



Australian Government

Inquiry into **National Freight**  
and **Supply Chain Priorities**



Discussion Paper – May 2017





© Commonwealth of Australia 2017  
May 2017 / INFRASTRUCTURE 3218

## Ownership of intellectual property rights in this publication

Unless otherwise noted, copyright (and any other intellectual property rights, if any) in this publication is owned by the Commonwealth of Australia (referred to below as the Commonwealth).

## Disclaimer

The material contained in this publication is made available on the understanding that the Commonwealth is not providing professional advice, and that users exercise their own skill and care with respect to its use, and seek independent advice if necessary.

The Commonwealth makes no representations or warranties as to the contents or accuracy of the information contained in this publication. To the extent permitted by law, the Commonwealth disclaims liability to any person or organisation in respect of anything done, or omitted to be done, in reliance upon information contained in this publication.

## Creative Commons licence

With the exception of (a) the Coat of Arms and (b) the Department of Infrastructure and Regional Development's photos and graphics; copyright in this publication is licensed under a Creative Commons Attribution 3.0 Australia Licence.

Creative Commons Attribution 3.0 Australia Licence is a standard form licence agreement that allows you to copy, communicate and adapt this publication provided that you attribute the work to the Commonwealth and abide by the other licence terms.

A summary of the licence terms is available from <http://creativecommons.org/licenses/by/3.0/au/deed.en>.

The full licence terms are available from <http://creativecommons.org/licenses/by/3.0/au/legalcode>.

This publication should be attributed in the following way: *Inquiry into National Freight and Supply Chain Priorities, Discussion Paper – May 2017* © Commonwealth of Australia 2017.

## Use of the Coat of Arms

The Department of the Prime Minister and Cabinet sets the terms under which the Coat of Arms is used. Please refer to the Department's Commonwealth Coat of Arms and Government Branding web page <http://www.dpmc.gov.au/resource-centre/government/australian-government-branding-guidelines-use-australian-government-logo-australian-government-departments-and-agencies> and in particular, the Commonwealth Coat of Arms - Information and Guidelines publication.

## Contact us

This publication is available in hard copy or PDF format. All other rights are reserved, including in relation to any Departmental logos or trade marks which may exist. For enquiries regarding the licence and any use of this publication, please contact:

Director - Publishing and Communications  
Communications Branch  
Department of Infrastructure and Regional Development  
GPO Box 594  
Canberra ACT 2601  
Australia

Email: [publishing@infrastructure.gov.au](mailto:publishing@infrastructure.gov.au)  
Website: [www.infrastructure.gov.au](http://www.infrastructure.gov.au)



# Table of Contents

<b>1.</b>	<b>INTRODUCTION.....</b>	<b>2</b>
1.1	Why do we need a National Freight and Supply Chain Strategy .....	2
1.2	Building on Past Reforms .....	3
1.3	Inquiry Approach.....	4
1.4	How to Make a Submission .....	5
1.5	Consolidated Questions.....	6
<b>2.</b>	<b>FREIGHT IN AUSTRALIA – ARE WE COMPETITIVE? .....</b>	<b>8</b>
2.1	What is moving where, why and how? .....	8
2.2	Competitiveness in the Australian freight sector .....	9
<b>3.</b>	<b>NATIONAL CRITICAL ISSUES AND EMERGING TRENDS.....</b>	<b>11</b>
3.1	Urban Growth Pressures .....	11
3.2	Port Corridor Pressures - Protecting Land, Sea and Air Connections .....	12
3.3	End-to-end supply chain integration and regulation .....	13
3.4	The Air Freight Market.....	15
3.5	Changing Technology.....	16
<b>4.</b>	<b>NEXT STEPS.....</b>	<b>18</b>
4.1	Capacity Forecasting .....	18
4.2	Key Drivers of Change for Use in Scenario Planning.....	18
4.3	A National Freight Performance Framework .....	18
4.4	Submissions.....	18
	<b>ATTACHMENT A: STRUCTURE OF AUSTRALIA’S FREIGHT NETWORK .....</b>	<b>20</b>
	<b>ATTACHMENT B: INQUIRY TERMS OF REFERENCE.....</b>	<b>23</b>



# 1. Introduction

In November 2016 the Australian Government committed to the preparation of a *National Freight and Supply Chain Strategy* (the Strategy) in line with a recommendation made in Infrastructure Australia's 2016 *Infrastructure Plan*<sup>1</sup>.

To initiate work on the Strategy, which will eventually be developed with jurisdictions through the Council of Australian Governments (COAG) Transport and Infrastructure Council, the Australian Government has initiated an Inquiry into freight and supply chain priorities. The Inquiry will be guided by an expert panel bringing industry expertise into the process.

The Inquiry will provide advice and evidence for the development of the Strategy, with clear short, medium and long term priorities for action, over a range of key reform areas.

## 1.1 Why do we need a National Freight and Supply Chain Strategy

The Strategy is being undertaken in the context of a growing Australia and the need for a freight system that boosts the nation's prosperity and meets community expectations for safety, security and environmental amenity into the foreseeable future.

This growth is being driven by Australia's growing population and from increasing demand for Australian resources and produce, especially in Asian markets. Australia is one of the fastest growing countries in the world, with our population projected to grow from 24 million at present to 30 million by 2030, the majority in urban areas<sup>2</sup>. Like Australia, global population forecasts indicate an increase in the number of extremely large cities, particularly in Asia. This will result in increased demand for mineral resources and products, particularly agricultural products. Australia needs to ensure it has the infrastructure to compete with other resource rich countries to supply the products necessary for these growing cities.

In its 2011 report, *Strategic Transport Infrastructure Needs to 2030*, the Organisation for Economic Co-operation and Development (OECD)<sup>3</sup>, acknowledged that, "major international gateway and corridor infrastructures are crucially important to the exports and imports of all the products and resources that the economies of all countries need ... [and] current gateway and inland transport infrastructure capacity will not be adequate to meet 2030 demand." Australia is no exception and

---

<sup>1</sup> Infrastructure Australia (2016), *Australian Infrastructure Plan*. [http://infrastructureaustralia.gov.au/policy-publications/publications/files/Australian\\_Infrastructure\\_Plan.pdf](http://infrastructureaustralia.gov.au/policy-publications/publications/files/Australian_Infrastructure_Plan.pdf)

<sup>2</sup> Australian Bureau of Statistics Cat 3222.0 *Population Projections Australia*.

<sup>3</sup> OECD (2012), *Strategic Transport Infrastructure Needs to 2030*, OECD Publishing, [http://www.keepeek.com/Digital-Asset-Management/oecd/economics/strategic-transport-infrastructure-needs-to-2030\\_9789264114425-en#.WQ-suhFdBaQ#page3](http://www.keepeek.com/Digital-Asset-Management/oecd/economics/strategic-transport-infrastructure-needs-to-2030_9789264114425-en#.WQ-suhFdBaQ#page3)



must engage with emerging demands before freight infrastructure becomes a barrier to productivity growth.

