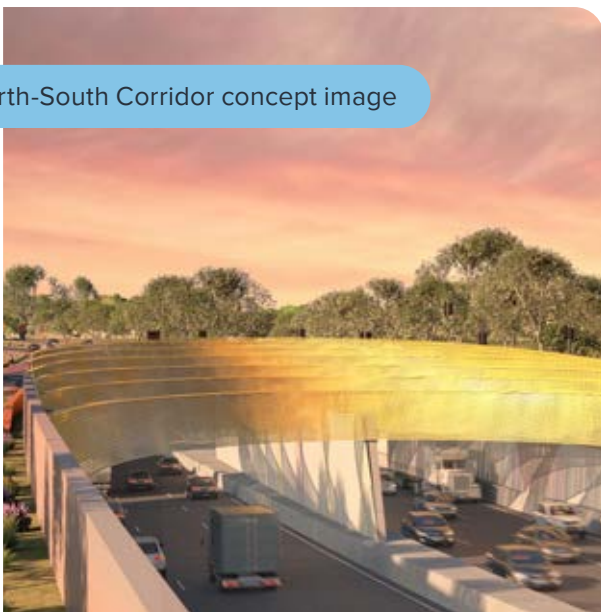
PBS certified HPVs enable more freight to be moved with fewer truck movements compared to their conventional truck equivalents. This can reduce labour, maintenance, fuel, insurance and warehousing costs for industry, and deliver productivity gains of an estimated 15% to 30%⁶⁰. Providing access for these vehicles to efficiently connect with key intermodal hubs will help to maximise the advantages of their use.

Efficiently connecting road and rail freight with the Port of Adelaide and road freight connections to Adelaide Airport is critical for the state's exports. The major investment in the upgrade of the North-South Corridor will improve such connectivity by reducing congestion and improving travel efficiency with a 78-kilometre non-stop journey between Gawler and Old Noarlunga⁶¹. So too will the Adelaide Airport's Airport East freight and logistics hub precinct. This will provide direct access between the Airport and major arterial routes, including the North-South Corridor⁶². Freight movements to Adelaide Airport and the Port of Adelaide are currently constrained to 26 metre B-double (HML) / PBS Level 2A heavy vehicles and 36.5 metre Road Trains (HML) / PBS Level 3B respectively. Expanding access for freight to the Airport and the Port of Adelaide will complement these upgrades and enable the full realisation of their benefits. Each of these projects will also provide opportunities for broader network improvements.

Making better use of existing infrastructure can also improve efficiency and the mode choices available. By improving the physical condition of the freight network, travel times and transport costs can be reduced⁶³.

The forecast growth of South Australia's freight and supply chain sector will create job opportunities.

North-South Corridor concept image



A national decline in enrolments and completion of Vocational Education and Training (VET) qualifications in the freight and logistics supply chain is driving a significant concern with industry about the availability of a sufficient workforce that are appropriately skilled to service the growing freight task, suggesting urgent action is required⁶⁴.

The development of more competency-based and on-the-job training and licensing systems, would enable quicker and more targeted upskilling and licensing of current and future employees. It would also allow qualifications to be better tailored to industry needs. Advertising the pathways and opportunities within the sector and facilitating access to them, through the removal of barriers, will be crucial to supporting the needed step change.

Technology and innovation can transform the productivity of freight and supply chain networks.

New technologies will be a strategic source of productivity gains in the freight and supply chain sector. This may take many forms, including increased use of data and digital solutions, automated operations, new fuel sources or delivery mechanisms, and improved vehicle designs.

While industry is best placed to identify suitable innovations to adopt, government has an important role in facilitating a sensible regulatory environment that encourages new technology and infrastructure and supports adoption through enabling public infrastructure.

For example, industry engagement identified poor telecommunications connectivity on regional and remote freight networks as a barrier to the increased uptake and full realisation of real-time fleet monitoring technologies. The ability to adjust and optimise routes in real-time can improve travel times, reduce driver fatigue, carbon emissions and structure degradation⁶⁵.

Regulatory systems that support industry to trial and ultimately adopt new productivity boosting technologies can also enable transformational productivity improvements. The increased adoption of 'regulatory sandboxes', which are regulatory frameworks that enable small-scale, real-world testing of innovations, is one regulatory tool being adopted to facilitate less burdensome technology adoption⁶⁶.

A sustainable supply chain that supports future growth and adaptability through financial viability, social license, resilience to shocks and decarbonisation.

For this Strategy this means:

- Investing in the network to support continued viability and sustainability of the freight and supply chain operations that underpin the community and economy.
- Building resilience to shocks such as cyber incidents, pandemics, extreme weather events and other disruptions.
- Planning and providing infrastructure that minimises risk of vulnerabilities and disruption.
- Collaboration across industry and government to provide viable network contingency plans for shocks and the ongoing impacts of climate change.
- Supporting decarbonisation from a whole of supply chain perspective, while balancing commercial considerations.
- Enable the growth of industries crucial to achieving net-zero goals including emerging renewable energy sources.

