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Access Economics

NSW Container and Port Policy

Port of Newcastle

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NSW PORT AND FREIGHT STRATEGY

The Port of Newcastle is an untapped solution in managing freight challenges in NSW

The freight challenge in NSW

2.4 million TEU moved through Port Botany in 2016-17

Moving this freight through Sydney faces **congestion and high costs** on both road and rail

$27.6 billion is planned for infrastructure to support port freight, largely to address current challenges

In the future, despite investments, this **pressure will intensify**, driven by growth in population and port freight

Current policy for **continued reliance on Port Botany** while freight grows to at least **5 million TEU** a year by 2040 and **then only considering expansion to Port Kembla**, exacerbates freight challenges

The potential for **Port of Newcastle as a solution** to current and future freight challenges is not addressed and is currently subject to artificial restrictions

The Port of Newcastle

The Port of Newcastle has capacity now to accommodate a **2 million TEU container terminal** if current restrictions are removed

By servicing its natural catchment PON could reduce the need for **500,000 TEU** a year to pass through Sydney's freight network. Growing to 1.1 million TEU by 2050

PON could help **reduce the strain on Sydney's transport network**, reducing congestion and delaying the urgency of some costly infrastructure projects now and in the future

Container movements at PON would **support regional growth and development**, in the Hunter and across NSW more broadly

If port competition is increased, port productivity will **grow by 2.5%** points and landside **transport costs will be reduced by $1.3 billion**

Executive Summary

NSW is currently facing increasingly intense challenges in managing port related freight. These challenges are fundamentally driven by growing population and economic activity but are made acute by the fact that the majority of NSW port freight currently moves through the congested population centre of Sydney, by the current limitations of freight network infrastructure and the difficulty in efficiently expanding the freight network.

This problem is present for both road and rail transport of port freight with each mode facing unique challenges (toll increases and a growing passenger rail task squeezing out freight rail, for example). As the freight task grows, this problem is only going to become more challenging.

Expanding the freight network in Sydney is necessary and Government is currently planning around $3 billion to help decongest Sydney's freight network. Future expansion poses significant challenges and, over time, there will be a need to relocate some trade activity away from Port Botany. Currently, NSW Government plans and strategies focus on Port Kembla as the alternative container port for NSW

There is little regard to the significant role that the Port of Newcastle could play in helping to manage the current and growing freight task for NSW as well as in facilitating major economic, environmental and regional benefits to the State.

This is a significant gap in planning, as it doesn't account for a number of important considerations:

- The current and future volume of freight moving into and out of Northern NSW is significant and is comparable to total throughput seen at some of Australia's ports. Moving this freight through Port of Newcastle would keep it out of Sydney reducing transport costs and potentially delaying the need to expand the freight network;

- The draft freight and ports plan does not contemplate utilising the existing capacity within the Port of Newcastle and its road and rail connections in meeting the container freight task. Therefore, the current plan may result in inefficient outcomes and unnecessary investment;

- Focussing on Port Kembla alone doesn't integrate with broader NSW Government plans for regional development. By diversifying port freight across the state and reducing supply chain costs for producers and consumers, the NSW Government could enhance current 'economic engine' industries across NSW, boost regional economic development and industrial diversity; and

- A more competitive port industry in NSW would create benefits in terms of reduced freight costs, fewer transport externalities and greater port and stevedore productivity which would flow through to the broader economy.

Overall, the current pressure on freight movement in NSW will intensify as employment and population increase over the next 30 years in Sydney and its surrounding regions. The significant increase in population and in

employment will also increase regional demand. This would lead to substantial growth in the number of containers that need to travel through NSW ports to meet rising demand. The level of NSW exports will also increase as output increases, driving even more port activity. Unless relieved by appropriate freight and regional planning, this pressure is likely to be concentrated in the Sydney region as this is where the vast majority of future growth occurs.

In summary, the message is clear: freight planning in NSW must come to terms with effectively managing a growing freight task in the presence of current challenges in Sydney's freight network and long term constraints at Port Botany.

The Port of Newcastle has existing port, road and rail capacity for a container terminal and offers a currently untapped solution to these freight challenges. Making better use of the Port of Newcastle for freight would also create benefits for the NSW economy more broadly and would assist in regional development for Northern NSW.

Findings

- In 2016-17 Port Botany saw around 2.43 million TEU moved through the port, a 4.6% increase over the previous year;
- Container movements will be well over 5 million TEU a year by the 2040s;
- 87% of NSW containers are initially transported to the greater Sydney area for unpacking. After unpacking, 61% of containerised imports remain in Sydney with 27% moving to the 'natural' catchment of the Port of Newcastle;
- Sydney accounted for around 43% of containerised export tonnage while the Port of Newcastle catchment accounted for 38%;
- All up, Sydney generates around 900,000 full TEU a year while the catchment of the Port of Newcastle generates around 500,000 full TEU a year and Southern NSW around 220,000 full TEU;
- Sydney will see around 2 million full TEU of exports and imports annually in 2050, the Port of Newcastle catchment around 1.1 million full TEU and Southern NSW to 450,000 full TEU;
- NSW Government plans recognise that Port Botany is anticipated to reach its natural capacity between 2030 and 2040, with existing and current plans indicating that Port Kembla will act as the overflow port for NSW port freight;
- The significant potential of, and future role for, the Port of Newcastle appears poorly understood and an omission in current NSW Government policy documents;
- The lack of consideration of the potential role for the Port of Newcastle in managing NSW's growing freight task appears as a shortcoming of current freight strategy in NSW;
- There is currently around $27.6 billion in planned investment to support port freight in NSW;
- Upcoming investments to directly support current port freight is in excess of $3 billion;
- Investments planned to support Port Botany generally focus on enhancing capacity of connections between the port and western Sydney with little expenditure identified for the port itself;
- For Port Kembla, investments are required both within the port precinct and to better connect the port it to the NSW freight network; and
- For the Port of Newcastle, much of the investment is focussed on enhancing connections between Sydney and Newcastle with no

significant planned or required direct investment in port infrastructure to enable an increase in container movements.

Table i: Some upcoming investments to manage current port freight in Sydney

Project	Cost
Moorebank Intermodal Terminal	$1.8 billion
Sydney Gateway	$800 million
Port Botany freight rail duplication	$200 million
Airport East Upgrades	$170 million
Southern Sydney Freight Line upgrade	$80 million
Total	**$3.1 billion**

Source: Deloitte Access Economics

- The Port of Newcastle has the potential to play an integral role in fulfilling the strategies and plans for regional development in NSW but this role is not currently recognised in many regional planning documents.
- Increased port competition could add, on average, 2.5 percentage points to port productivity growth rates for 6 to 7 years thereby making a significant gain to supply chain logistics costs for exporters and importers across a range of industries.
- A lack of container port competition in NSW could generate around $1.3 billion in additional landside transport costs and externalities in NSW and around $50 million in additional toll payments over the period to 2050 based on a per trip toll cost of $60-80. These costs are set out in the table below with toll costs likely being a conservative estimate:

Table ii: Transport related economic benefits for PON catchment freight

Cost item	$m in 2018	$m NPV
Landside transport costs	63.5	1,108
Congestion	4.5	78
Road damage	0.5	9
Accident costs	0.5	8
Air pollution	3.1	53
All others externalities	3.4	60
Total benefits	**75.5**	**1,316**
Estimated road toll payments	2.5	48

Note: NPV is calculated to 2050 using a discount rate of 7%

Source: Deloitte Access Economics

Summary Report

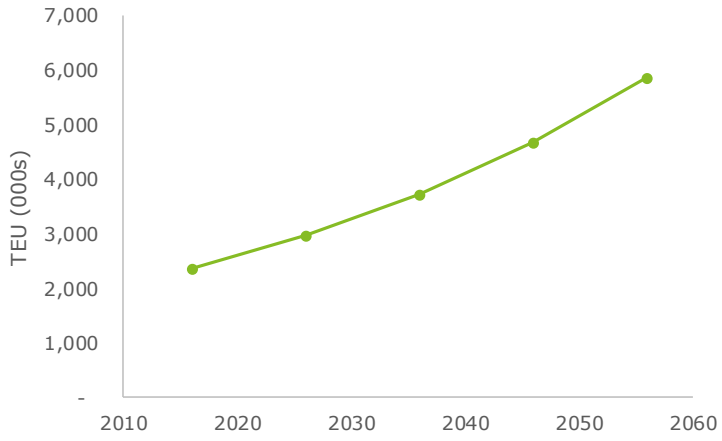
Port freight in NSW

Australia's freight task is the fifth largest in the world (OECD, 2018), and it is growing quickly. Almost all (97%) of Australia's imports and exports are moved by sea, passing through the nation's ports on the way (Deloitte, 2013). In 2014-15, 27 million tonnes of freight were imported into NSW with around 9.5 million tonnes of containerised freight.

Considering Port Botany in particular, in 2016-17 Port Botany saw around 2.43 million TEU moved through the port, a 4.6% increase over the previous year. Full exports grew at a very strong 9.8%, largely driven by good agricultural harvests. Over the longer run, annual growth rates in containerised trade in NSW have been around 5% a year.

In the future, strong growth in containerised freight in NSW is expected to continue. Although forecasts vary significantly, there is general agreement that container movements will be well over 5 million TEU a year by the 2040s.

Chart i: NSW TEU forecasts – 2.3% per year growth



Source: Indicative based on recent consultation with TfNSW

According to customs data, the vast majority of containers are initially transported to the greater Sydney area for unpacking. These containers are generally transported to broader Western Sydney areas such as Eastern Creek, Hoxton Park, Erskine Park, Wetherill Park and Blacktown, which are supported by significant warehousing facilities.

Considering where the freight inside the container ends up, aggregating all Sydney SA4s[1], modelling indicates that just over 61% of containerised imports remain in Sydney. The Port of Newcastle catchment, defined broadly as shown in the figure below, is estimated to account for around 27% of containerised imports with the southern part of NSW accounting for the remaining 12% of containerised imports. These results are based on

[1] Statistical Area Level 4, defined by the ABS to represent meaningful sub-regions for each state.

how containerised imports are used in the NSW supply chain and the location of relevant economic activity. The PON's catchment has been selected based on consideration of factors such as the distance, cost and transport options available within NSW for transport to different ports.

Figure i: Catchment area for Port of Newcastle

Source: Port of Newcastle

Exports are sourced from a broader range of areas within the state. Overall NSW exported around 186 million tonnes of freight in 2014-15, of which approximately 6.9 million tonnes was containerised. Sydney accounted for around 43% of containerised export tonnage while the Port of Newcastle catchment accounted for 38% of all containerised exports.