However, the increasing cost of land transport infrastructure and services raises questions about future funding models. Escalating costs of transport infrastructure limit the ability of the governments to fund all necessary transport infrastructure requirements and has meant consideration of alternate funding sources<sup>4</sup>. Because of these escalating costs, the National Transport Commission (NTC) has noted it is imperative the allocation of funds and resources for moving Australia's freight is done in the most efficient manner possible<sup>5</sup>.

It is not just a matter of optimising the use of funding, but also ensuring regulatory and operational settings optimise long-term infrastructure investments, including for recently announced Australian Government commitments such as the:

- Establishment of the \$10 billion National Rail Program to fund urban and regional rail projects;
- commitment of \$8.4 billion in additional equity to deliver the Melbourne to Brisbane Inland Rail; and
- commitment of \$5.3 billion in equity to build the Western Sydney Airport.

It will be in the national interest to have a long term strategy that positions Australia's freight infrastructure to extract the best value from investment and meets future challenges related to domestic and international growth.

## 1.2 Building on Past Reforms

There has been considerable effort in recent years to undertake work to make freight more efficient and to streamline integrated planning and regulatory processes. The Strategy will build on recent achievements including:

- Infrastructure Australia's 2015 *Australian Infrastructure Plan* and the 2016 Australian Government Response to the plan;
- the 2012 National Land Freight Strategy and 2011 National Ports Strategy;
- recent Productivity Commission reviews, including reviews of the National Access Regime, Infrastructure and Agriculture (2013-2016); and
- master plans for our major ports and airports.

These reforms and strategies have laid the foundation for better integrated planning between governments, particularly with regard to road and rail transport. They have enabled the delivery of the national key freight routes map<sup>6</sup>, state and territory-based freight strategies and plans, long

---

<sup>4</sup> For example, see Department of Transport and Main Roads – Queensland Government, *Moving freight*, December 2013, p. 26. <http://www.tmr.qld.gov.au/movingfreight>

<sup>5</sup> National Transport Commission (2017) *A National Land Transport Productivity Framework*.

<sup>6</sup> Council of Transport and Infrastructure (2014), *National Key Freight Routes Map*, [http://transportinfrastructurecouncil.gov.au/publications/freight\\_route\\_maps.aspx](http://transportinfrastructurecouncil.gov.au/publications/freight_route_maps.aspx)



term master plans for nationally significant ports and airports, improved freight data, performance and planning assessment and implementation tools.

The key freight routes map, for example, has already assisted governments to agree national productivity improvements, with a uniform minimum objective for 'as of right' access by heavy vehicle B-doubles up to 26 metres in length to key freight route roads across Australia.

A description of the current structure of Australia's freight network is at [Attachment A](#).

### 1.3 Inquiry Approach

The Inquiry terms of reference were released on 9 March 2017 ([Attachment B](#)). The Inquiry will contribute a strong evidence base for the development of the Strategy. The Inquiry will be led by the Australian Government Department of Infrastructure and Regional Development, with assistance from an expert panel. The role of the panel will be to review the Inquiry's findings, advise how Australia can best lift productivity and improve the efficiency of Australia's freight and supply chain infrastructure, and engage with industry on the Inquiry's objectives.

To address the terms of reference the Inquiry wishes to hear about issues and possible solutions from a broad cross-section of the users and providers of freight services, the regulators of freight, the owners and operators of freight infrastructure, and land use and transport planners, consultants, forecasters, researchers and communities engaged with freight development.

The Inquiry's formal consultation process will comprise an open-invitation to interested persons and organisations to make submissions, supplemented by one-on-one meetings with freight transport, shipper, retail, consumer, business, and infrastructure investment and insurance peak bodies, and key freight and logistics operators and research bodies. This discussion paper will be the framework for consultations.

Thought-starter questions are set out in this paper. These may be used as a framework to structure submissions, but the Inquiry is equally happy to hear about views on improving Australia's freight system efficiency and productivity, however you wish to provide them.

The Inquiry will look at transport supply chains from a number of different perspectives, both end to end commodity supply chains (particularly minerals, agricultural and urban freight supply chains) and supply chain systems (particularly import/export, inter/intra domestic and city freight supply chains). Using both approaches will allow the Inquiry to clearly articulate infrastructure service requirements and possible systemic improvements across different commodity streams. The Inquiry welcomes submissions framed in regard to specific supply chains or the freight network more generally.

The Inquiry is especially keen to learn about current freight system performance, including the costs of moving freight along transport supply chains and the opportunities for efficiency improvement and reduced costs through improved infrastructure capacity, access, pricing, competition, technological advances, data acquisition or other investment or regulatory arrangements. Particularly welcome is quantitative data about the costs of moving freight, and any information provided can be treated with high levels of confidentiality.



The Inquiry is also keen to identify key functional elements of supply chains through case studies demonstrating how Australia's freight system is working on the ground, including case studies about things working well, as well as examples of the challenges where improvements can be made. Identification of potential future trends in supply chains would also be valuable.

A range of independent research is being commissioned to supplement consultation advice. This includes work looking at future supply chain trends and international comparisons of Australian freight performance and productivity. Further work will be commissioned on a needs basis as key issues are identified through the stakeholder consultation process.

A draft Inquiry report is to be available for industry and Government comment by December 2017, and the final report should be given to the Australian Government by March 2018. The Inquiry report will inform the development of the Strategy, which is expected to be provided to governments by mid-2018.

While the Inquiry report will preferably address all issues presented during the consultations, this may not be possible. It would be appreciated if you could advise if you have previously raised issues in your submission in another public context.

There are a number of interrelated policy reforms being progressed concurrently, including Land Transport Market Reform, Coastal Shipping Reform and development of Urban Rail Plans for Australia's largest cities. While it is important that these projects inform each other and have complementary outcomes, the Inquiry will not seek to duplicate work being conducted by these other national initiatives.

## 1.4 How to Make a Submission

The Inquiry is interested in speaking with people from across the freight network, and critically, freight consumers and suppliers to find out what they require now and into the future from our national freight supply chains.

Formal submissions may be made by email or mail.

By email: [freightstrategy@infrastructure.gov.au](mailto:freightstrategy@infrastructure.gov.au)

By post: Freight and Supply Chain Inquiry  
Department of Infrastructure and Regional Development  
GPO Box 594  
CANBERRA CITY ACT 2601

Submissions are open until 28 July 2017. They will be published on the Department of Infrastructure and Regional Development website unless marked "In Confidence". Stakeholders wishing to make "In Confidence" submissions will not be identified in the Report or on the Inquiry website.



## 1.5 Consolidated Questions

In responding to questions set out in the paper it would be appreciated if, where relevant, respondents could:

- Identify where they are in the supply chain (in terms of the system (i.e. import/export, intra/inter domestic or urban freight) and the specific commodity(s) being transported;
- Identify the priority issues, whether they be 'regulation', 'productivity', 'technology' or 'infrastructure'; and
- Identify the time horizon for each issue.

### 2.1 *What is moving where, why and how?*

- What infrastructure is used in your supply chain and how well does it perform?
- What changes would you like to see to make your supply chain work better?
- What data gaps are you aware of in relation to Australia's freight and supply chains?

### 2.2 *Competitiveness in the Australian freight sector*

- In your view, is Australia's freight system internationally competitive?
- What are the key indicators which tell us this?
- How important is freight movement to your business competitiveness?
- Are regulatory factors affecting productivity for your business? How could this be improved?