Why focus on sustainability?

More resilient supply chains will improve responsiveness to national and global shocks.

COVID-19 placed a spotlight on supply chains, our reliance on them, and their vulnerability to external shocks. The Commonwealth Government's COVID-19 Response Inquiry currently underway is expected to identify lessons for resilience in supply chain and transport issues. However, other forces including geopolitical events and the urgency of decarbonisation have further emphasised the need for proactive planning to secure robust and resilient supply chains⁶⁷.

Resilience, particularly for fresh produce, can be achieved by shortening supply chains. This involves increasing the prevalence of producers supplying businesses that are in closer geographic proximity. These shorter supply chains therefore reduce the risk of shocks causing widespread disruption.

Ensuring that critical freight routes such as the national road and rail transport corridors in South Australia are continually assessed, improved where possible, and have contingency plans in place that are accessible and appropriate for industry needs, will require collaboration across governments, industry, and asset owners. Creating additional cross-border routes, including through the re-establishment of disused rail lines, such as the Pinnaroo to Murrayville line, can both improve redundancy and reduce regional freight costs.

Addressing skills shortages will support the ongoing viability of operations into the future.

The freight and supply chain sector relies on appropriately skilled labour. At the time of writing the freight and supply chain industry continues to experience an inadequate workforce supply with skills shortages including truck and train drivers, and warehousing staff⁶⁸. These shortages are aligned with the shortages identified for South Australia in the National Skills Priority List⁶⁹. A coordinated and targeted effort led by industry and supported by government to increase the availability of a skilled workforce is needed.

Decarbonisation and the adoption of future technologies and ways of working will rely on the availability of a workforce that is sufficiently trained and qualified to support the green transformation of the freight and supply chain sector. Consistent feedback from industry also highlighted the opportunity for greater competency-based training across the sector, whereby workers can get qualifications, such as vehicle licences, based on the demonstration of sufficient skill.

Decarbonisation across the freight and supply chain sector is important for South Australia's path to net zero.

There are opportunities to provide greater incentives for industry to pursue decarbonisation. Removing or softening barriers such as upfront costs, information gaps or limited resources and capability can increase the rate of decarbonisation⁷⁰.

For industry, it is important that end-consumers understand the cost implications of decarbonisation measures. Maintaining a level playing field for operators of the heavier low and zero emission heavy vehicles by facilitating access to the network through increased mass limits will be essential to encourage uptake.

Advancements in technology provide a significant opportunity to decarbonise freight transport. The emergence and adoption of new lower emissions vehicles (including trucks and locomotives), ships, aircraft and fuel types are expected to play a transformative role over the longer term. Similarly, the increased use of sustainable construction practices and material across the supply chain will support the delivery of more sustainable infrastructure.

Given the relatively small market size of South Australia compared to national and international jurisdictions, the adoption of new technologies, particularly vehicles, ships and aircraft, must consider the trends occurring in larger jurisdictions. This will ensure that technologies are interoperable with international markets, and that the supply of technology by global manufacturers is consistent and reliable.

Industry has highlighted a significant opportunity to align industry and government decarbonisation investments and forward planning. Improved communication between government and industry for decarbonisation implementation milestones will be required to improve such harmonisation.

South Australia's relative strength in renewable energy can be leveraged to support freight decarbonisation.

From the use of renewable energy for freight and supply chain facilities⁷¹, to cleaner fuel sources for heavy machinery⁷², there are significant opportunities to decarbonise the operations components of South Australia's freight and supply chain network through the use of clean fuel and energy sources. New and lower emission fuel and energy sources including Hydrogen will not only support lower emissions, but also provide opportunities for the creation of new industries.

The close proximity of wind and solar resources in South Australia to areas suitable for green hydrogen production is a relative strength for the State. This will be important for the full realisation of the opportunities that a hydrogen production and export capability present⁷³. Leveraging a green hydrogen production capability to explore potential uses in the freight and supply chain industry, such as hydrogen powered vehicles, will be beneficial over the medium to long term.



Wind and solar farms

Stakeholders are engaged appropriately and recognise the value produced by the freight and supply chain sector.

For this Strategy this means:

- Engaging with stakeholders across the whole supply chain.
- Proactively engaging with stakeholders that may be impacted by a decision at early stages and continuously through decision making processes.
- Building a collaborative approach to decision making.
- Improving community awareness and understanding of the importance of the freight and supply chain sector to their daily lives and South Australia's economy.
- Responding to the evolving freight task collectively.

Why focus on stakeholder-centricity?

Strong stakeholder relationships will maintain and enhance the sector's social licence to operate.

The freight and supply chain sector delivers a critical service for communities, providing goods, job opportunities, and connections for businesses. The proximity of freight and supply chain operations to communities makes community understanding of the value and long-term benefits of the freight and supply chain sector important in preventing negative sentiment impacting network upgrades or industry's licence to operate.

Ensuring that engagement occurs as early as possible will help to manage community expectations from the outset and mitigate risks associated with community opposition to changes. Figure 5 identifies the various stakeholder groups involved in the sector.