Table iii: Estimated regional locations of port freight in NSW

	Greater Sydney	Eastern Sydney	Western Sydney	PON Catchment	Southern NSW	Total NSW
Total freight						
Import (% of tonnes)	57	32	25	30	13	100
Export (% of tonnes)	13	4.8	8.6	77	10	100
Containerised freight						
Initial location (% of TEU)	87	NA	NA	4	9	100
Unpacked location						
Import (% of TEU)	61	36	24	27	12	100
Export (% of TEU)	43	21	22	38	18	100
Total Full TEU	**898,487**	**513,649**	**384,838**	**497,141**	**223,731**	**1,619,359**

Source: Deloitte Access Economics estimates

Figure ii: Containerised import destinations in NSW by SA4, 2014-15 (TEU)

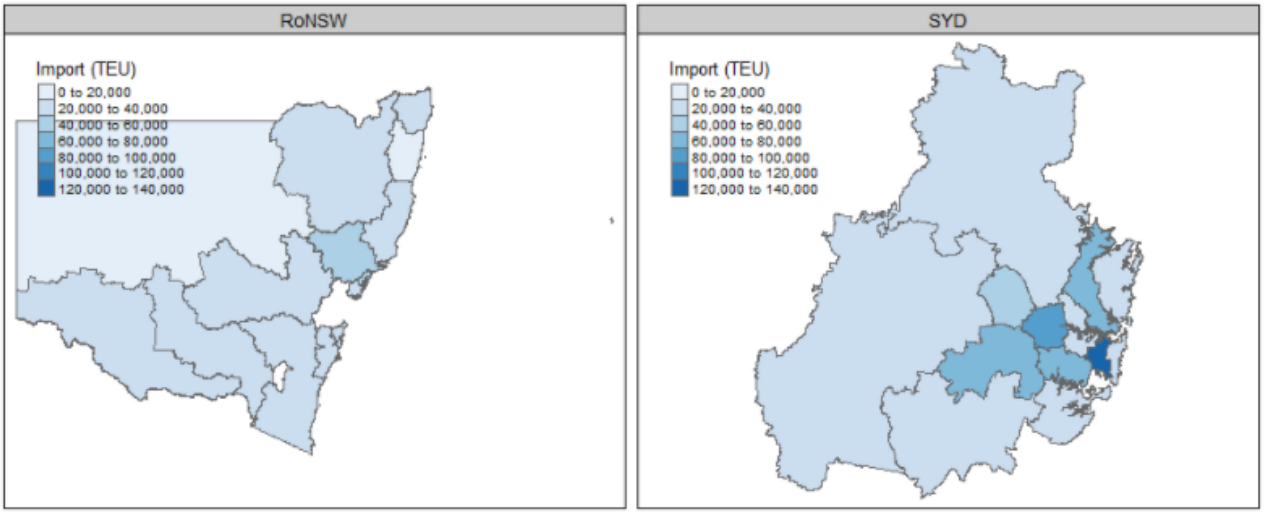
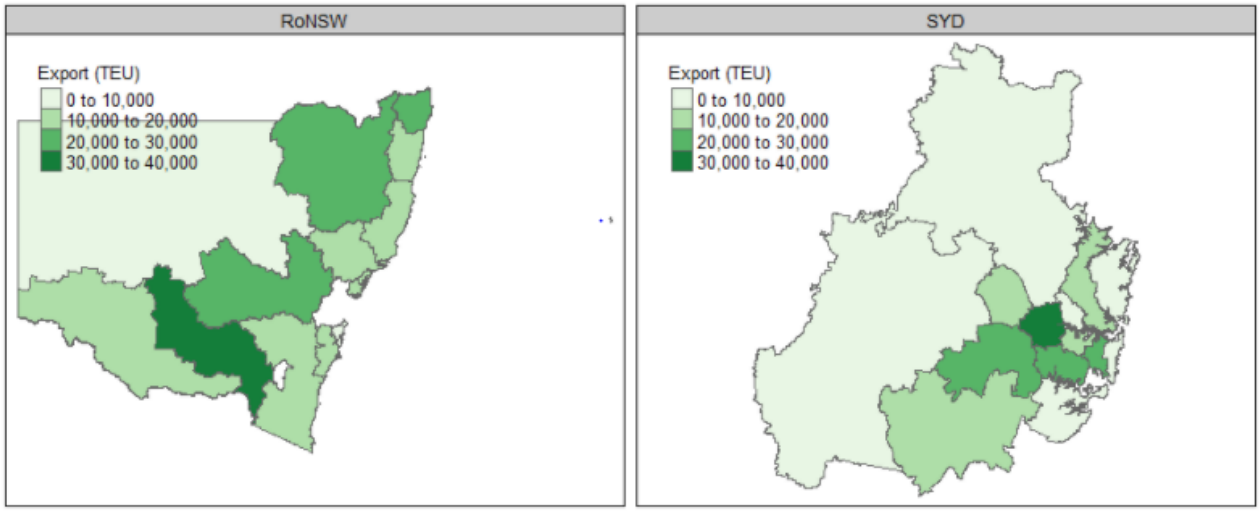


Figure iii: Containerised export origins in NSW by SA4, 2014-15 (TEU)



Growth challenges

New South Wales is currently facing intensifying challenges in managing its port freight task. The number of containers moved through NSW's ports is expected to break the 5 million TEU mark in the late 2040s, double current levels. Without a diversification plan, this freight will be concentrated on Port Botany and Sydney's major east-west road and rail links.

This growth is fundamentally driven by increases in population and economic activity. Overall, the NSW population is projected to rise from 7.8 million in 2016-17 to about 11.1 million in 2049-50, an addition of some 3.3 million people, roughly equivalent to the current population of Brisbane and Adelaide combined. The Greater Sydney region is expected to continue to grow relatively strongly over the period to 2050, with average annual population growth between 2016-17 and 2049-50 of 1.3% per annum. This means that the Greater Sydney region is expected to grow by around 87,000 people each year on average in the decade to 2019-20, and 70,000 people per year in the decade to 2049-50.

Table iv: Summary population projections

		Historical 2009-10	Forecast 2019-20	2029-30	2039-40	2049-50
New South Wales						
Population	000's	7,113	8,180	9,271	10,218	11,125
Average annual change[(a)]	000's	68,558	133,328	136,386	118,331	113,354
Average annual change[(b)]	%	1.0%	1.2%	1.0%	0.8%	0.7%
Greater Sydney						
Population	000's	4,534	5,399	6,302	7,054	7,750
Average annual change[(a)]	000's	50,682	86,545	90,275	75,208	69,591
Average annual change[(b)]	%	1.2%	1.8%	1.6%	1.1%	0.9%
Share of New South Wales	%	63.7%	66.0%	68.0%	69.0%	69.7%

Source: Australian Bureau of Statistics; Deloitte Access Economics.

Note: (a) Average calculations for 2009-10 start in 2001-02; (b) Compound annual growth rate of the previous decade; Average calculations for 2009-10 start in 2001-02.

Overall, the current pressure on freight movement will intensify as employment and population increase over the next 30 years in Sydney and its surrounding regions. The significant increase in population and increase in employment will also increase regional demand. This would lead to substantial growth in the number of containers that need to travel through NSW ports to meet rising demand. The level of NSW exports will also increase as output increases, driving even more port activity. Furthermore, unless relieved by appropriate freight and regional planning, this pressure is likely to be located in the Sydney region as this is where the vast majority of future growth occurs.

Modelling of the expected population and economic growth in each region in NSW, and keeping total TEU forecasts to indicative levels expected in recent forecasts from TfNSW indicates that port freight is expected to more than double between 2015 and 2050, reaching around 5.2 million TEU by 2050 of which around 3.6 million TEU will be full containers. The table below

shows how this growth is split across each region in NSW, both in import and export terms.

Table v: Full import, export and total TEU volumes in NSW

Region	2020	2030	2040	2050
Greater Sydney				
Imports	828,494	1,087,059	1,354,320	1,617,977
Exports	244,398	320,672	399,511	477,288
Total	1,072,892	1,407,732	1,753,832	2,095,265
PON catchment				
Imports	364,600	457,561	570,462	699,265
Exports	210,747	264,480	329,740	404,190
Total	575,346	722,042	900,202	1,103,455
Southern NSW				
Imports	153,699	189,057	228,823	276,144
Exports	97,288	119,670	144,841	174,794
Total	250,987	308,727	373,664	450,938
Total NSW				
Imports	1,346,793	1,733,678	2,153,606	2,593,386
Exports	552,433	704,822	874,092	1,056,272
Total	1,899,226	2,438,500	3,027,698	3,649,658

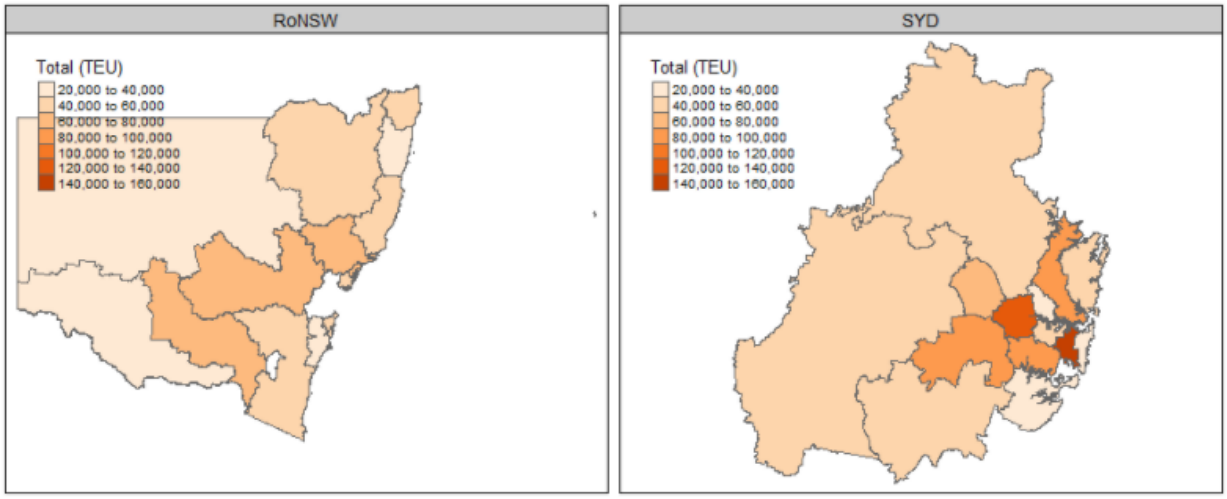
Source: DAE modelling

Overall, this growth will take Sydney to around 2 million full TEU annually in 2050, the Port of Newcastle catchment to around 1.1 million full TEU and Southern NSW to 450,000 full TEU.