### 3.1 *Urban Growth Pressures*

- What are the key issues for freight in Australia's major cities?
- How can Australia's urban networks better prioritise passenger and freight services in the most effective manner possible?
- How are our cities and supply chains being impacted by changing consumer behaviours such as online shopping?
- What are the critical last mile issues you face in urban areas?


### 3.2 *Port Corridor Pressures - Protecting Land, Sea and Air Connections*

- Do you face, or expect in the future to face, problems moving your freight through Australian air, land or sea ports?
- How can Australia's maritime channels be appropriately maintained and able to accommodate bigger ships?
- How are other countries dealing with the landside implications related to distributing cargo from bigger ships?

### 3.3 *End-to-end supply chain integration and regulation*

- How effective is your supply chain at transitioning your freight between modes and across boundaries?
- What regulations do you have to deal with in your supply chains?



- 
- How could any of them be simplified?
  - Are empty containers a problem for you?

### *3.4 The Air Freight Market*

- Are our airports appropriately integrated into surrounding freight networks?
- Are there any international examples of where airports are used more effectively in freight networks?
- Can Australia be making greater use of air freight?

### *3.5 Changing Technology*

- What emerging technological trends do you think will impact on your supply chain?
- When are these impacts likely to be felt and how does Australia's freight infrastructure need to be adapted to make best use of likely changes?
- Do you feel you can make use of the technology you need?

### *4.1 Capacity Forecasting*

- Any data or insights you are willing to contribute to assist in capacity forecasting assessment would be appreciated

### *4.2 Key Drivers of Change for Use in Scenario Planning*

- The Inquiry welcomes views on what factors and key drivers of change should be considered in the scenario planning analysis.
- The Inquiry is also keen to identify key functional elements of supply chains through case studies demonstrating how Australia's freight system is working on the ground, including case studies about things working well, as well as examples of the problems and where improvements can be made. Identification of potential future trends in supply chains would be valuable.

### *4.3 A National Freight Performance Network*

- The Inquiry is particularly interested in views on the potential need for a national freight performance framework and the likely key indicators.



## 2. Freight in Australia – are we competitive?

All industries relying on transportation to move their goods look for ways to optimise their supply chains, reduce cycle times, improve service and cut costs. In turn, leaner and more agile supply chains reduce the cost of goods and services, encouraging increased demand and driving economic growth, while also making Australia more competitive globally.

Just as enhancements made by infrastructure owners to the transport network potentially offer supply chain managers new ways to achieve value, those supply chain managers must also ensure they choose the most efficient transport mode for a given freight task. An integrated supply chain perspective is therefore central to managing the performance and future design of each element of Australia's national freight infrastructure, whether ports, airports, roads, rail or intermodals.

### 2.1 What is moving where, why and how?

- What infrastructure is used in your supply chain and how well does it perform?
- What changes would you like to see to make your supply chain work better?
- What data gaps are you aware of in relation to Australia's freight and supply chains?

Continuing growth in freight volumes has given rise to a range of increasingly complex challenges for the Australian community. In recognition of this, all levels of government have agreed on the need to apply a national focus and to collaborate with industry to deliver a streamlined, integrated and multimodal transport and logistics system, capable of efficiently moving freight throughout Australia.

Freight transport activity is often measured in terms of tonne kilometres (the movement of one tonne of freight, one kilometre). The Australian domestic freight task has been increasing strongly for the last 40 years. Rapid growth in the rail freight task has been driven by rail's movement of iron ore in the Pilbara region and, to a lesser extent coal freight exports in NSW and Queensland. In contrast, coastal shipping freight has not changed significantly in scale over the last 40 years and has decreased slightly since 2006–07<sup>7</sup>. Rail now accounts for around half of the domestic freight task, road approximately a third and coastal shipping for just under one-sixth<sup>8</sup>.

---

<sup>7</sup> BITRE (2016), Australian Infrastructure Statistics Yearbook 2016, Department of Infrastructure and Regional Development, [https://bitre.gov.au/publications/2016/files/BITRE\\_yearbook\\_2016\\_statistics\\_full\\_report.pdf](https://bitre.gov.au/publications/2016/files/BITRE_yearbook_2016_statistics_full_report.pdf)

<sup>8</sup> National Transport Commission (2017), *Who moves what where: Better informing transport planning for Australians*, information sheet, [https://www.ntc.gov.au/Media/Reports/\(D121CACB-6406-F0FB-D940-8B1290BF2893\).pdf](https://www.ntc.gov.au/Media/Reports/(D121CACB-6406-F0FB-D940-8B1290BF2893).pdf)



The National Transport Commission notes the domestic freight task increased by 50 per cent in the 10 years to 2016 and is forecast to grow another 26 per cent by 2026<sup>9</sup>.

In addition to its role in meeting the national freight task, the freight sector is also a significant driver of national economic outcomes. Freight rail alone added \$13.2 billion to the Australian economy in 2013 (making up 0.7% of the total national economy), employed over 15,000 people and paid over \$1.2 billion in wages annually<sup>10</sup>. Any changes or productivity benefits gained in the industry will therefore have a direct effect on the national economy.

Air freight is comparatively small by volume but is also growing at a rapid rate and is high in value. In the 10 years to 2015-16, international air freight volumes rose 37 percent to almost a million tonnes<sup>11</sup>. Estimates of domestic air freight are only available for recent years. Bureau of Infrastructure Transport and Regional Economics data indicates the volume of domestic air freight reached 435,000 tonnes in 2016<sup>12</sup>.

Data is a valuable asset (as the recent surge of interest in big data exemplifies). However, its value depends on its fitness for purpose, accessibility and accuracy. The Productivity Commission has found that data problems such as the absence of consistent and comparable data limit analysis and benchmarking of public infrastructure used in Australia, making project selection and investment more difficult<sup>13</sup>. This potentially has implications for Australia's entire infrastructure selection and investment process, introducing a level of uncertainty (and therefore risk and extra costs) into major project developments.

## 2.2 Competitiveness in the Australian freight sector

- In your view, is Australia's freight system internationally competitive?
- What are the key indicators which tell us this?
- How important is freight movement to your business competitiveness?
- Are regulatory factors affecting productivity for your business? How could this be improved?