Figure 5: Freight and supply chain sector stakeholder groups



Building awareness of the sector can support greater harmony between the sector's stakeholders.

Articulating the value that freight provides to communities will support greater harmony between the freight and supply chain sector and the community. Directly linking the efficient movement of freight to safety and the cost and availability of goods to communities, will support greater community acceptance of freight and supply chain operations. This extends to not only the value of maintaining a quality physical network, but also broader operational requirements of industry.

Greater visibility of government policies and strategy will enhance industry's ability to undertake long-term planning.

Industry engagement highlighted that there is a need for greater transparency around the long-term strategic ambitions of government to support the associated planning by industry. This will help industry to better operate within an environment of evolving regulation, policy and physical networks while remaining commercially viable. Greater awareness of government direction will also provide operators with increased confidence to invest in the vehicles, technology and business functions of the future.

Proactive engagement with relevant stakeholder groups will enable the freight and supply chain sector to continually evolve.

Existing strategic planning and programs of work consider the wide-ranging stakeholder groups that may be affected. Industry has identified that this consideration can be improved through proactive and frequent engagement with impacted stakeholders to build understanding and bring them along on the journey throughout decision-making processes.

Preparing for, and responding to, the evolving freight task will also require appropriate engagement with relevant stakeholders. Given the dispersed roles and responsibilities across the sector, collaboration and coordination will be critical to ensure the sector continues to be able to underpin the economy.

Stakeholder-centricity is critical for the achievement of the Strategy's other outcomes.

Placing stakeholder groups at the core of this Strategy will be critical for the realisation of the Strategy's other outcomes: safe, productive and sustainable. Without effectively engaging with impacted stakeholder groups the efficacy of this Strategy will be limited.



Train passing level crossing near Crystal Brook (courtesy ARTC)



Strategic responses – how we will respond

Eight strategic responses provide the key areas of focus to achieve the Strategy’s vision and strategic outcomes. Strategic responses represent a central consideration of government and industry in the freight and supply chain sector to guide activity over the Strategy’s timeline.

Each strategic response is comprised of two components:

1. What success looks like:

The key factors that will define progress, and ultimately, success.

2. Strategic actions:

The relevant areas of activity that will direct initiatives defined in the Strategy’s implementation plan.

Responding to strategic outcomes

Each of the Strategy’s strategic responses support the achievement of one or more strategic outcomes. Those mapped below are the main outcomes each strategic response seeks to support.

Strategic responses	Strategic outcomes			
	Safe	Productive	Sustainable	Stakeholder-Centric
1. Develop and maintain a safe and fit-for-purpose freight and supply chain network that provides efficient connectivity to serve an evolving freight task, considering all modes and sectors.	●	●	●	●
2. Facilitate transparent and long-term planning across infrastructure and land-use, identifying and protecting freight network and supply chain assets, to support informed decision making and user safety.	●	●	●	●
3. Facilitate and enable a holistic and integrated approach to decarbonisation, supporting a path towards net zero .			●	●
4. Embed resilience and redundancy across the network to enhance safety while protecting freight and supply chains from shocks including climate change, pandemics and cyber risks.	●		●	
5. Support the safe and efficient integration of emerging technologies in South Australia’s supply chains.	●	●	●	
6. Support the timely addressing of skill gaps and workforce shortages to meet current and future needs, with a focus on diversity, training, and career pathways in the sector.	●	●	●	●
7. Support data sharing between industry and government, including through effective standardisation and regulation, to enable better business and policy outcomes.	●	●	●	
8. Facilitate a harmonised regulatory and policy environment that is streamlined, customer driven, and facilitates optimal freight movements and safer outcomes.	●	●		●

Safe and connected network

Develop and maintain a safe and fit-for-purpose freight and supply chain network that provides efficient connectivity to serve an evolving freight task, considering all modes and sectors.

Ensuring a safe and fit for purpose network is critical for freight and supply chain operations and is a joint responsibility between industry and government. As South Australia continues to evolve from the historical reliance on traditional manufacturing, the freight and supply chain network must also evolve to improve safety and optimise connectivity for existing industries and support the emergence of new industries.

What success looks like:

This response seeks to deliver a South Australian freight and supply chain sector where:

- safety outcomes are improved in line with sector priorities
- competitiveness is optimised through a fit-for-purpose infrastructure network
- there is joint responsibility with industry for the maintenance of an interconnected network of public and private infrastructure that meets the needs of the evolving freight task
- specific geographic and modal challenges are addressed effectively with consideration to the evolving freight task
- a multi-modal solution appropriately addresses an evolving freight task, considering factors including freight and vehicle type, cost, speed and environmental impacts
- short and long-haul movements and first and last mile movements are effectively facilitated.

Strategic actions:

The following Strategic Actions will inform future initiatives outlined in the Implementation Plan.