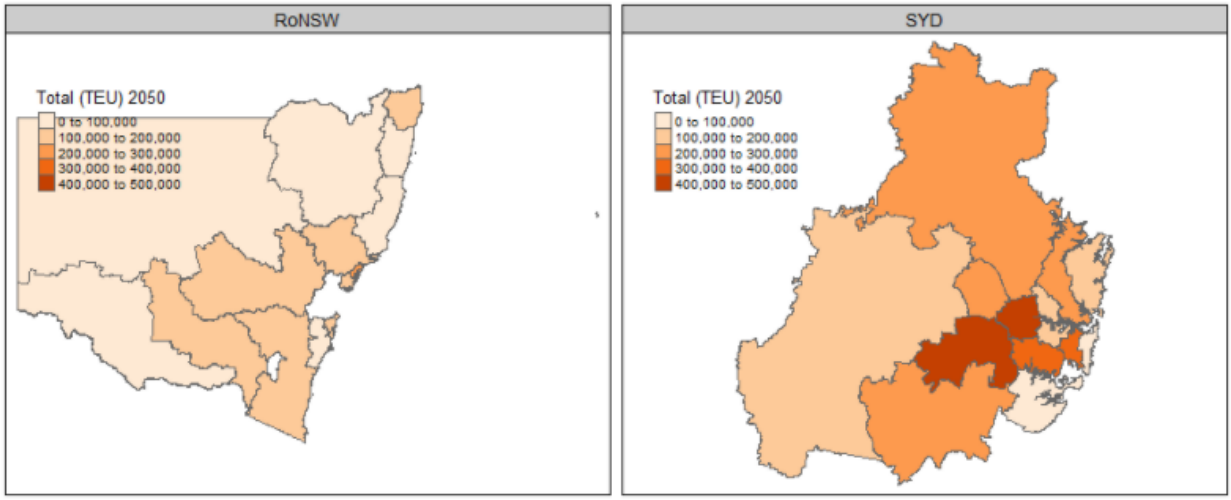
This analysis indicates that a significant proportion – over a quarter – of the imports and an even larger share of the exports – 38% – that are currently moving through Port Botany are actually destined for use in parts of the state that are closer to the Port of Newcastle. This suggests that the Port of Newcastle could play a role in more efficiently moving this freight into the supply chain.

Figure iv: TEU by SA4 region, 2015 and 2050

2015



2050



This expected growth in Sydney presents a number of challenges. The container supply chain in Sydney includes a mix of both rail and road transport. Road, however, accounts for the majority of movements (likely in excess of 90% of movements within the metropolitan area). For road, there are a number of issues facing container transport in NSW including poor infrastructure near the port, congestion, the direct cost of road tolls, and access restrictions. For rail, there are challenges in terms of accessing reliable times of availability at the port and navigating through the congested commuter rail network. These rail challenges lead to problems with existing train paths and rail windows at the port, which will become more intense as the volume of commuter rail increases.

This growth in population and container movements will put increasing pressure on Port Botany and its supply chain connections to western Sydney, which are both already facing congestion issues, and also raises the potential for ports outside Sydney to play a role in servicing their local market and reducing pressure on Port Botany and Sydney more broadly.

Planning for growth

Past and current transport plans and strategies acknowledge these challenges facing NSW's freight network and highlight the issues of:

- bottlenecks on road and rail networks;
- overall capacity of the freight network; and
- community and environmental impacts of freight.

These ongoing challenges in the Sydney metro region highlight the need for real consideration for ports outside Sydney to play a role in servicing local and nearby regional markets, reducing pressure on Port Botany and mitigating negative externalities in the Sydney area.

NSW Government plans recognise that Port Botany might approach its natural capacity between 2030 and 2040, due to the growth in freight outstripping future capacity of Port Botany, and therefore, an additional container port will be required to supplement Port Botany. Existing and current plans are consistent in their indication that Port Kembla will act as the overflow port for NSW port freight.

The significant potential of and future role for the Port of Newcastle is generally not well recognised nor effectively dealt with in detail in current NSW Government policy documents. At most, there is consideration of the Port of Newcastle's role as an ongoing coal export facility. There is generally no consideration given to the potential for the Port of Newcastle to:

- complement Port Botany as a major container port;
- assist in developing the north-south connections described in the Draft Greater Sydney Region Plan;
- contribute to the ongoing diversification and revitalisation of the Newcastle and Hunter economy;
- facilitate a growing non-bulk freight task in NSW;
- act as an important element of a plan to mitigate against many of the negative externalities impacting on the ongoing effectiveness of Sydney as a major conurbation driving the nation’s growth; or
- enable the efficient export of a diversified mix of commodities from NSW.

The lack of consideration of the potential role for the Port of Newcastle in managing NSW's growing freight task is a missing component of current freight strategy in NSW.

A result of overlooking the potential role of the Port of Newcastle in managing NSW's growing port freight task is that consideration has not been given to the overall level of investment required to support growth in NSW's port freight under different policy options. A number of road and rail projects that will support port freight are outlined within various government plans and strategies, including the *NSW Freight and Ports Plan*, the *2015-2024 Sydney Metropolitan Freight Strategy*, and the *Infrastructure Priority List*. It also lists a number of port-specific projects identified within port development plans, including NSW Ports’ *Navigating the Future* and Port of Newcastle’s *Port Development Plan 2015 – 2020.*

Considering how these projects support Port Botany, the Port of Newcastle and Port Kembla is challenging as many of the investments will support freight more broadly in NSW and may benefit more than one port. However, reviewing these projects indicates that the investments planned to support Port Botany generally focus on enhancing capacity of connections between the port and western Sydney with little need for expenditure at the

port itself. For Port Kembla, investments are required in both the port itself and in better connecting it to the NSW freight network. Minimal NSW Government investment is required to establish a container terminal at the Port of Newcastle, as the Port has the land, channel, and existing road and rail connections to develop a container terminal now. Much of the investment identified in NSW Government strategies is actually focussed on enhancing connections between Sydney and Newcastle, with no significant planned or required direct investment in port infrastructure to enable an increase in container movements.

The investments that have been identified to support the Port of Newcastle would also most likely be needed regardless of the policy approach to port freight. These investments will support general freight movements between Sydney and Brisbane, and a growing number of passenger movements between Sydney, the Central Coast and the Hunter.

It's also important to note that the Lower Hunter Freight Rail Corridor is still in early stages of development and may not provide additional beneficial capacity without the Northern Sydney Freight Corridor.

An overview of projects is provided in the table below with projects directly related to a port identified with an R and projects that support a port identified with an S.

Project	Estimated Costs	General Freight Investment	Port Botany	Port Kembla	Port of Newcastle
Sydney Gateway	*$800 million*	✓	Required		
NorthConnex	*$3.1 billion*	✓			Supports
Port Botany freight rail duplication	*$200 million*		R		
Development of the Moorebank Intermodal Terminal	*$1.8 billion*	✓	R		
Airport East Upgrades	*$170 million*		R		
Maldon - Dombarton Railway Line	*$800 million*			R	
Bells Line of Road improvements	*$50 million*	✓	S	S	
M1 Pacific Motorway Upgrades	*$390 million*	✓	S		S
M1 Princes Motorway improvements Picton Road to Bulli Tops	*$80 million*			S	
Bridges for the Bush	*$290 million*	✓	S	S	S
The Lower Hunter Freight Rail Corridor	*Assessment not available*	✓			S
Northern Sydney Freight Corridor	*$5 billion*	✓	R		S
Inland Rail	*$9.9 billion*	✓	S	S	S
Southern Sydney Freight Line upgrade	$80 million	✓	R	R	
Regional Road Freight Corridor	*$2 billion*	✓	S	S	S
Western Sydney Freight Line and Intermodal Terminal access	*$2.2 billion*	✓	S	S	
Outer Sydney Orbital	*Assessment not available*	✓	S	S	S
Development Port Kembla's Outer Harbour	*$700 million*			R	
Capacity upgrades to Port Botany	*Assessment not available*		R		

Source: Deloitte Access Economics

Regional Development

Moving beyond freight, the Port of Newcastle also has the potential to play a significant role in terms of the regional development of NSW. The Port of Newcastle is well placed to be a gateway for northern NSW (and even into southern Queensland), as well as serving the growing population of the Hunter region.

The Hunter itself is a significant part of the Australian economy, generating large volumes of exports and being home to Australia's seventh largest city. Of the areas surrounding Sydney, the Hunter Valley (excluding Newcastle) is expected to grow the fastest over the period to 2050 with the population of the Hunter and Newcastle reaching around 840,000 by 2050. A successful Hunter region has the further potential to reduce population growth strains in Sydney.

This population growth is fundamentally being driven by the long-term economic rejuvenation that has occurred within Newcastle as the city has transitioned from heavy industry to a more diversified economy. In the long run, this growth will be supported by strong natural characteristics of Newcastle and the Hunter, particularly the availability of land in the Hunter region for expansion of population centres and the good connection of the Hunter and Newcastle to the national transport network.

The economic and regional development priorities for NSW are set out in a selection of key NSW Government documents. While the priorities are not articulated in any single place, the key messages are consistently repeated. They include that:

- Strategies for development should focus on engine industries that represent a specialisation for the region – based on the region's endowments – and play to its comparative advantage;
- Attempts to implant industries won't be encouraged by NSW Government; rather, enabling investments (including for infrastructure) will be considered as long as they pass a test of costs versus benefits; and
- NSW Government is focussed on fostering skills, improving infrastructure provision, supporting key endowment-driven industries in select regions, encouraging greater participation in the workforce and making targeted investments.

This represents a clear policy position for the NSW Government when it comes to regional planning and development, and provides a foundation for strategies targeting the economic development of regional NSW.

The PON has the potential to play an integral role in fulfilling the strategies and plans for regional development in NSW. For example, the Hunter Regional Plan, developed by NSW Government, outlines the Government's goals and aspirations for the region to 2036. A key goal for the plan includes positioning the Port of Newcastle and Newcastle Airport as a global gateway, through improved interregional links and infrastructure for freight movements.

While current regional development plans don't tend to focus strongly on the role of the PON in regional development, there is a potential intuitive role for the port in regional development through:

- Supporting NSW's globally competitive growth segments by acting as a key facilitator and connector, particularly those located north and west of Sydney. A well-connected port provides businesses with access to the

markets needed to develop new product offerings (via importing inputs) and capitalise on new markets (via exporting products);
- Acting as a key economic asset and a direct source of employment and economic activity in the Hunter region;
- supporting economic diversification within the Hunter region by enabling trade in the advanced manufacturing industry;
- Supporting growth in NSW's industrial base by acting as a key enabler for existing economic clusters in the Hunter region; and
- Reinforcing the broader strategic economic priorities of NSW Government:
  - Job creation;
  - Making the right investments in enabling infrastructure;
  - Decentralisation of economic activity, particularly away from Sydney; and
  - Regional development.