<sup>9</sup> National Transport Commission (2017), *Who moves what where: Better informing transport planning for Australians*, discussion paper, [https://www.ntc.gov.au/Media/Reports/\(D121CACB-6406-F0FB-D940-8B1290BF2893\).pdf](https://www.ntc.gov.au/Media/Reports/(D121CACB-6406-F0FB-D940-8B1290BF2893).pdf)

<sup>10</sup> Australasian Railway Association (2016), *Freight Transport Group: 2017-19 Strategic Plan*, Freight Rail in Australia, [https://ara.net.au/sites/default/files/FTG\\_Strategy\\_Booklet\\_2017-19\\_WEB.pdf](https://ara.net.au/sites/default/files/FTG_Strategy_Booklet_2017-19_WEB.pdf)

<sup>11</sup> Bureau of Infrastructure, Transport and Regional Economics (BITRE) (2016), *Australian Infrastructure Statistics Yearbook 2016*, Department of Infrastructure and Regional Development, [https://bitre.gov.au/publications/2016/files/BITRE\\_yearbook\\_2016\\_statistics\\_full\\_report.pdf](https://bitre.gov.au/publications/2016/files/BITRE_yearbook_2016_statistics_full_report.pdf)

<sup>12</sup> Bureau of Infrastructure, Transport and Regional Economics (BITRE), 2017, *Domestic aviation activity*, Statistical Report. [https://bitre.gov.au/publications/ongoing/files/Domestic\\_aviation\\_%20Dec\\_2016.pdf](https://bitre.gov.au/publications/ongoing/files/Domestic_aviation_%20Dec_2016.pdf)

<sup>13</sup> Productivity Commission (2014), *Public Infrastructure*, Inquiry Report Volume 2, [http://www.pc.gov.au/\\_data/assets/pdf\\_file/0005/137282/infrastructure-volume2.pdf](http://www.pc.gov.au/_data/assets/pdf_file/0005/137282/infrastructure-volume2.pdf)



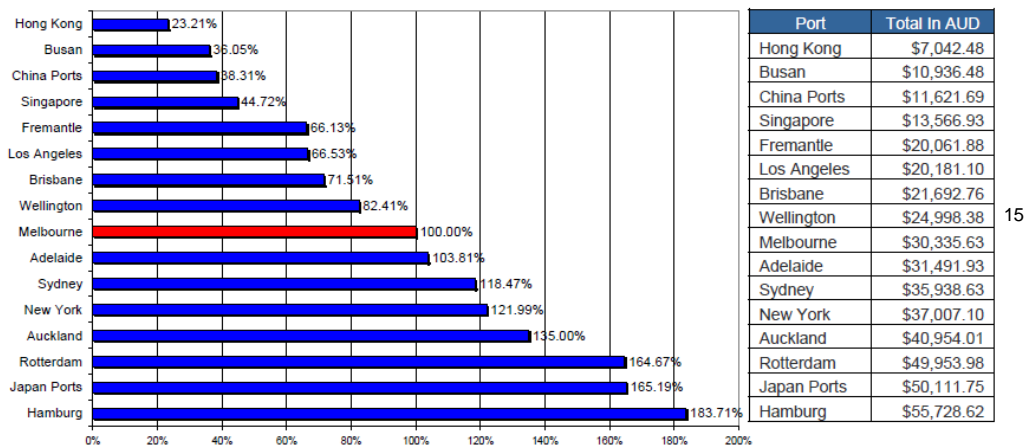
Productivity growth is a key source of long-term economic growth, business competitiveness and real per capita income growth. It is an important determinant of a country's living standards and wellbeing.

A key outcome of the Inquiry will be to establish whether inefficient infrastructure planning, delivery and operation has created congestion in freight networks and supply chains, ultimately harming national productivity and competitiveness.

A wide ranging assessment of Australia's international competitiveness prepared by McKinsey Australia for the Business Council of Australia<sup>14</sup> concluded that Australia was competitive in a few sectors, but not currently competitive in other sectors, including the logistics and communications sector. While this was a broad brush assessment, it indicated that while labour productivity in this sector was similar to that in the USA, relative input costs were considerably higher, as they were for most other sectors.

However, there are indications that poor or decreasing productivity and high costs are not experienced across the board in the freight sector. Shipping Australia Limited compared costs in Australia's major container ports against international ports to examine relative costs (see graph below). It found that Australian ports are bunched in the middle of the table with lower costs than the assessed Japanese and European ports.

**Graph: Port Price Index**



<sup>14</sup> McKinsey and Company. Compete to Prosper: Improving Australia's Global Competitiveness. July 2014

<http://www.mckinsey.com/global-locations/pacific/australia/en/latest-thinking/compete-to-prosper>

<sup>15</sup> Shipping Australia Limited (2010), *International Port Cost Comparison Project*, [https://shippingaustralia.com.au/wp-content/uploads/2012/01/L\\_InterPortCostCcomparison.pdf](https://shippingaustralia.com.au/wp-content/uploads/2012/01/L_InterPortCostCcomparison.pdf)



## 3. National Critical Issues and Emerging Trends

### 3.1 Urban Growth Pressures

- What are the key issues for freight in Australia's major cities?
- How can Australia's urban networks better prioritise passenger and freight services in the most effective manner possible?
- How are our cities and supply chains being impacted by changing consumer behaviours such as online shopping?
- What are the critical last mile issues you face in urban areas?

Two thirds of the value of Australia's international trade flows through the four largest cities, Sydney, Melbourne, Brisbane and Perth<sup>16</sup>. Sydney leads Melbourne as Australia's major trading node by value due to the rise in the value of freight flowing through Kingsford-Smith Airport<sup>17</sup>.

Overall, the total road freight task in all capital cities is forecast to increase by two-thirds between 2008 and 2030, from 40.15 billion tonne kilometres (tkm) to 66.60 billion tkm. This represents an average growth rate of 2.33 per cent per annum<sup>18</sup>, outstripping the current population growth of around 1.5 per cent per annum. Nevertheless, our major cities will be much larger by 2030, with Sydney and Melbourne having around 6 million people each, and Brisbane and Perth around 3 million (see graph below).

The largest growth in the freight task is expected to occur in Brisbane, from 7.80 billion tkm in 2008 to 14.26 billion tkm in 2030, an average annual growth rate of 2.8 per cent.<sup>19</sup>

Such large increases in the freight task mean that to avoid future land use conflicts the Australian freight industry needs to build on the technological innovations that have increased productivity in recent years and continue to seek future productivity gains in a range of ways, not just rely on more roads and bigger trucks, ships and planes.

---

<sup>16</sup> BITRE (2015), *International trade and Australian cities: what house prices say*, Information Sheet 67, [https://bitre.gov.au/publications/2015/files/is\\_067.pdf](https://bitre.gov.au/publications/2015/files/is_067.pdf)

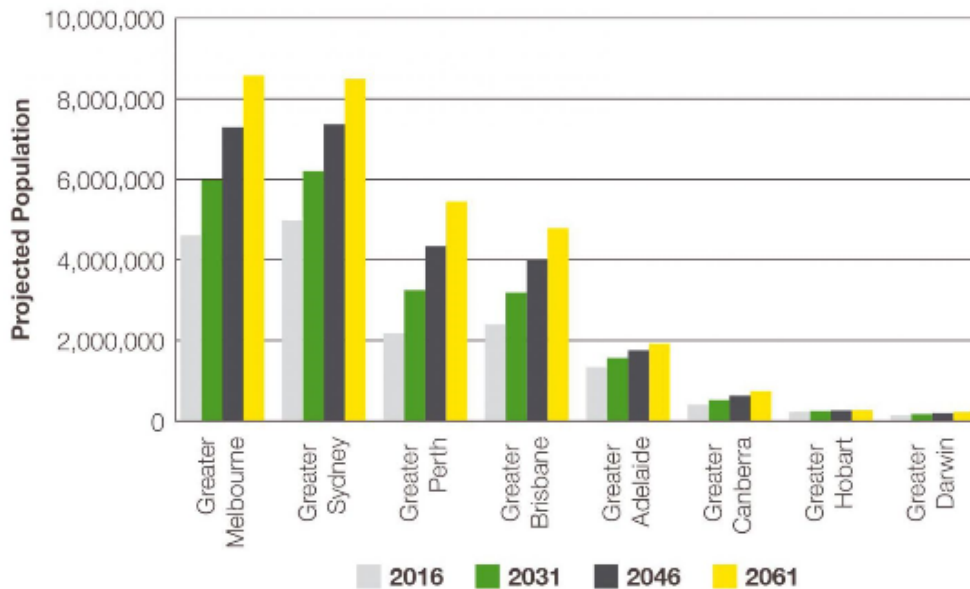
<sup>17</sup> BITRE (2015), *International trade and Australian cities: what house prices say*, Information Sheet 67, [https://bitre.gov.au/publications/2015/files/is\\_067.pdf](https://bitre.gov.au/publications/2015/files/is_067.pdf)