- 1 **Minimise the potential for conflict between different freight transport modes and road users across South Australia's transport network so far as reasonably practicable, given the need to balance safety and freight efficiency.** Key focus areas include road user behaviour, road infrastructure, vulnerable road users and workplaces.
- 2 **Respond to constraints and the changing freight task to improve connectivity between modes, regions and jurisdictions and enhance South Australia's capacity for economic growth and onshore capabilities that support access to markets.** This will require improved understanding of current gaps and evolving needs and having the appropriate infrastructure, modal mix and policy setting in place.
- 3 **Improve infrastructure and access to increase supply chain productivity while appropriately optimising safety and anticipating industry needs.** Intermodal, interstate, and international connectivity will be important enablers of productivity. This will include a focus on improved road and level crossing safety and access to the Airport and Ports.
- 4 **Expand the higher productivity vehicle network, where safe and viable.** A key focus area is to assess the business case for expanding the network for the South Australian border with Victoria to the South Australian border with Western Australia.

Long-term planning

Facilitate transparent and long-term planning across infrastructure and land-use, identifying and protecting freight network and supply chain assets, to support informed decision making and user safety.

A well-functioning freight and supply chain sector relies on a physical network that can safely support the current and future freight task. Long-term planning must facilitate growth, improved safety outcomes and promote greater cohesion between competing land-uses by ensuring freight networks are accommodated and appropriately incorporated into development plans.

What success looks like:

This strategic response seeks to deliver a South Australian freight and supply chain sector where:

- planning for high density nodes and corridors protects critical freight networks and optimises safety outcomes
- master planning establishes freight priority areas
- planning facilitates safer, more efficient and cost-effective freight movements
- specific freight, logistics and industry precincts and priorities are considered and created
- long-term planning effectively anticipates future network needs, including demand and modal mix, HPV use and intermodal hubs
- future industry and resource opportunities can be readily activated.

Strategic actions:

The following strategic actions will inform future initiatives outlined in the implementation plan.

- 1 Look for opportunities to support global energy transition for South Australia.** Increase the prosperity of the State by facilitating renewable energy resources and unlocking valuable minerals like copper and magnetite iron ore. Identify opportunities to take advantage of future global demand for resources and products such as green steel.⁷⁴
- 2 Engage early with stakeholders throughout the planning and development process to ensure impacts on supply chain networks and nodes are considered.** Early and innovative methods of engagement with industry and communities alongside more collaborative planning will support more effective and mutually acceptable development plans.
- 3 Preserve and improve supply chain networks and nodes through integrated transport and land-use planning.** The potential tension between freight and supply chain networks and urban development needs collaboration from planning bodies to protect critical freight and supply chain networks, including access to and from origin and destination points, while considering urban development needs.



Heavy vehicle crossing Nullabor Plain

Net zero pathway

Facilitate and enable a holistic and integrated approach to decarbonisation, supporting a path towards net zero.

Decarbonisation is an increasingly prominent driver of activity across all sectors of the economy, including the freight and supply chain sector. Industry have highlighted the need for more freight and supply chain specific support to enable a transition that maintains energy reliability, is economically viable, and supports meaningful action across entire supply chains to contribute to net zero efforts.

What success looks like:

This strategic response seeks to deliver a South Australian freight and supply chain sector where:

- industry understands government's ambition for net zero pathways in the sector and government understands and assists industry to meet its challenges in decarbonisation
- there are various multifaceted solutions defined and available to support the freight and supply chain to reduce emissions
- the sector as a whole works collaboratively to pursue decarbonisation activities across all modes and parts of the supply chain
- technology is effectively integrated into decarbonisation solutions
- the pathways towards net zero effectively consider available opportunities for South Australia to be a leader or realise competitive advantages.

Strategic actions:

The following strategic actions will inform future initiatives outlined in the implementation plan.

- 1 **Establish a baseline of current decarbonisation performance and build industry and government understanding of the benefits and challenges of decarbonisation pathways in freight and supply chains globally and locally, including clarity of current sector emissions to support strategic planning.** This baseline will help to define decarbonisation activities and measures available and help articulate the opportunities that exist across the freight and supply chain sector locally.
- 2 **Provide direction and strategic support, including through regulatory frameworks, to promote sector-wide decarbonisation that aligns with net zero commitments, coordinating with industry to identify needs and challenges and ensure commercial viability.** This will help industry understand the sector-specific pathways for decarbonisation and consequently plan for required activity to reduce sector emissions while maintaining commercial viability.



Resilience and redundancy

Embed resilience and appropriate redundancy across the network to protect freight and supply chains from shocks including climate events, pandemics and cyber risks.

Given the potential for increased incidence and severity of shock events, ensuring the resilience of South Australia's freight and supply chain network is ever more paramount. South Australia's network is critical for local prosperity but also for broader economic activity across the country, providing key links between states and territories for delivery of the evolving freight task. Industry emphasised a need to understand existing critical assets and proactively plan for potential disruptors across all modes and regions.