Pro-competitive policy for NSW's ports

Currently, the volume of full containerised freight being exported from and imported to the Port of Newcastle's catchment is modelled to amount to around 500,000 TEU per year, and this is expected to grow to around 1.1 million TEU over the period to 2050. This is slightly below the volume of freight moving through Fremantle Ports.

Currently, this freight must be transported to and from Sydney, adding to congestion on Sydney's freight network as well as adding cost for local importers and exporters and having environmental impacts. In the future, under current NSW Government plans, this freight may need to be moved to Port Kembla, further adding to transport costs for importers and exporters and potentially providing only minor relief to the Sydney freight network as freight will likely still pass through western Sydney.

One of the largest motivations for the privatisation of government owned assets, such as ports, is to encourage competition, create pressure on costs and eventually to generate efficiency over time – leading to lower prices for consumers and making the Australian economy more internationally competitive. However, there has been criticism within Government that this goal has not been the focus of more recent privatisations. For example, Rod Sims has noted that the regulator of privatised entities is competition.

The potential for the Port of Newcastle to contribute to managing NSW's freight task and promote efficient trade is not only constrained by NSW Government policy but is hampered by conditions imposed during the sale of the ports. The past creation of a constraint created during the transaction and sale of the ports in NSW should not prevent the Government from proper planning and considering how best to manage freight, growth and development in NSW overall.

A lack of competition in container ports creates significant costs for the NSW economy. NSW relies on ports for almost all of our international trade and so a lack of competition both reduces port efficiency and increases landside transport costs.

Analysis of international ports suggest that increased port competition could add, on average, 2.5 percentage points to port productivity growth rates. Analysis of productivity growth rates following past port reforms in Australia indicate that, after the first year, these benefits will tail off over a period of around six to seven years.

Pursuing productivity gains in Australian ports is critical as, historically, Australian ports have not been as productive, nor grown their productivity as quickly as international competitors. Past research by Deloitte Access Economics indicates that a 2.5 percentage point increase in port productivity could be worth around $111m to the economy per year.

Turning to landside transport cost savings, currently the freight moved from PON's catchment area to Port Botany is, generally, moving greater distances than it would need to move if a competitive option was available at Newcastle.

One of the goals of the Draft Freight and Ports Plan is to grow the economy via 'a transport system that power our State's $1.3 trillion economy and enables economic activity across the State'. However, a report by Lycopodium has identified that NSW exporters in the north and north-west of the State are currently paying roughly 30% more in transport costs to export through Port Botany, compared with the scenario of a container terminal at the Port of Newcastle.

Combining assumptions about the distances this freight moves with information from a Lycopodium report on freight costs indicates that landside transport costs for freight in PON's catchment could be reduced by around $60 million a year, a NPV of around $1.1 billion over the period to 2050. Standard values for transport externalities from TfNSW indicate that the externalities associate with these freight movements are likely around $12 million a year, or $209 million in NPV terms. All up, a lack of container port competition in NSW could therefore generate around $1.3 billion in additional landside transport costs in NSW over the period to 2050.

Based on existing port capacity, good road and rail connectivity, proximity to a sizable natural catchment area, the economic benefits indicated above and the potential for enhance regional development, The Port of Newcastle should therefore be a considered as a solution to the port freight and supply chain challenge that is occurring in and around Sydney including Port Botany.

The Port of Newcastle can complement the trade that takes place through Port Botany and take the pressure off the burgeoning freight task that is facing rapidly growing challenges from increased population and congestion.

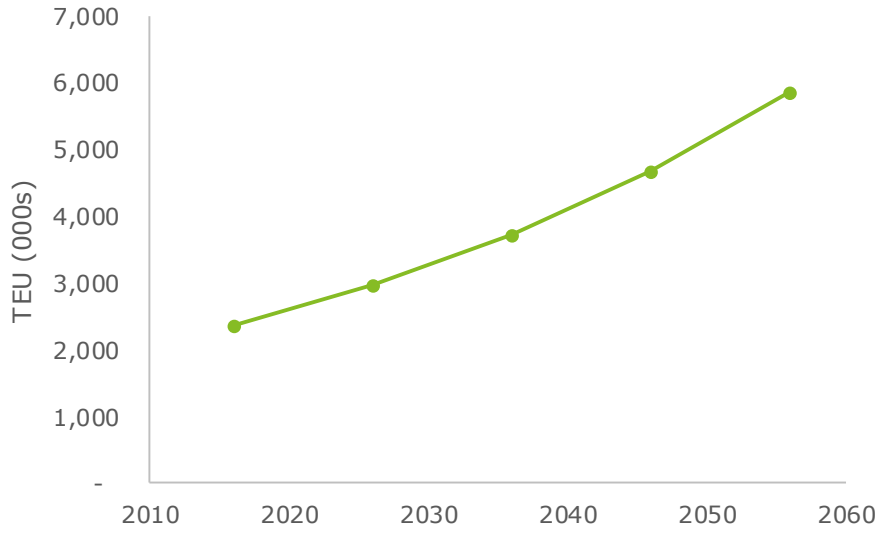
Deloitte Access Economics

1 Background

New South Wales is currently facing a number of challenges in managing its port freight task. The fundamental challenge for NSW is that there is expected to be ongoing growth in the number of containers moved through NSW Ports. Considering Port Botany in particular, in 2016-17 Port Botany saw around 2.43 million TEU moved through the port, a 4.6% increase over the previous year, full exports grew at a very strong 9.8% largely driven by good agricultural harvests. Over the longer run, annual growth rates in containerised trade in NSW have been around 5% a year.

In the future, strong growth in containerised freight in NSW is expected to continue. Although forecasts vary significantly, there is general agreement that container movements will be well over 5 million TEU a year by the 2040s. The latest available forecasts from TfNSW indicate that the 5 million TEU mark will be passed in around 2047.

Chart 1.1: NSW TEU forecasts



Source: Freight Task Forecasts 2016-2056 (TfNSW – Transport, Performance and Analytics

This growth in container movements in NSW will put increasing pressure on Sydney, which is already facing congestion issues and also raises the potential for ports outside Sydney to play a role in servicing their local market and reducing pressure on Port Botany and Sydney more broadly.

As part of this broader outlook for containers in NSW, the Port of Newcastle (PON) is currently progressing a business case for a staged container terminal development of up to 2 million TEU per annum on its Mayfield site. This development is currently being progressed as an internal business strategy for PON, however, as it progresses, this strategy will need to interact with and be supported by broader NSW Government strategy around the future directions for supply chain logistics for port freight in NSW.

Planning for future port operations in NSW has gone through a number of phases and approaches in the last two decades. In the 2003 Port Growth

Plan, Newcastle was identified as the overflow port for Port Botany. This position had changed so that by 2012, when developing the Port Lease, the NSW Government generally took the view that The Port of Newcastle Leasing Agreement was drawn up in accordance with the NSW Government's freight policy of maintaining Port Botany as the state's primary container port until it reaches capacity, at which point Port Kembla would be designated to take the overflow and Newcastle would be further developed once Port Kembla is full.

This series of strengthening commitments by the NSW Government to Port Kembla as the overflow port for Port Botany means that, to further develop the PON as a competitive alternative, will require a change in NSW Government policy towards a policy stance that will encourage a more competitive port environment.

As a result of the need for this policy change, the PON is looking to develop a sound evidence base which can be used to assist in further developing of the business case for a container terminal at Newcastle. This report develops this evidence base in the following sections:

- Section 2 covers current port freight in NSW and considers how it is distributed across the state;
- Section 3 provides an overview of the freight growth challenges that will be facing NSW over the coming decades;
- Section 4 sets out how the NSW Government is currently planning to manage this growing freight task what role the Port of Newcastle is seen as having and identifies specific investments that the NSW Government are planning;
- Section 5 provides a view of approaches to regional development and the potential for the Port of Newcastle to support regional development policy in NSW; and
- Section 6 considers the potential broader economic benefits of increased competition between ports in NSW.

2 Port freight in NSW

Australia's freight task is the fifth largest in the world (OECD, 2018), and it is growing quickly. Almost all (97%) of Australia's imports and exports are moved by sea, passing through the nation's ports on the way (Deloitte, 2013).

According to customs data, the vast majority of containers are initially transported to the greater Sydney area for unpacking. These containers are generally transported to the broader western Sydney area. Once the container has arrived at its destination, it will normally be unpacked and the freight transferred for further processing.

Moving beyond the container and to the unpacked destination for imports, aggregating all Sydney SA4s[2], just over 60% of containerised imports are modelled to remain in Sydney. The Port of Newcastle catchment receives 27% of the state's containerised imports, and Southern NSW get 12% of containerised imports. These results are based on how containerised imports are used in the NSW supply chain and the location of relevant economic activity.

While the majority of imports stay in Sydney, exports are sourced from a broader range of areas within the state. Sydney accounted for around 43% of containerised export tonnage while the Port of Newcastle catchment accounted for around 38% of all containerised exports.