<sup>18</sup> BITRE (2010), *Road freight estimates and forecasts in Australia: interstate, capital cities and rest of state*, Report 121, [https://bitre.gov.au/publications/2010/files/report\\_121.pdf](https://bitre.gov.au/publications/2010/files/report_121.pdf)

<sup>19</sup> BITRE (2010), *Road freight estimates and forecasts in Australia: interstate, capital cities and rest of state*, Report 121, [https://bitre.gov.au/publications/2010/files/report\\_121.pdf](https://bitre.gov.au/publications/2010/files/report_121.pdf)



### Australian population growth by capital city and region



20

## 3.2 Port Corridor Pressures - Protecting Land, Sea and Air Connections

- Do you face, or expect in the future to face, problems moving your freight through Australian air, land or sea ports?
- How can Australia’s maritime channels be appropriately maintained and able to accommodate bigger ships?
- How are other countries dealing with the landside implications related to distributing cargo from bigger ships?

The performance of airport, port and intermodal terminals is strongly linked to the performance of the wider aviation, maritime and land transport networks. Impacts on the freight transport corridors, and competition for those corridors from passenger transport, will affect the performance of key terminals. Planning, technology and pricing are important means of ensuring a well-supporting network for our terminals.

Over time economic growth and the enlargement of market areas, primarily due to the growth of trade and transport, has supported the expansion of ports, airports and warehousing facilities. This continuing expansion of freight nodes is being challenged by growing population density in areas

<sup>20</sup> Australian Government (2016), *Smart Cities Plan*, <https://cities.dpmc.gov.au/htmlfile>



surrounding key transport infrastructure and increasing land costs causing conflicts over adjoining land uses, and growing congestion.

Freight corridor protection, for current and future use, is a vital component to ensuring the seamless transition to a future where the freight task will be 80 per cent greater in 2030 than the task in 2010.

The advent of bigger ships is an issue that many countries are currently grappling with. While the progressive introduction of bigger ships by international shipping lines reduces the carbon footprint and operating costs per container, many ports do not have the depth of water or landside connections required for these ships to dock. Dredging to accommodate bigger ships introduces a number of environmental concerns and must be approached with careful consideration. In addition, bigger ships create greater peaks in demand for landside infrastructure around already congested ports.

At Australia's largest container port, the Port of Melbourne, the average size of ships currently using the shipping channel is about 290 metres. Post-Panamax vessels that may be introduced to international shipping routes to Australia in the near future, are likely to be longer than 320 metres exceeding the current size restrictions at Swanson Dock<sup>21</sup>. Though options are currently under consideration to remedy potential limitations at the Port of Melbourne and larger ships can now access the new container terminal at Webb Dock, should larger ships become more common the Port of Melbourne's quay line capacity may be significantly impacted.

Land use conflicts near airports can result in regulations that restrict access, including through curfews and aircraft movement caps which reduce efficiency and limit the amount of air freight that can be carried. The *National Airports Safeguarding Framework*<sup>22</sup>, a collective initiative of the Commonwealth, state and territory governments, is a recent initiative to protect airports from inappropriate off-airport development.

### 3.3 End-to-end supply chain integration and regulation

- How effective is your supply chain at transitioning your freight between modes and across boundaries?
- What regulations do you have to deal with in your supply chains?
- How could any of them be simplified?
- Are empty containers a problem for you?

A large and relatively isolated country, Australia depends on freight infrastructure to access international markets for export and import of goods and operation of domestic freight networks to allow efficient internal markets. However, the distance from international suppliers and consumers

---

<sup>21</sup> Parsons, H and P Van Duyn (2014) *Build it – but will they come? A pre-mortem analysis of the Port of Hastings Development Project*, Institute for Supply Chain and Logistics, Victoria University

<sup>22</sup> [https://infrastructure.gov.au/aviation/environmental/airport\\_safeguarding/nasf/](https://infrastructure.gov.au/aviation/environmental/airport_safeguarding/nasf/)



and the multiple country and jurisdictional boundaries are challenges for the integration and regulation of Australian supply chains.

### **Integration**

A challenge for supply chain participants and consumers is the lack of visibility of freight moving through the supply chain, i.e. from shipping containers down to parcels ordered online. The two main causal factors include the use of paper-based records and incompatible technology and data transfer across supply chain participants. These two factors in particular can result in delayed or misdirected freight movements, poor use of freight infrastructure, and suboptimal investment planning.

There are some current efforts among industry groups in Australia to remedy this situation. The Australian Logistics Council and GS1 Australia, for example, have successfully piloted the development of a harmonised national tracking data standard that can be used by all supply chain participants to identify and share information as events occur along supply chains. A challenge in implementing any common tracking data standard will be ensuring take-up by smaller supply chain participants.

A Port Community System is a digital technology used in some of the world's largest ports. It is a neutral and open computer system allowing supply chain port participants to rapidly and securely exchange commonly required information, such as the identifiers of trucks and containers. Port Community Systems enable public and private stakeholders (customs, stevedores, freight companies, etc.) to optimise, manage and automate port and logistics processes. This facilitates efficient commercial interactions between supply chain participants, while ensuring that commercially sensitive information is protected.

Increasingly governments are looking to the private sector to improve freight movement efficiency by using technology to manage demand and schedule vehicle movements. The ubiquity of smart-phones provides a rich, low-cost source of real time traffic data, which is increasingly being used for a range of network optimisation, planning and road management purposes.

### **Regulation**

Australia's domestic freight network links with international networks through maritime and air transport, with air transport providing transport for time-critical and high value products and maritime catering for everything else.

Compared to other high-income OECD countries, Australia performs poorly on metrics relating to trading across borders. The cost (including time) to importers and exporters of complying with border regulations and documentary/information exchange is markedly higher than many of Australia's competitors. There is a view that unnecessary complexity exists in seaport gateway access for freight in particular, given the multiple levels of government involved in coastal shipping and landside regulation.

Consequently, minimising economic, safety, security and environmental regulatory burdens is a significant opportunity for the national economy by reducing the costs of freight entering and exiting the domestic market, as well as moving within Australia.





While governments have mechanisms to carefully scrutinise and moderate the regulatory burden, there can be unintended impacts on efficiency and productivity by uncoordinated or conflicting regulation or duplication and overlap of regulation between levels of government.