What success looks like:

This strategic response seeks to deliver a South Australian freight and supply chain sector where:

- physical and cyber infrastructure and networks are resilient to potential shocks
- regional and rural areas are a key focus for future scenario planning
- protocols and systems are adaptable and flexible to support responsiveness to challenges that arise
- areas of greatest value and impact are identified and well understood
- plans exist for the resilience and redundancy of significant infrastructure and key networks.

Strategic actions:

The following strategic actions will inform future initiatives outlined in the implementation plan.

- 1 Plan for supply chain infrastructure to minimise the risk of disruption from shocks and vulnerabilities across supply chain networks, with consideration to labour, infrastructure, and digital assets, and alignment to national plans/strategies.** This includes greater insights into privately owned assets to better support holistic disaster responses.
- 2 Support continuity in strategic response to disruptions across supply chain networks, including the supply of critical inputs.** Critical inputs may include resources such as fuel that continue to be crucial to the economy through periods of disruption.
- 3 Manage network shocks to effectively coordinate activity across industry, agencies and other stakeholders.** The extensive number of stakeholders that may be involved in responding to a network shock heightens the need for well-understood and effective decision-making processes. These should deliver clear communications to relevant stakeholders and limit the risk of information falling through the cracks.



Flinders Adelaide Container Terminal
(courtesy Flinders Port Holdings)

Technology integration

Support the safe and efficient integration of emerging technologies in South Australia's supply chains.

A regulatory and policy system that helps industry trial and adopt emerging technologies will be crucial to achieving each of the Strategy's outcomes. New technologies can generate improvements in productivity, safety and sustainability, while enabling responsiveness to stakeholder demands.

What success looks like:

This response seeks to deliver a South Australian freight and supply chain sector where:

The adoption of new technologies is facilitated by adaptable policy and regulation

- openness to trialling and adopting new technologies creates a competitive advantage
- traceability and validation practices are enhanced and embedded across the sector through the adoption of enabling technology
- the adoption of new technology is conducted in a safe and responsible way.

Strategic actions:

The following strategic actions will inform future initiatives outlined in the implementation plan.

- 1 Work with industry to understand current and emerging technology and innovation developments, including potential barriers and appropriateness to South Australia's sector.** Industry will be the main adopter of new technology, however government has an important role to play in the uptake of new technology by ensuring policy and regulation is adaptable and enabling infrastructure is available to facilitate trials and implementation.
- 2 Support the increased use of appropriate technological enhancements where suitable, to improve efficiency and safety, and future-proof the supply chain and infrastructure network.** There are opportunities for government to improve communication about, and incentives for, technological change that aligns with specific freight and supply chain sector strategies, as well as broader economic and sustainability agendas.



Loaded iron ore locomotive near Flinders Ranges

Skilled workforce

Support the timely addressing of skill gaps and workforce shortages to meet current and future needs, with a focus on diversity, training and career pathways in the sector.

Ensuring an available workforce is one of the critical priorities for the future viability of the freight and supply chain sector and its ability perform its role in underpinning the economy. It intersects extensively with each of the Strategy's outcomes.

What success looks like:

This strategic response seeks to deliver a South Australian freight and supply chain sector where:

- organisations can employ appropriately skilled individuals in a timely way and retain them
- the education sector offers a range of fit-for-purpose skilling pathways to prospective workers that align with industry needs and account for the evolving role of technology
- organisations can deliver quality, and recognised, on-the-job training
- barriers to enter the industry are appropriately reduced across metro, regional and remote areas
- stakeholders understand the diverse career paths available in the freight and supply chain sector
- there is a strong supply of people moving into the sector, including via migration pathways
- the workforce reflects the diversity of South Australia's population.

Strategic actions:

The following strategic actions will inform future initiatives outlined in the implementation plan.

- 1 Understand the evolving scale, nature and distribution of workforce shortages and skill gaps across supply chain networks, having consideration to the differing needs of specific regions and industries.** This baseline will help to define a path forward, develop appropriate programs of work, including the consideration on non-training solutions to workforce challenges such as targeted migration strategies to address identified gaps.
- 2 Support the review and development of formal and informal training pathways in collaboration with other key skilling entities, while also supporting upskilling programs.** This will help balance the rigour of formal qualifications against the extra burden they place on prospective candidates. Recognised and well resourced on-the-job competency-based training will also enable appropriate upskilling with consistent and recognised qualifications.
- 3 Improve understanding of, and access to, career pathways in the freight and supply chain sector within the community, and the education sector.** More young workers are needed to offset parts of the sector that are facing ageing workforce challenges.



Data sharing

Support data sharing between industry and government, including through effective standardisation and regulation, to enable better business and policy outcomes.

Data is increasingly central for decision making across all sectors. Its appropriate use offers unique opportunities to the freight and supply chain sector. Such an opportunity must, however, be balanced against the potential risks of misuse or misunderstanding to give relevant stakeholders greater confidence to engage with it.

What success looks like:

This strategic response seeks to deliver a South Australian freight and supply chain sector where:

- accurate and reliable data is the backbone of productivity gains
- industry and government coordinate effectively to support a higher value network
- careful consideration is given to how data is collected and used to ensure mutual benefit to impacted stakeholders
- there is clarity about multi-direction data sharing arrangements, supported by strong governance and regulation.