Table 2.1: Estimated regional locations of port freight in NSW

	Greater Sydney	Eastern Sydney	Western Sydney	Northern NSW	Southern NSW	Total NSW
Total freight						
Import (% of tonnes)	57	32	25	30	13	100
Export (% of tonnes)	13	4.8	8.6	77	10	100
Containerised freight						
Initial location (% of TEU)	87	NA	NA	4	9	100
Unpacked location						
Import (% of TEU)	61	36	24	27	12	100
Export (% of TEU)	43	21	22	38	18	100
Total TEU	**898,487**	**513,649**	**384,838**	**497,141**	**223,731**	**1,619,359**

Source: Deloitte Access Economics estimates

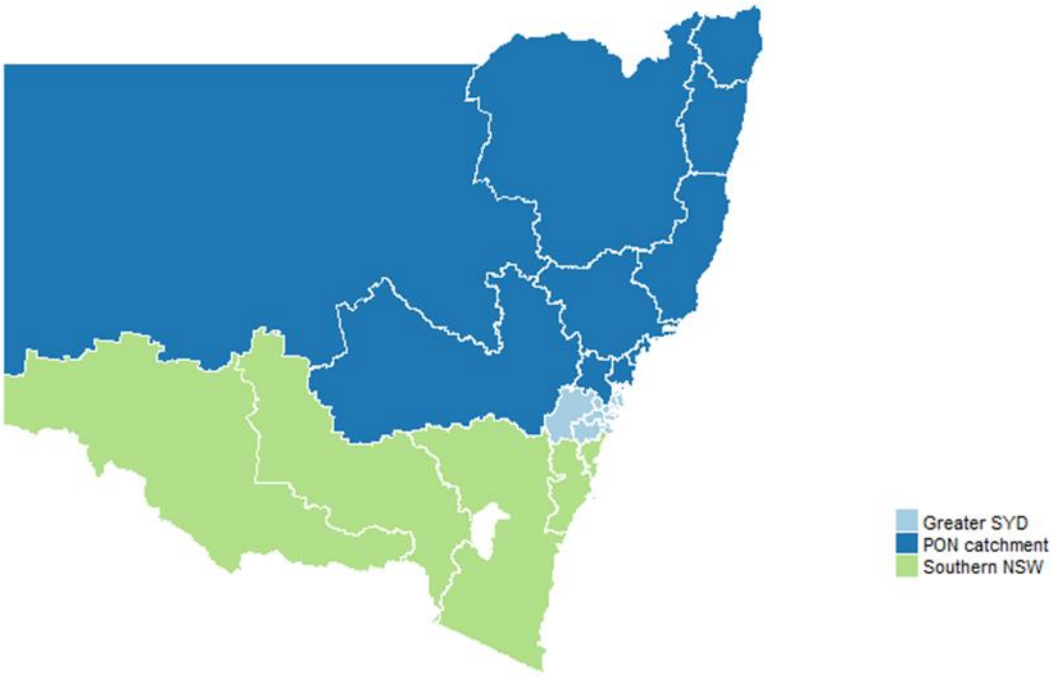
[2] Statistical Area Level 4, defined by the ABS to represent meaningful sub-regions for each state.

Currently, there is likely to be almost 500,000 TEU of freight from the Port of Newcastle catchment generated each year. Freight from the region is shipped largely out of Port Botany rather than the closer Port of Newcastle. Transport to the further Port Botany results in increased costs for NSW exporters (reducing their international competitiveness) and higher costs for imports (hurting consumer's wellbeing).

2.1 Regions used in this report

Throughout this report, freight movements are divided into three regions: the Greater Sydney area, the Port of Newcastle catchment area (that is, what the Port of Newcastle could reasonably expect to service should it become a major international container port), and Southern NSW. The PON's catchment has been selected based on consideration of factors such as the distance, cost and transport options available within NSW for transport to different ports. These regions are presented in the figure below.

Figure 2.1: Major freight regions in NSW

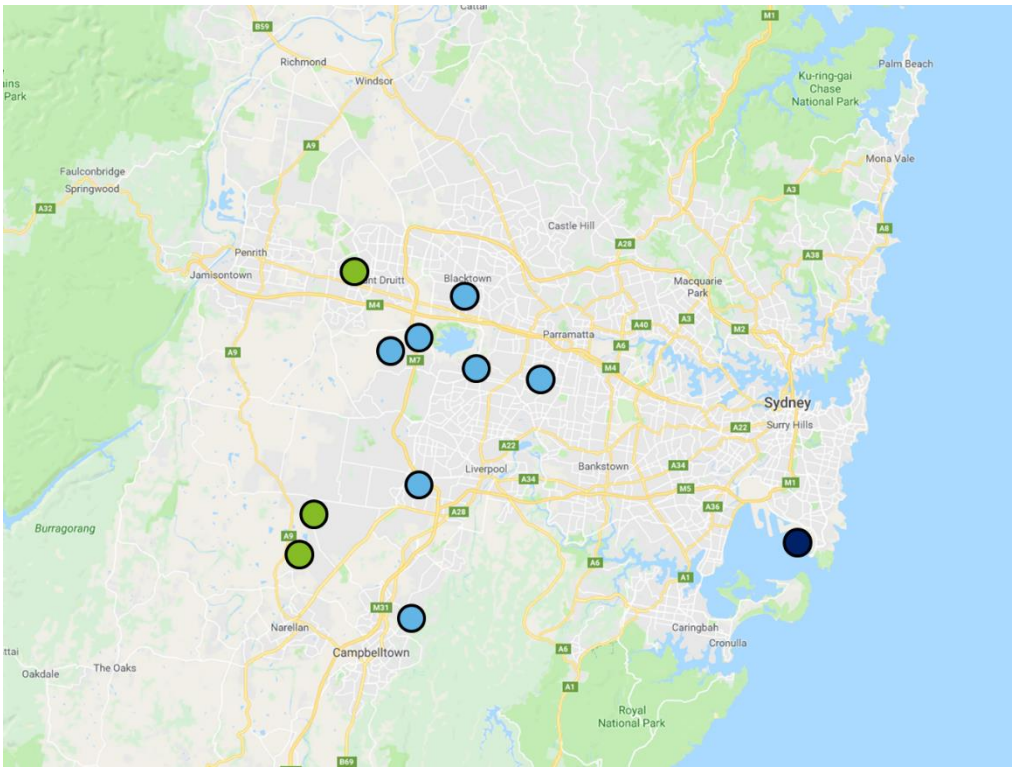


2.2 The container supply chain in NSW

The container supply chain in Sydney includes a mix of both rail and road transport. Road, however, accounts for the majority of movements (likely in excess of 90% of movements within the metropolitan area).

For delivery to customers, the majority of containers are transported to broader western Sydney areas such as Eastern Creek, Hoxton Park, Erskine Park, Wetherill Park and Blacktown, which are supported by significant warehousing facilities. Minto and Yennora are also significant freight storage locations for rail freight. Figure 2.2 shows these current destinations, as well as suburbs expecting significant freight growth in the future – St Marys, Bringelly and Badgerys Creek.

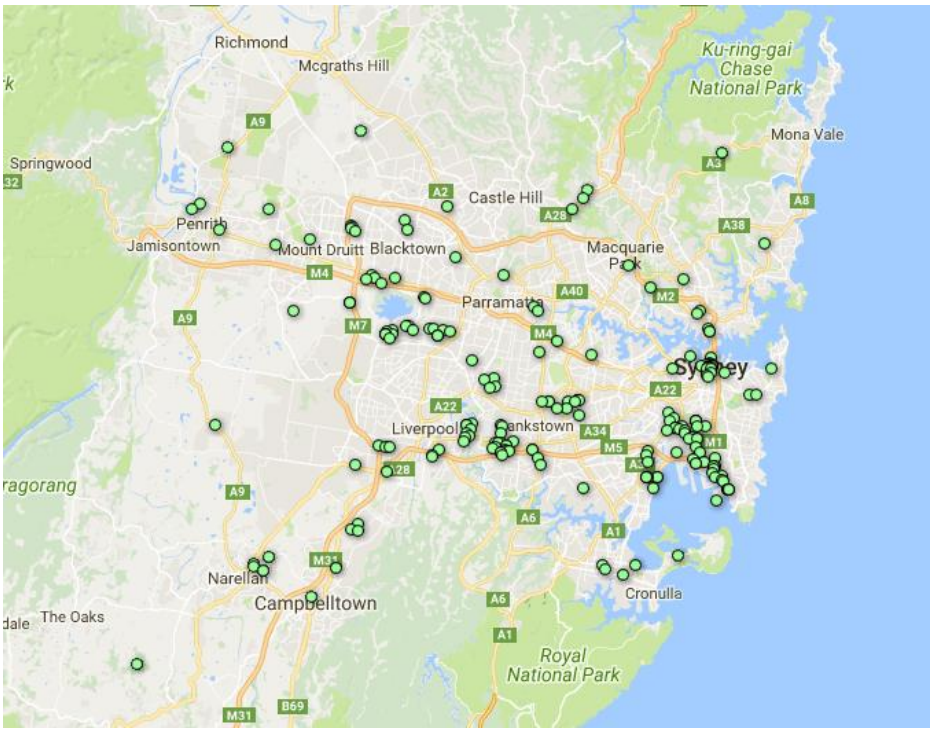
Figure 2.2: Current and future freight locations in Sydney



For road freight, most operators work across Sydney without significant geographic specialisation. That is, an operator based in the south-west could make deliveries across the greater metropolitan region. This causes inefficiencies on the roads, with freight operators crossing paths and travelling further than they need to.

This approach to the movement of containers is supported by the predominance of a "staging" approach among freight operators in Sydney. The staging approach involves an initial truck movement to the port, and storage of the container at a dedicated freight facility before delivery to the final customer. This staging approach is used by the majority of large freight operators in Sydney. Figure 2.3 shows the estimated spread of carriers within metropolitan Sydney.

Figure 2.3: Freight carriers in Sydney



While carriers are distributed around Sydney, there are clear patterns. The largest carriers are located within the port area –these carriers account for around 68% of total TEU movements. Other areas of high carrier density are in the Moorebank/Chipping Norton area, the Chullora area and around Wetherill Park and Eastern Creek. It appears that very few carriers are located in Northern Sydney or along the M4.

There are a number of issues facing container transport in NSW currently. In particular, there is a significant concern with the infrastructure at port areas. In the short run there are issues related to the areas near the port including Coal Pier Road in Port Botany, where a majority of freight operators are located. The layout of the roads creates a number of chokepoints in the port area, which causes significant delays during peak times, and so far, attempts to address these problems have not been successful. In the longer term, uncertainty surrounding the Gateway project (a road linking the airport and the port) presents problems for road operators. Without a well-designed and implemented gateway, investment in WestConnex will not result in significant improvements in container movements near the port.

Another significant concern for road operators in Sydney is congestion and tolls. Congestion in the Sydney area is estimated to be the worst of any city in Australia (Grattan Institute, 2017). Congestion results in lost time for road operators as well as unreliable arrival at the port, both of which increase costs and reduce efficiency in supply chains. Tolls too, are a problem – recent industry consultation reveals that it costs around $60-$80 in tolls to move a container west from Port Botany. As well as the cost, toll increases are often not transparent meaning that drivers are unable to appropriately prepare for and respond to changes. Bringing these two issues together is the fact that tolls are not performance based; a congested road still charges the same as a free-flowing road.

From a regulatory point of view, given the dense population in Sydney, there is a concern with access restrictions. While local councils seem to have no problem with providing B Double access to road operators, there is likely to be opposition to future improvements in vehicle efficiency through the introduction of A Doubles. In many instances, road operators have had applications for A Doubles access rejected, often without well-considered explanation. Most road operators would be open to incremental improvements in access for A Doubles, for instance they could start by moving just empty containers and only in certain hours, and then transition to a less restricted access regime, but this avenue has not yet been pursued in Sydney.

Cargo owners north of Sydney have described the challenge of transporting goods to Port Botany by truck within the safe drive limits. In some cases, the travel distance, plus congestion near the port, exceed the windows allowed in regulations. This means that the cargo cannot be delivered in time and results in extra costs, as well as delays and inefficiencies.