### **Empty Container Management**

The management of empty shipping containers is an ongoing challenge for Australia, because of trade imbalances between Australia and the world, and the pressures on the dehirring and storage of empty containers in our major cities.

The volume of containerised cargo shipped from the rest of the world, predominately Asia, to Australia continues to increasingly outstrip the volume of returning full boxes. This creates an imbalance that presents a logistics challenge for the supply chain. In the past there have been capacity issues within the empty storage market, mostly brought on by increasing dwell times. However over the past five years, port managers, empty container park operators and shipping lines have worked closely together to decrease the dwell time of stored empty containers, thus increasing the overall capacity.

Effective ways to handle the growing empty container task, which is primarily a metropolitan area issue, need to be considered. Suggestions such as:

- shipping lines repositioning empty containers overseas at a faster rate to reduce their dwell time in empty container parks;
- dehirring empty containers at intermodal terminals (for return to port by rail) and industrial lands away from the main port precincts; and
- dehirring empty containers directly at stevedore terminals where a full container is being collected, to allow maximum utilisation of trucks.

Increasingly transport operators and shippers are experiencing greater pressure on movement, storage and dehirring, of empty containers.

## **3.4 The Air Freight Market**

- Are our airports appropriately integrated into surrounding freight networks?
- Are there any international examples of where airports are used more effectively in freight networks?
- Can Australia be making greater use of air freight?

Australia's isolation from major cities and the time taken for sea freight to reach our shores means that air freight is an important part of the freight sector. Although volumes of freight are relatively small, air freight is generally high in value. Total international air freight at Australia's airports



nearly quadrupled from 1985 to 2013<sup>23</sup> and reached the million tonne mark in 2016. Domestic freight in 2016 totalled 435,700 tonnes<sup>24</sup>.

The major outbound air freight products by weight in 2011 were perishable food, including meat, vegetables, fruit, fish and crustaceans. These represented over 40% of Australia's outbound air freight by weight. As they often come from regional locations and are perishable, such products require reliable supply chains to reach their international destinations. Major air freight imports by weight were office machines, manufactured products, clothing, machinery and electrical items<sup>25</sup>.

The high value of air freight means that the value of trade value flowing through city airports can be similar to sea ports, although the volumes through seaports are much larger. Sydney and Perth Airports have about the same value of trade flowing through them as Port Botany and the Port of Fremantle<sup>26</sup>. These two airports also have the highest value of international trade, followed by Melbourne and Brisbane airports.

### 3.5 Changing Technology

- What emerging technological trends do you think will impact on your supply chain?
- When are these impacts likely to be felt and how does Australia's freight infrastructure need to be adapted to make best use of likely changes?
- Do you feel you can make use of the technology you need?

Digital technology has the potential to transform every aspect of moving freight through a supply chain. Examples include barcoding and SMS messaging for deliveries. New and retrofitted technology such as 3D printing and the use of unmanned aerial vehicles (drones) could radically change the way freight is moved, optimising operations and increasing productivity while partially offsetting the need for ever-increasing infrastructure investment.

#### **Supply chain optimisation, data and analytics**

Businesses in Australia and globally are already innovating, developing mobile applications to schedule and streamline the collection and delivery of containers at ports, and through the supply chain more broadly. Applications such as these increase productivity and reduce costs by more efficiently utilising labour and supply chain infrastructure.

CSIRO's Data61<sup>27</sup> is working on a range of projects to optimise transport and freight networks. For example, on the Sydney Harbour Bridge, sensors and data analytics are being used to predict

---

<sup>23</sup> Gregory (2015), *Creating access for regional communities to efficient and effective aviation logistics infrastructure*, Supply Chain & Logistics Conference 26 & 27 May 2015, <http://www.smartconference.com.au/wp-content/uploads/2015/05/Phil-Gregory.pdf>

<sup>24</sup> BITRE (2016) *Statistical Report, Domestic Aviation Activity*. December 2016. [https://bitre.gov.au/publications/ongoing/files/Domestic\\_aviation\\_%20Dec\\_2016.pdf](https://bitre.gov.au/publications/ongoing/files/Domestic_aviation_%20Dec_2016.pdf)

<sup>25</sup> Hamal k (2011) *International Airfreight movements through Australian airports to 2030*. [http://atrf.info/papers/2011/2011\\_Hamal.pdf](http://atrf.info/papers/2011/2011_Hamal.pdf)

<sup>26</sup> BITRE (2015), *International trade and Australian cities: what house prices say*, Information Sheet 67, [https://bitre.gov.au/publications/2015/files/is\\_067.pdf](https://bitre.gov.au/publications/2015/files/is_067.pdf)

<sup>27</sup> See <https://data61.csiro.au/>



maintenance problems before they occur, reducing costs and disruption to users of a key arterial road.

Governments are developing heavy vehicle asset registers and infrastructure investment plans, requiring assessment of key road freight routes in relation to access, safety characteristics and ride quality. This data will help inform funding decisions with a focus on improving the performance and maintenance of the freight network.

### **Automated and connected vehicles**

Over the coming decades, factors influencing freight movement by road will include:

1. Digital connectivity (to other vehicles and road-side infrastructure);
2. Electric vehicles (or other non-petroleum fuels); and
3. Automated, unmanned cars, trucks, trains, ships and planes.

These trends have the potential to be truly transformative, including for freight transport, and present a range of legal, economic, safety and security issues.

The Australian Government is working with the states and territories under the *National Policy Framework for Land Transport Technology*<sup>28</sup> to ensure the policy and regulatory settings are ready to support trialling of automated vehicles in the short term, and on-road use of vehicles with higher levels of automation in the longer term.

### **Innovation in Unmanned Aerial Vehicles (UAV) and 3-dimensional printing**

Innovative movement of goods, such as the use of UAV, or Unmanned Aerial Systems (UAS) have the potential to significantly disrupt current methods of delivering freight in urban areas. UAVs also have the potential to be used to cost-effectively inspect and maintain freight infrastructure such as bridges, or to monitor operations.

The use of UAVs for freight transport presents a significant challenge to regulators, in balancing the need to maintain safety outcomes for existing aviation users and people and property on the ground, while at the same time not overly restricting innovation.

3D printing (or additive manufacturing) has the potential to reshape global trade patterns, by enabling the manufacture of goods, or components, closer to consumers. This could reduce demand for international or long haul freight movements and reduce warehousing and inventory requirements as more products are routinely customised. There are significant opportunities for innovation as manufacturing becomes a supply chain service.

---

<sup>28</sup> Transport and Infrastructure Council (2016) *National Policy Framework for Land Transport Technology*.  
[http://transportinfrastructurecouncil.gov.au/publications/files/National\\_Policy\\_Framework\\_for\\_Land\\_Transport\\_Technology.pdf](http://transportinfrastructurecouncil.gov.au/publications/files/National_Policy_Framework_for_Land_Transport_Technology.pdf)



## 4. Next Steps

### 4.1 Capacity Forecasting

The terms of reference for the Inquiry include a requirement to assess the capacity of key ports, airports and intermodal terminals to meet freight demands over the next 20 years.