Strategic actions:

The following strategic actions will inform future initiatives outlined in the implementation plan.

- 1 Engage with the National Freight Data Hub and other sources to understand opportunities for South Australia to engage with, and use, available disaggregated and de-identified data.** This should support industry use of the National Freight Data Hub and a national approach to the use of data available for decision making, including relating to future investments and/or policy positions.
- 2 Improve the insights from available data and tools such as the NHVR Portal and the Resource Sector Heatmap to support supply chain networks planning and development.** This also reflects the need for a level of data format standardisation to enable improved interpretation and analysis to avoid incorrect interpretation or use of shared data.
- 3 Improve the integrity (e.g. through regulation and data certification) of data sharing systems and build transparency about how shared data can be used.** Industry participation in data sharing can be bolstered through assurances about the security of shared, disaggregated data.



Cargo loading onto aircraft (Courtesy Adelaide Airport Limited)

Regulation and policy harmony

Facilitate a harmonised regulatory and policy environment that is streamlined, customer driven and facilitates optimal freight movements and safer outcomes.

Underpinning freight and supply chain operations is a complex regulatory and policy environment that covers different jurisdictions and governing agencies. Industry have highlighted the difficulties that this can create for navigating operating requirements across different jurisdictions.

What success looks like:

This strategic response seeks to deliver a South Australian freight and supply chain sector where:

- relevant policy and regulation at a national and local level is harmonised and enables safe, heavy vehicle movements within and across borders
- an appropriate policy and regulatory environment exists for first and last mile, short-haul or linehaul and long-haul freight
- regulation enforces road and rail infrastructure managers to address level crossing safety risks on the freight network
- areas of regulation that create barriers for safe and productive operations across the sector are identified and addressed
- there is appropriate consideration of customer-driven regulation and reporting requirements.

Strategic actions:

The following strategic actions will inform future initiatives outlined in the implementation plan.

- 1 **Support a fit-for-purpose regulatory system, as well as a modernised heavy vehicle national law in collaboration with other jurisdictions, industry, state and local government road managers, and the National Heavy Vehicle Regulator.** A continued focus area is collaboration between the Department for Infrastructure and Transport and the NHVR to identify permit reforms and priority freight routes based on permit volumes for different types of vehicles.
- 2 **Plan for seamless cross-border freight and supply chain operations in coordination with other jurisdictions, regulators and industry to enhance interstate freight movements.** Consistent road and rail network conditions and access permissions across borders will support more efficient, productive and flexible freight movements to, from and within South Australia.



Freight train in rural South Australia



Key Performance Indicators

Key Performance Indicators (KPIs) provide the metrics to monitor and evaluate the progress and success of the Strategy.

Key Performance Indicators

Performance indicators will be developed for each of the four strategic outcomes. However, it is important that South Australia’s performance indicators align with the National Freight and Supply Chain Strategy. Accordingly, performance indicators and measures will be developed upon completion of the National Freight and Supply Chain Strategy.

Strategic outcomes

The following four outcomes are of critical importance for the freight and supply chain sector as it facilitates economic growth now and into the future.



Safe

Stakeholders recognise and manage safety risks, engaging collaboratively to adopt systems that facilitate safe operations for all.



Sustainable

A sustainable supply chain that supports future growth and adaptability through financial viability, social license, resilience to shocks and decarbonisation.