The high costs of land and the increasing congestion in Sydney is forcing the centre of freight activity west. This continual progression will be an increasing problem in the future – moving freight from the port out to these centres in the west for distribution will become a significant task. Minimising this movement where possible will be essential to managing road congestion as the network reaches – and surpasses – capacity.

Most businesses have their freight delivered via road from Port Botany, but there is also a role for rail. A small number of relatively large customers utilise rail – these are customers that have facilities located along the rail line (such as Woolworths, Samsung, Sunbeam, Breville, Bunnings, Kmart, Coles, LG, Asics and Unilever).

A significant challenge for rail is that, around Port Botany, securing reliable rail paths and windows at the port is difficult for operators. An attempt is currently being made to start running shuttle services to the port, so as to maximise the utilisation of each rail service and minimise the requirement for splitting and shunting containers at the port. However, progress towards this goal has been slow. The metropolitan rail network curfew further restricts the scheduling of rail on the way to the port, and these problems will only increase as passenger trains grow in number. Potential solutions advocated by rail operators include dynamic rail windows or centralised independent scheduling of rail windows.

Given these challenges, the current operating model for rail is not seen as particularly reliable among industry however, and generally operators maintain the ability to run a road operation to compensate when rail is not working well. As a result, rail operators are actually subject to many of the same issues that road operators are – road infrastructure, congestion management, road costs and other access concerns.

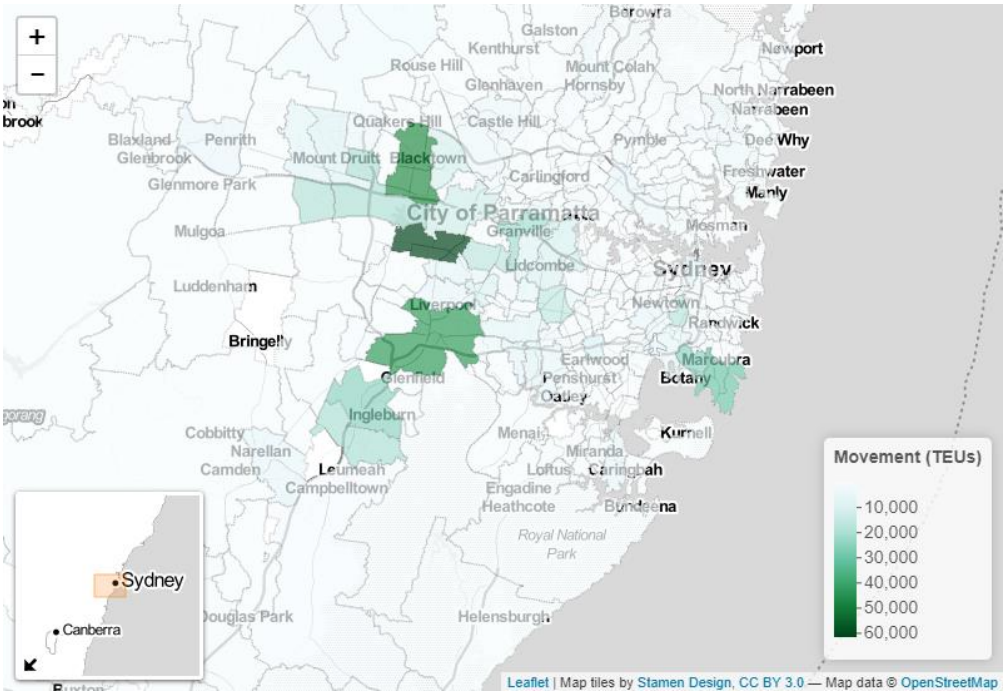
Overall, Sydney's container supply chain faces a fundamental issue of moving freight from the far east of the city to the west. This movement must pass through the heart of the city's population and so places significant strain on the transport network. This is true for both road and rail transport in Sydney. As a result, both modes of transport currently face challenges in terms of issues such as costs, reliability and congestion.

2.3 Initial container locations in NSW

In 2014-15, around 2.3 million TEU were imported and exported from NSW. The data in Figure 2.4 indicate that many of these TEU were initially moved to locations within Metropolitan Sydney. The map shows the postcode of destination for TEU imports based on information from Australian Customs. It indicates significant movements to areas around the port as well as in south Sydney around Minto and Liverpool, and in western Sydney around Blacktown through to Eastern Creek.

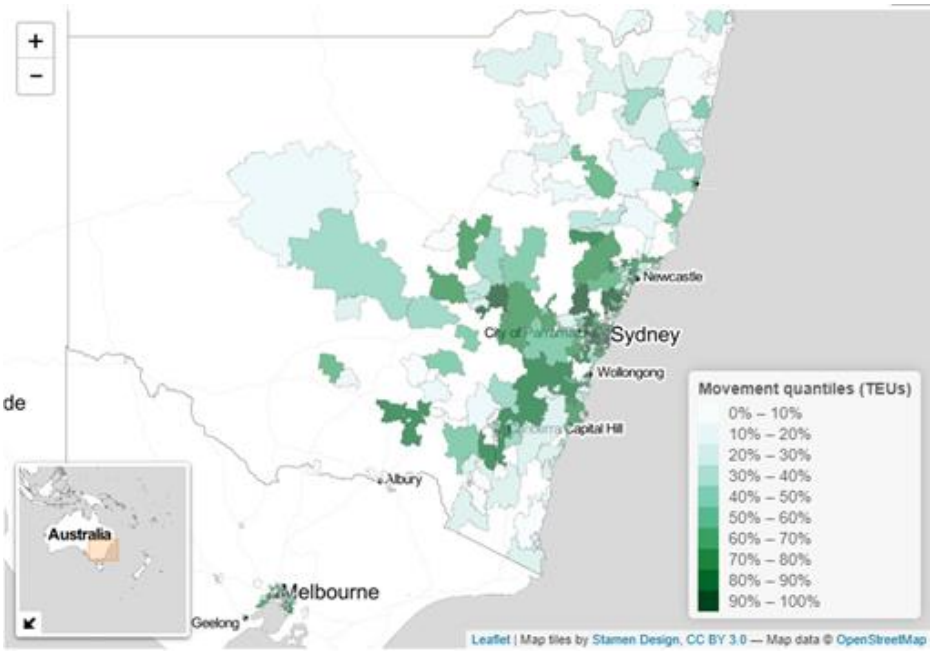
It's important to note that this data shows the location of container movements according to customs data. Once the container has arrived at its destination, it will normally be unpacked and the freight transferred for further processing. The final origin and destination of this freight is considered in the following sections.

Figure 2.4: Initial TEU locations (imports by TEU)



Despite the intensity of TEU locations in the greater metropolitan area, there is also a broad mix of TEU activity across the state. Figure 2.5 shows TEU locations from Port Botany according to their position in the rank of locations. This shows that containers do move to a range of regional locations within the state, despite the predominance of the greater Sydney region.

Figure 2.5: Initial TEU locations (imports by quantile)

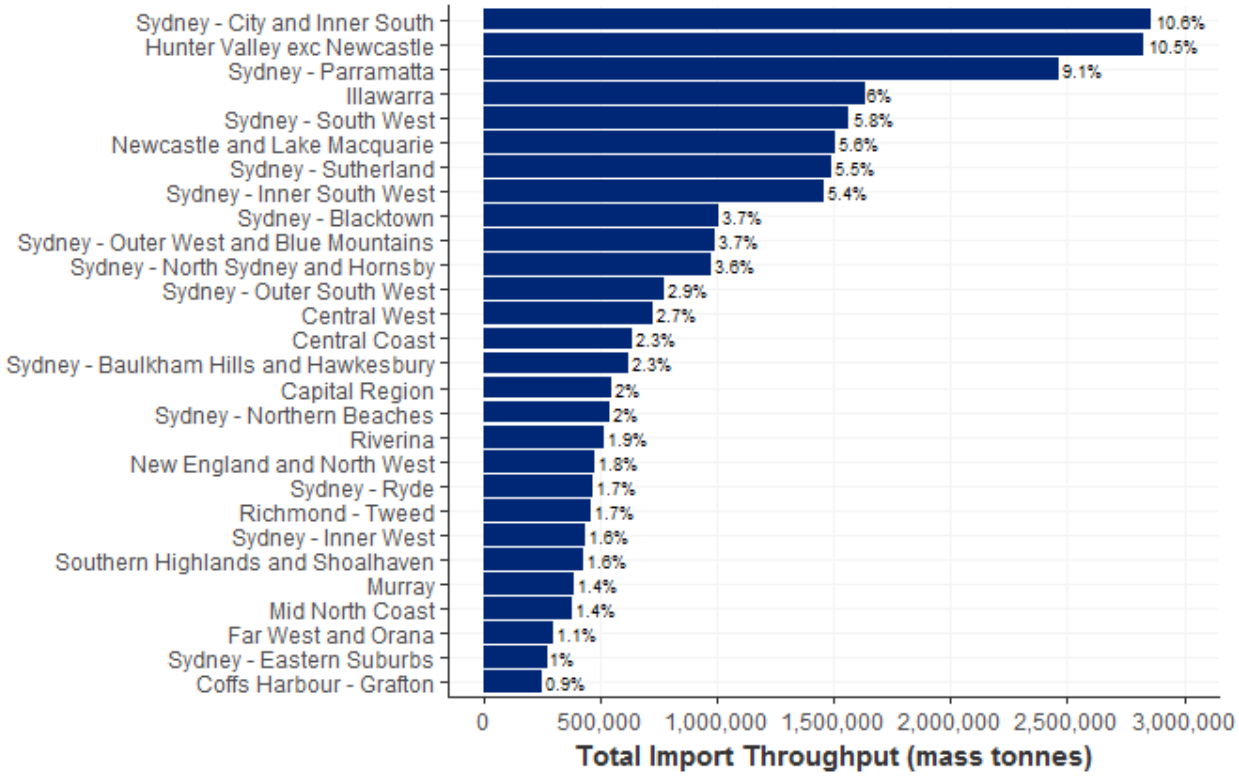


2.4 Import destinations – all freight

Moving beyond the container and to the unpacked destination for imports, in 2014-15, 27 million tonnes of freight were imported into NSW. Regardless of mode of transport used for distribution, almost all of this passed through a port before being loaded onto road or rail.

The final destination of imports is closely tied to population, and as a result, the majority of imports stay in Sydney. Chart 2.1 splits NSW imports into the destination at the SA4 level. Both the Hunter Valley and Newcastle are also significant destinations for import freight in NSW.