Any data or insights you are willing to contribute to assist in this assessment would be appreciated.

### 4.2 Key Drivers of Change for Use in Scenario Planning

The terms of reference for the Inquiry include a requirement for scenario planning. This will encompass some of the potential drivers of change in freight and supply chains, including population growth and locational shifts, technological change and climate change adaptation strategies.

The Inquiry welcomes views on what factors and key drivers of change should be considered in the analysis.

The Inquiry is also keen to identify key functional elements of supply chains through case studies demonstrating how Australia's freight system is working on the ground, including case studies about things working well, as well as examples of the problems and where improvements can be made. Identification of potential future trends in supply chains would be valuable.

### 4.3 A National Freight Performance Framework

The terms of reference for the Inquiry require identifying options for regulatory change and investment to improve performance, productivity and efficiency of freight and supply chains in Australia. To be able to determine if proposed reforms can do this, a baseline and ongoing monitoring of freight and supply chain system performance is need.

The Inquiry is particularly interested in views on the potential need for a national freight performance framework and the likely key indicators.

### 4.4 Submissions

The deadline for submissions is 28 July 2017. Following the completion of the public consultation process, the Department will collate and review all submissions. A draft Inquiry report will be presented to the Minister for Transport and Infrastructure by December 2017, with a final report to be provided in March 2018.

The findings from the Inquiry will inform the development of a National Freight and Supply Chain Strategy for consideration by the Council of Australian Governments Transport and Infrastructure Council in 2018.



Providing input to the issues paper is your opportunity to help develop and steer the freight and supply chain at a national level for the next 20 years. Please send your submission to:

By email: [freightstrategy@infrastructure.gov.au](mailto:freightstrategy@infrastructure.gov.au)

By post: Freight and Supply Chain Priorities  
Department of Infrastructure and Regional Development  
GPO Box 594  
CANBERRA CITY ACT 2601

Submissions are open until 28 July 2017.



## Attachment A: Structure of Australia's Freight Network

Infrastructure assets are long lived (typically 35 to 100 years). The bulk of the infrastructure that will be used to handle the freight task for the foreseeable future is already in place today. Most of this infrastructure is in the form of common user facilities, which will continue to need to service a diverse range of changing and differently growing freight needs. Lifting the efficiency and productivity of existing freight transport infrastructure stock will be critical for supporting future growth.

### Current freight network structure

Australia's current freight infrastructure is the legacy of land transport and coastal shipping routes that evolved from the original six independent British colonies federated under the Commonwealth of Australia in 1901. Key periods of construction and technological development included:

- from the early 1800s - coastal shipping facilities in place of effective land transport to export ports;
- 1860s to 1900s – significant regional/intrastate railway construction, including agricultural commodity routes that are still in use;
- 1920s to 1980s – staged expansion of the arterial and local road networks, and the growth of the aviation network, commencement of the National Highway System (NHS) and sealing of all NHS roads which gradually diminished the use of rail; regular container shipping services were introduced which saw significant investment as ports adapted their facilities and resulted in the opening, in 1979, of Australia's first dedicated container port at Botany in Sydney.
- 1980s to now: a significant period of major highway construction under the NHS and successive programs, the resources freight network, standardisation of the interstate rail network and the creation of the Australian Rail Track Corporation to act as a single operator for the majority of interstate track; introduction of National Competition Policy to promote efficient use of infrastructure, amongst other things; the privatisation of major airports and ports and deregulation of the airline industry; and initiation of heavy vehicle regulatory reform with the creation of the National Road Transport Commission in 1991 and the introduction of Heavy Vehicle National Law in 2014. Currently, increased demand for mineral exports has driven significant investment in rail capacity and bulk port terminals; increased demand for imports and the growth of containerisation, has led to increased demand for cargo handling, leading to investment in container terminals and landside intermodal access; automated technologies are being integrated in ports, on rail and increasingly in other modes of transport.

The current infrastructure network comprises:

- **Ports:** bulk ports (including offshore oil and gas), mixed ports for containerised and bulk goods, and ports of other significance (e.g. Antarctic shipping).
- **Airports:** major (federally leased) airports, regional (state/local government) airports, remote and private landing strips.
- **Air and sea routes:** although not physical infrastructure assets, these channels form vital domestic and international links in Australia's freight network.



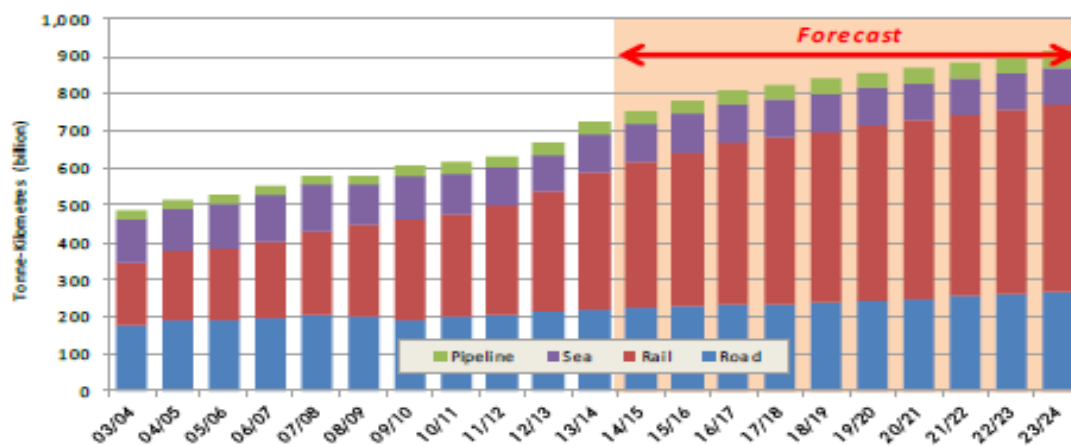
- **Roads:** Public roads – Urban highways (including toll roads), non-urban highways, arterials, local roads; and private roads such as at ports, airports, intermodal terminals and industrial sites.
- **Rail:** Interstate, intrastate/resource (bulk goods), and metropolitan rail (mixed goods mostly shared with the passenger network but there are some dedicated freight rail lines).
- **Intermodal facilities:** precincts for the interchange of mixed freight between rail and road transport. These typically have warehousing and other value-adding features.

Among these are the nationally significant places for freight and the key freight routes, which were identified and first mapped by governments in 2014. The national key freight routes map is an evolving document, available online at:

<<http://maps.infrastructure.gov.au/KeyFreightRoute/index.html>>.

A valuable consideration for users of each mode is ensuring the right commodity is on the right mode of transport at the right time, which highlights the value of freight forwarders and users using a multi-modal approach. Current projections of growth by modal type are provided below.

**Graph: Forecast Growth in the Australian Domestic Freight Task, by Mode of Transport**



29

<sup>29</sup> National Transport Commission (2016), *Who Moves What Where: Freight and Passenger Transport in Australia*, information paper, [https://www.ntc.gov.au/Media/Reports/\(D62E6EFC-36C7-48B1-66A7-DDEF3B04CCAE\).pdf](https://www.ntc.gov.au/Media/Reports/(D62E6EFC-36C7-48B1-66A7-DDEF3B04CCAE).pdf)



**Map: Why Ports are Important - Value of Australia's international sea freight by trading region of final destination/origin**



Note: "Appendix B: Trading regions and country codes" shows the country composition of trading regions. "PNG" stands for "Papua New Guinea".