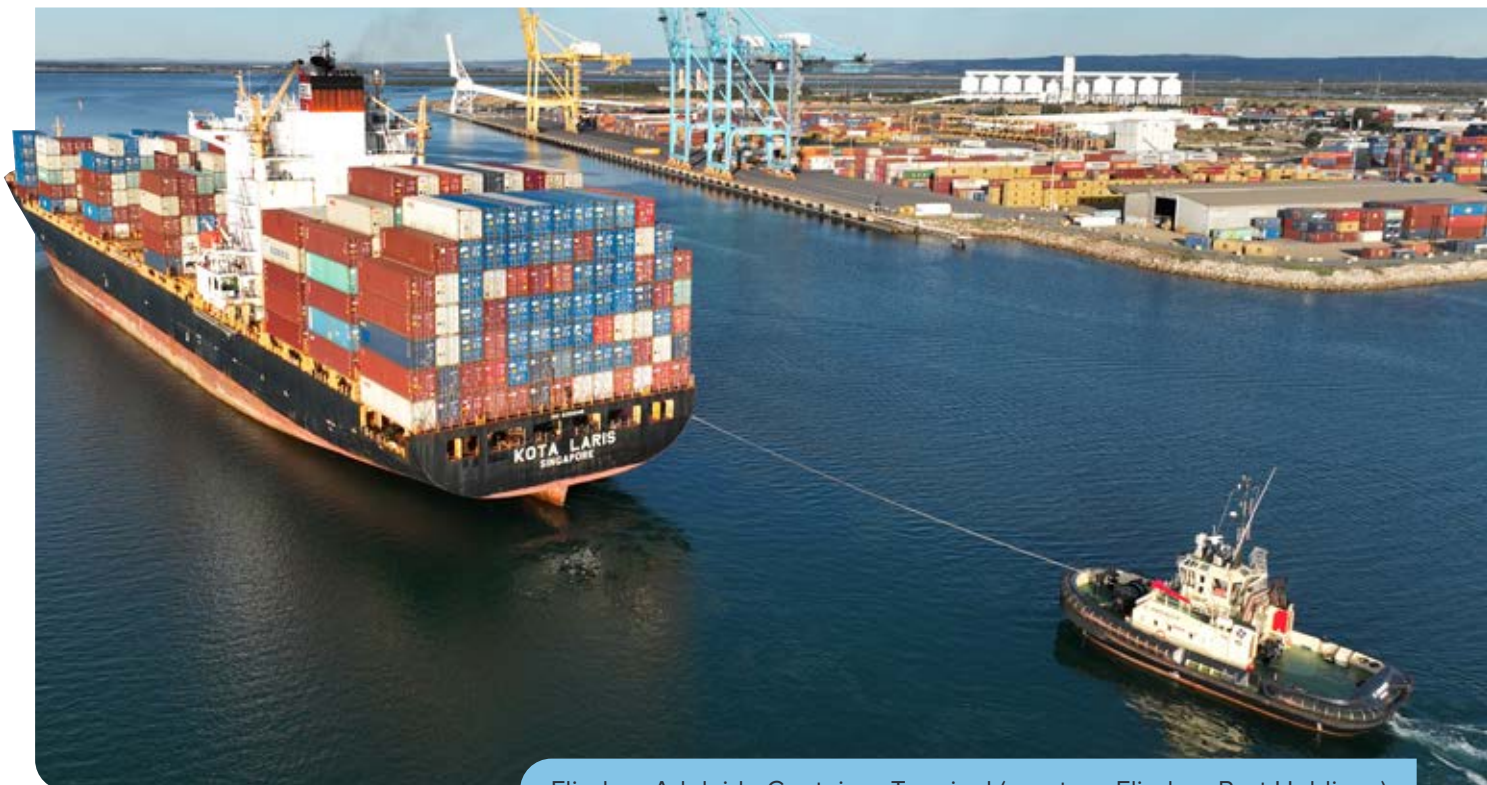
Productive

An optimised supply chain that best utilises the network, technology and infrastructure to efficiently deliver the freight task.



Stakeholder-centric

Stakeholders are engaged appropriately and recognise the value produced by the freight and supply chain sector.



Flinders Adelaide Container Terminal (courtesy Flinders Port Holdings)