Chart 2.1: Final import destination NSW by SA4, 2014-15 (all freight)



Source: ABS IO tables

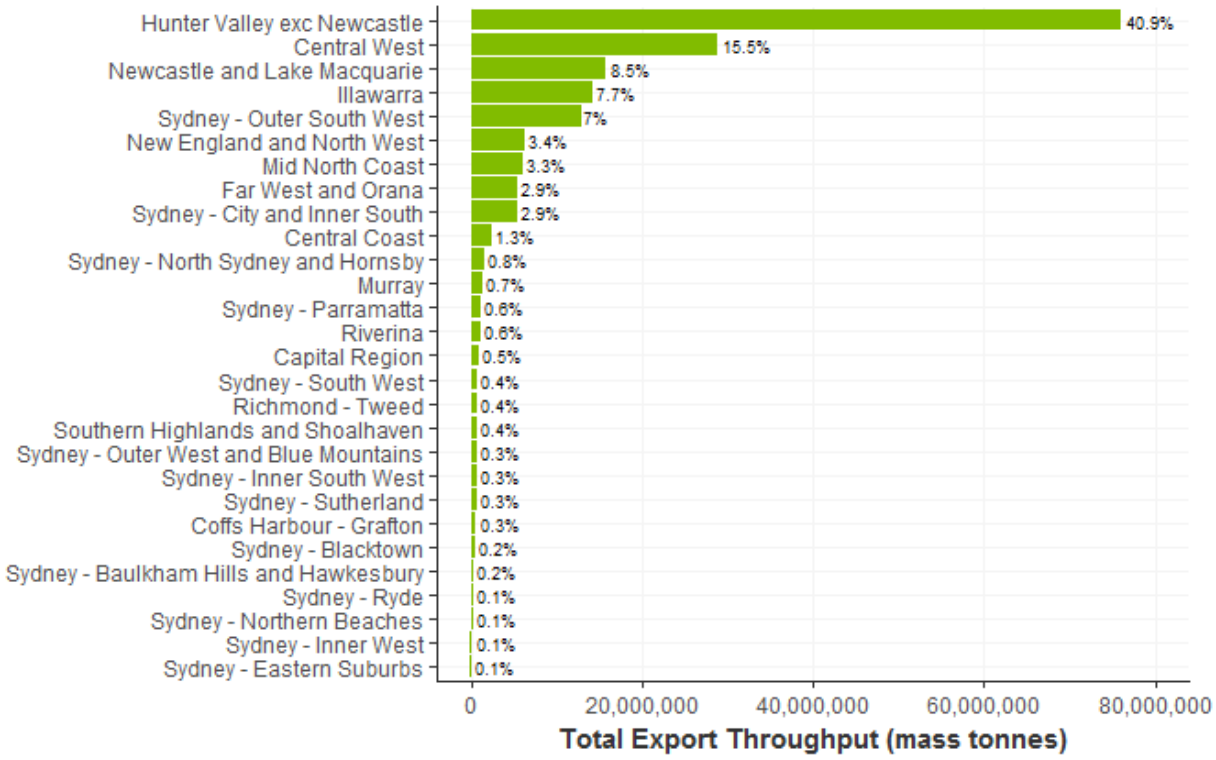
Aggregating all Sydney SA4s, just over 60% of containerised imports remain in Sydney. The Port of Newcastle catchment receives 27% of the state's containerised imports, and Southern NSW get 12% of containerised imports. These shares are roughly in proportion to the level of economic activity that occurs in each of these regions.

2.5 Export origins – all freight

Unlike imports, export origins do not depend as strongly on population, but rather on the nature of economic activity in each region. In NSW, the majority of exports are from mining or agricultural sectors and are sourced from regional areas, so having access to another (in many cases closer) port would be beneficial.

Considering all freight, bulk and containerised, in 2014-15 NSW exported just under 186 million tonnes of freight. Chart 2.2 shows the source of these exports, by SA4.

Chart 2.2: Total export origins NSW by SA4, 2014-15 (all freight)



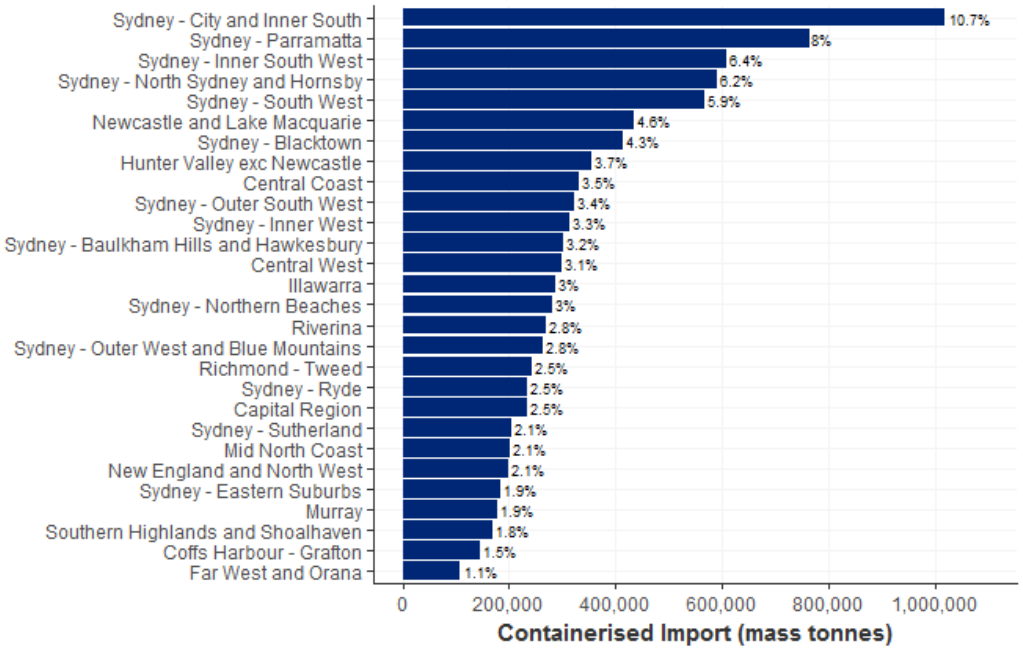
Source: ABS IO tables

In aggregate, Sydney is responsible for just 13% of exports when measured in tonnes, relative to its 60% share of imports. The Port of Newcastle catchment is the largest exporting region, accounting for around three-quarters (77%) of total exports in NSW. Southern NSW generates the remaining 10% of export tonnage.

2.6 Import destinations – containerised freight

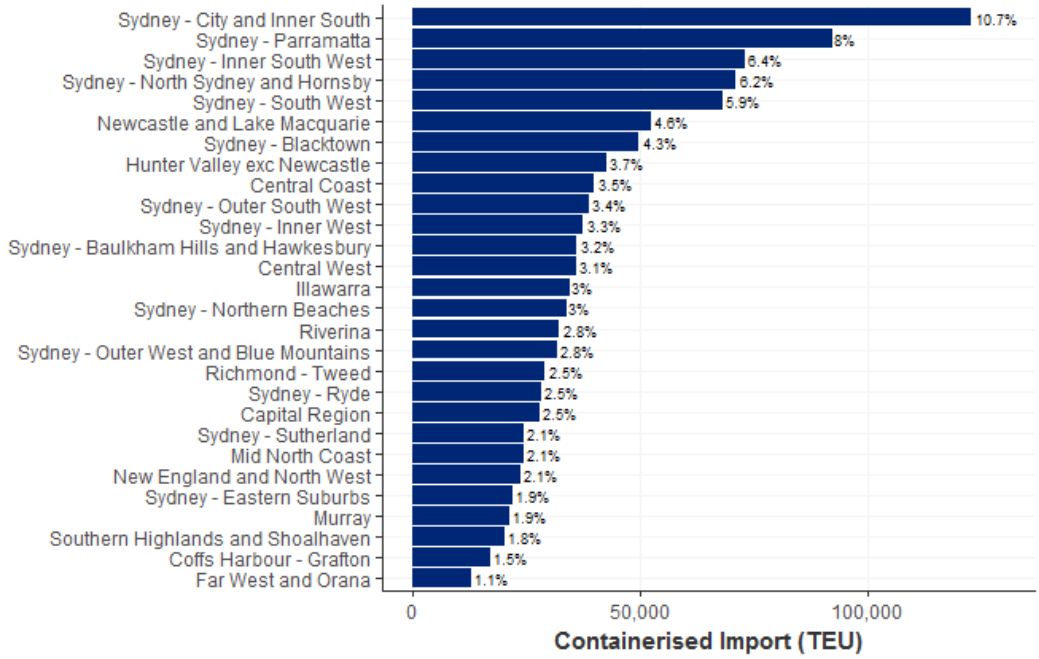
Focussing specifically on containerised freight, in 2014-15, around 9.6 million tonnes of containerised freight were imported into NSW. The majority of imports (61%) stayed in the greater Sydney area. The Port of Newcastle catchment is estimated to account for around 27% of containerised imports, with the southern part of NSW accounting for the remaining 12% of containerised imports.

Chart 2.3: Import destinations NSW by SA4, 2014-15 (containerised tonnes)



Source: ABS IO tables

Chart 2.4: Import destinations NSW by SA4, 2014-15 (TEU)



Source: ABS IO tables

Figure 2.6 maps NSW imports in terms of TEU. Within the greater Sydney region, the CBD and southern industrial area around the port is the largest destination for imports (11% of NSW imports), followed by the Parramatta region (around 8%).