Source: ABS (2014).





# Attachment B: Inquiry Terms of Reference

## INQUIRY INTO NATIONAL FREIGHT AND SUPPLY CHAIN PRIORITIES

### TERMS OF REFERENCE

The Australian Government is seeking to improve freight and supply chain efficiency and capacity and to reduce the costs of transporting goods through our major national container ports, airports and intermodal terminals.

To achieve this the Government is undertaking an Inquiry into Australia's National Freight and Supply Chain Priorities. Identified priorities will inform the development of a long term (20 year) National Freight and Supply Chain Strategy through the COAG Transport and Infrastructure Council.

An Expert Panel will assist in the inquiry, by reviewing inquiry findings, providing advice on how Australia can best lift productivity and the efficiency of Australia's freight and supply chain infrastructure, and leading engagement with industry on the inquiry's objectives. The Expert Panel will be able to access specialist advice to complete its role throughout the inquiry process.

Productivity is the foundation for growth in Australian incomes and living standards. The freight and supply chain sector contributes to that growth as a service provider to Australian industries, communities and regions, and as the connection to international suppliers and consumers.

Australia's freight task is expected to grow by around 50 per cent over the next two decades. Australia's freight supply chains, including road, rail, shipping and air, need to continue adapting to meet the freight task.

When examining options for new and/or adaptive capacity to meet forecast freight growth, and possible productivity and efficiency improvements for freight and supply chain infrastructure, the inquiry will need to take into account a range of factors and possible interdependencies, including: urban, regional and investment planning; efficient markets; competition; innovation; connectivity; resilience; and safety. Industry has identified the following measures as important:

- preservation of transport corridors and protection of access corridors (including shipping channels) and freight precincts from encroachment which reduces efficiency and capacity of key national port, airport and intermodal terminal assets;
- integrated land use and transport planning to ensure adequate land transport and site capacity, including airport/port/intermodal terminal master planning;
- rail access to ports and intermodals;
- efficient pricing and competitive access arrangements for key infrastructure assets;
- efficient infrastructure investment planning;
- first and last mile issues;
- road and supply chain safety;
- better use of big and open data to maximise innovation opportunities;
- the key technology changes likely to enable further efficiency and safety improvements; and
- effective supply-chain performance data and measurement.



### **Scope of the inquiry for a national freight and supply chain strategy**

Without limiting related matters, the inquiry and development of a national freight and supply chain strategy through consultation with industry will inform Transport and Infrastructure Council members, by:

1. Establishing the capacity of the key national ports, airports and intermodal terminals in comparison to international markets with similar characteristics, identifying trends occurring in the global supply chain and reviewing the adequacy of investment planning to efficiently meet forecast growth to keep Australia's position with its trading partners;
2. Determining the regulatory and investment barriers to improved efficiency and access to key national terminals, including road and rail corridors;
3. Establishing the opportunities for regulatory changes and targeted investment to lift the capacity of key supply chain nodes and improve efficiency of operations, including an analysis of the implications of the changing profile of ownership in large scale supply chain infrastructure such as ports and rail;
4. Identifying the costs and benefits of options at a national level to improve:
  - a. The efficient operation of our national supply chain system, including effective and transparent public performance measures for key national terminals; and
  - b. Broad first and last mile issues.
5. Providing options for scenario planning and predictions, where possible, related to the following areas:
  - a. Future developments across the supply chain e.g. distributed production and changes in technology;
  - b. Urban distribution and impacts of the movement of freight in urban areas due to population growth and changing consumer activities such as online shopping;
  - c. Decentralisation and redistribution of the population into regional centres;
  - d. Trade arrangements and the development of distribution systems in agriculture; and
  - e. Impacts on the supply chain following major climatic events.
6. Exploring opportunities to use big and open data and new digital technologies to improve the performance of our freight infrastructure; and
7. Identifying options and recommending regulatory changes and investment actions (public or private) that will benefit the economy over the next 20 years. Specifically through improved performance, productivity and efficiency of the freight and supply chain network and infrastructure.

The inquiry should have regard to any recent policy reviews commissioned by Australian governments relating to the productivity performance of Australia's transport infrastructure such as:

- The current land transport market reform and work program;



- Productivity Commission’s National Access Regime, Infrastructure and Agriculture Reviews – 2013-2016<sup>30</sup>;
  - Harper Competition Policy Review – 2015<sup>31</sup>;
  - Infrastructure Australia’s 2015 Infrastructure Plan and 2016 government response<sup>32</sup>;
  - Agricultural<sup>33</sup> and Northern Australia<sup>34</sup> White Papers – 2015;
  - Industry Innovation and Competitiveness Agenda<sup>35</sup>, and National Science and Research Priorities – 2014-2015<sup>36</sup>;
  - National Ports Strategy<sup>37</sup>, National Land Freight Strategy<sup>38</sup> and current state and territory freight/port strategies and plans – 2012 to present;
  - Coastal shipping reviews and city deals;
  - National Rail Vision and Work Program<sup>39</sup>;
- and include any international best practice guidance relevant to freight and supply chain infrastructure.

### Process

The inquiry report should be supported by evidence and, where possible, provide qualitative analysis where data is not available.

A draft report is to be made available for industry and government for comment by December, and the final report should be provided to the Government by March 2018.

### **DARREN CHESTER**

Minister for Infrastructure and Transport

9 March 2017

---

<sup>30</sup><http://www.pc.gov.au/>

<sup>31</sup><http://competitionpolicyreview.gov.au/final-report/>

<sup>32</sup><http://infrastructureaustralia.gov.au/policy-publications/publications/Australian-Infrastructure-Plan.aspx>

<sup>33</sup><http://agwhitepaper.agriculture.gov.au/>

<sup>34</sup><http://www.northernaustralia.gov.au/sites/prod.office-northern-australia.gov.au/files/files/NAWP-FullReport.pdf>

<sup>35</sup><https://industry.gov.au/industry/Pages/Industry-Innovation-and-Competitiveness-Agenda.aspx#header>

<sup>36</sup><http://science.gov.au/scienceGov/ScienceAndResearchPriorities/Pages/default.aspx>

<sup>37</sup>[http://infrastructureaustralia.gov.au/policy-publications/publications/files/COAG\\_National\\_Ports\\_Strategy.pdf](http://infrastructureaustralia.gov.au/policy-publications/publications/files/COAG_National_Ports_Strategy.pdf)

<sup>38</sup>[http://transportinfrastructurecouncil.gov.au/publications/files/National\\_Land\\_Freight\\_Strategy\\_Compressed.pdf](http://transportinfrastructurecouncil.gov.au/publications/files/National_Land_Freight_Strategy_Compressed.pdf)

<sup>39</sup>[http://transportinfrastructurecouncil.gov.au/publications/files/National\\_rail\\_vision\\_and\\_work\\_program.pdf](http://transportinfrastructurecouncil.gov.au/publications/files/National_rail_vision_and_work_program.pdf)