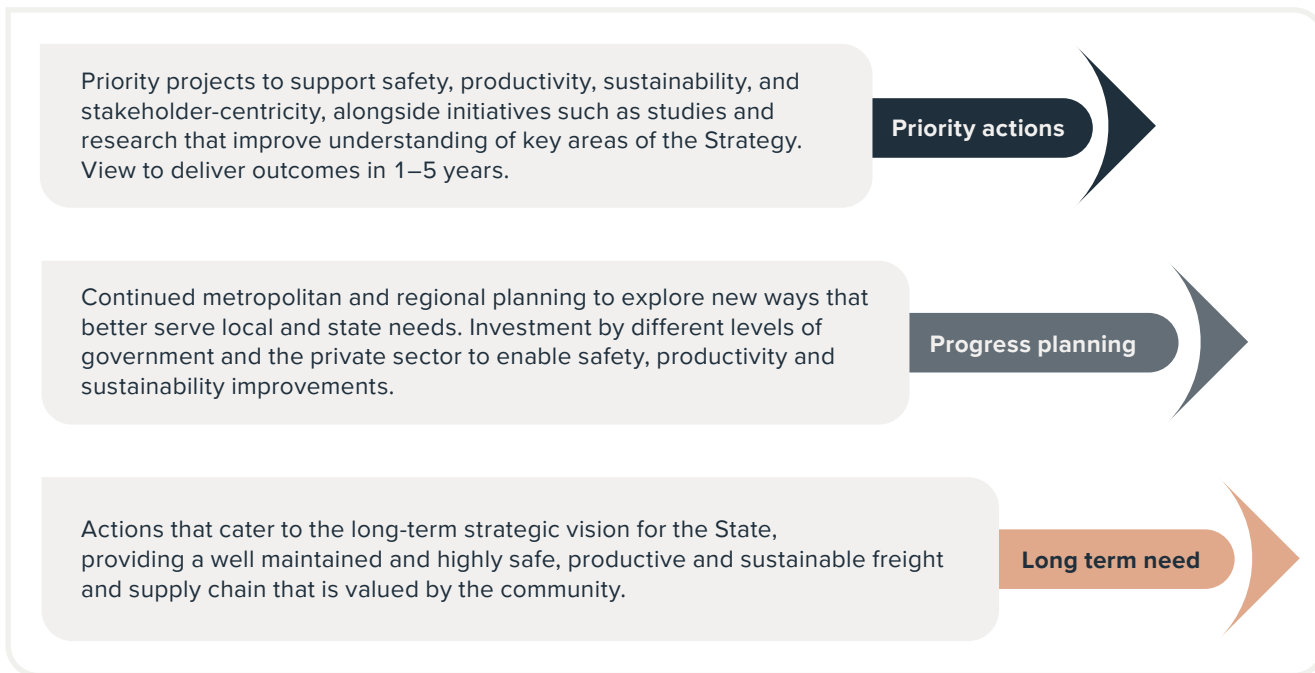
Implementing the Strategy

This Strategy represents the direction for South Australia's freight and supply chain sector. It outlines the strategic outcomes, responses and actions that will set South Australia up for success. Effective implementation of this Strategy is critical to realise its ambition in the face of dynamic economic, physical, technological, social and political environments.

Implementation Plan

This Strategy will be supported with an implementation plan that defines specific initiatives, timing and responsibilities for implementation. An overview of the time horizons is captured in Figure 6.

Figure 6: Initiative timelines



Implementation principles

Four principles will continue to define and drive the implementation of this Strategy. These are:

1. genuine engagement
2. clear accountability
3. strategic alignment
4. regular review.

Genuine engagement

This Strategy has been developed through deep consultation, with a committee comprised of industry experts leading its creation. This proactive engagement approach will continue throughout the Strategy’s implementation. The private sector, all levels of government and the community have important roles in supporting South Australia’s freight and supply chain sector. Throughout the implementation of this Strategy, it will be important to continue to work in partnership with stakeholders towards a common ambition.

Clear accountability

The Department for Infrastructure and Transport (DIT) is the lead agency for the implementation of this Strategy and will work with stakeholders to coordinate its delivery. DIT will also continue to promote South Australia’s vision and priorities in national policy settings such as the review of the National Freight and Supply Chain Strategy and collaborate with other jurisdictions with work undertaken across Australia.

Other South Australian Government agencies that will play important roles in the delivery of the Strategy include the Department for Environment and Water, the Department for Energy and Mining, the Department for Education, the Department of Primary Industries and Regions and the Department for Trade and Investment.

Strategic alignment

South Australia's Freight and Supply Chain Strategy is one of many strategies that will inform South Australia's future. To maximise the impact of the Strategy, aligning with the current and evolving local and national strategic environment is critical. This Strategy will be implemented with consideration to National and State policies, such as those listed below.

National

- National Freight and Supply Chain Strategy
- AUKUS nuclear-powered submarine pathway
- National Sectoral Decarbonisation Plans
- National Road Safety Strategy 2021-2030
- BITRE Road and Rail Supply Chain Resilience Review

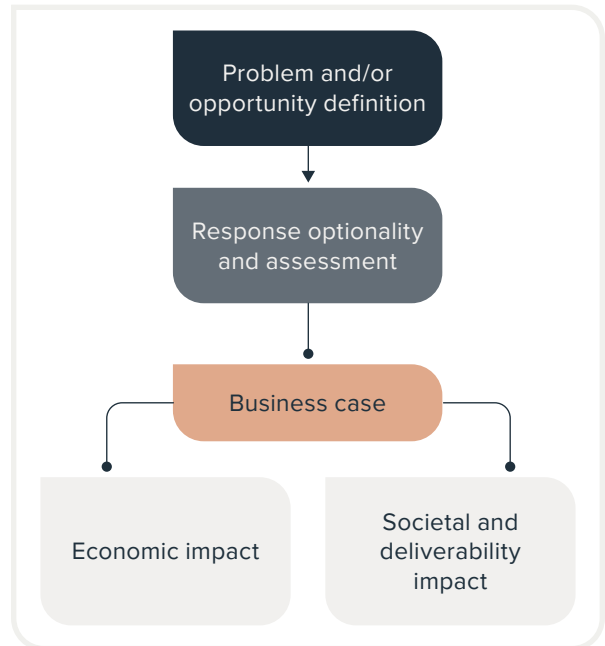
South Australia

- State Planning Policies
- 20-Year State Infrastructure Strategy
- South Australian Road Safety Strategy to 2031
- South Australian Skills Plan
- South Australian Economic Statement
- South Australia – Response to Climate Change
- South Australian Hydrogen Jobs Plan
- State Emergency Management Plan

Prioritisation framework

The implementation plan will identify initiatives that operationalise the strategic actions outlined in this Strategy, and more broadly, that support the Strategy's vision and strategic outcomes. Initiatives may be subject to detailed assessment to ensure informed decision making as per the example assessment framework in Figure 7 below.

Figure 7: Example of an initiative assessment framework



Monitoring achievements

Maximising the impact of the Strategy will rely on maintaining its relevance, evolving to meet the changing dynamics of freight and supply chains locally and globally. Progress against the Strategy will be reviewed regularly with progress monitored. The appropriate timing for a review of the Strategy will be considered as part of monitoring achievements.



Road train crossing Marla town on Stuart Highway in outback South Australia

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