Figure 2.6: Containerised import destinations NSW by SA4, 2014-15 (TEU)

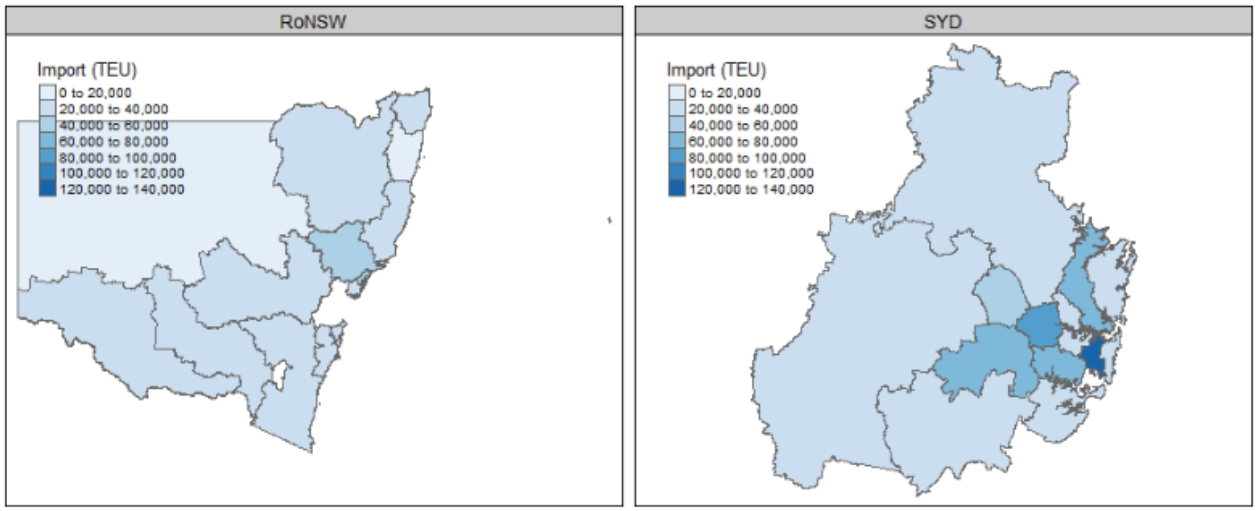
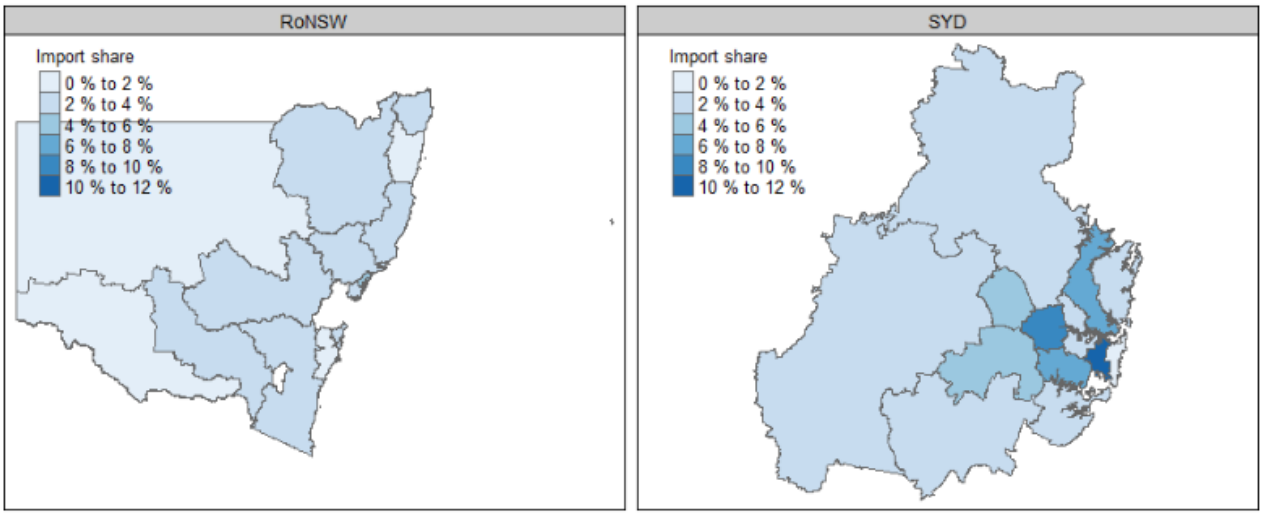


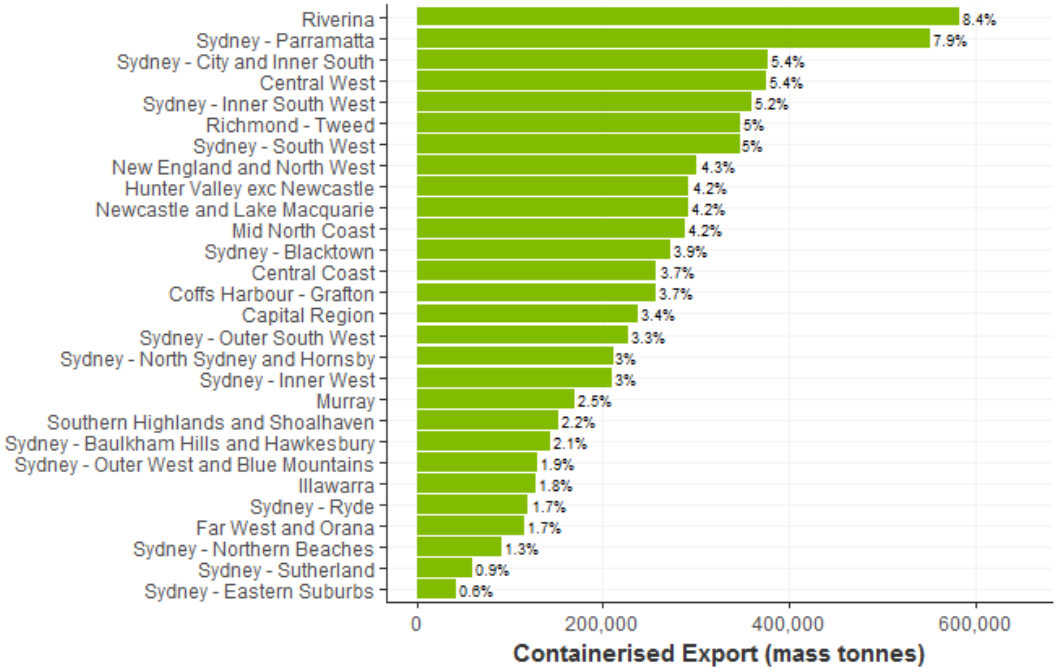
Figure 2.7: Containerised import destinations NSW by SA4, 2014-15 (share)



2.7 Export origins – containerised freight

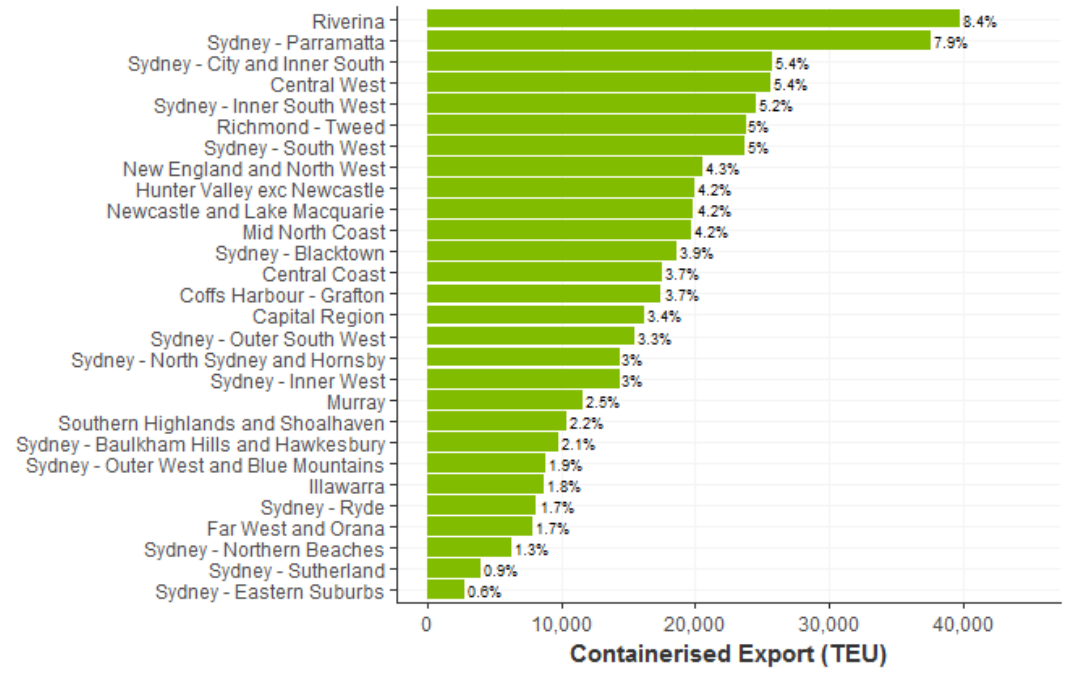
Focussing specifically on containerised freight, the Riverina region is estimated to be the largest single source of containerised exports accounting for 8.4% of all exports. Overall, the greater Sydney region accounts for 39% of exports. The Port of Newcastle catchment accounts for 43% of NSW containerised exports (see Chart 2.5).

Chart 2.5: Export origins NSW by SA4, 2014-15 (containerised tonnes)



Source: ABS IO tables

Chart 2.6: Export origins NSW by SA4, 2014-15 (TEU)



Source: ABS IO tables

Figure 2.8 maps NSW exports by SA4 level. Within the greater Sydney region, Parramatta is the largest source of exports (8% of NSW exports) followed by the inner South west and the South West (around 5% each). However, these regions within Sydney are comparable in volumes to those generated in regional NSW.

Figure 2.8: Containerised export origins NSW by SA4, 2014-15 (TEU)

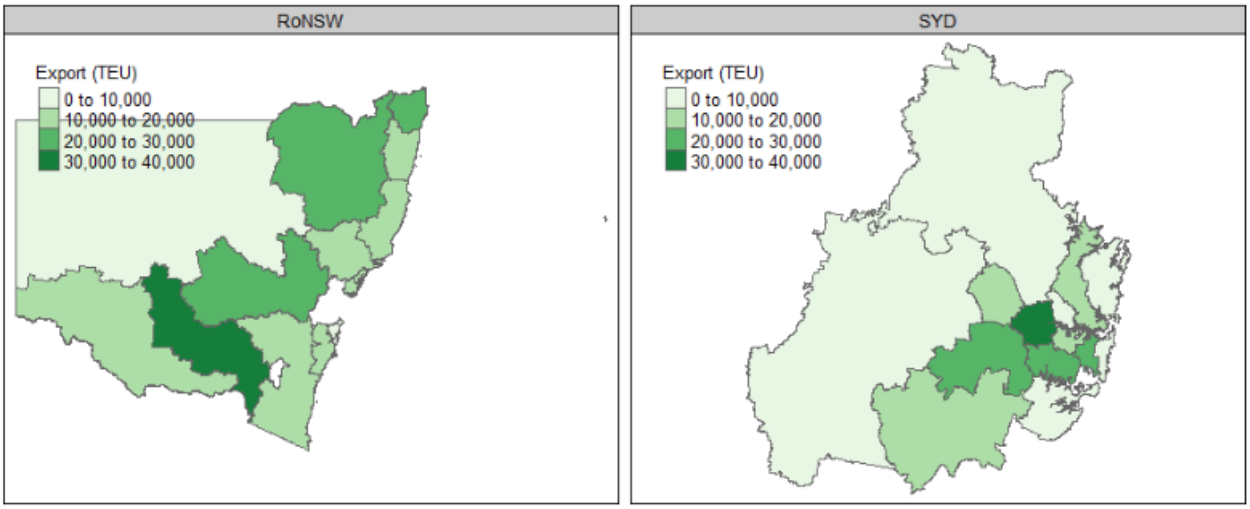
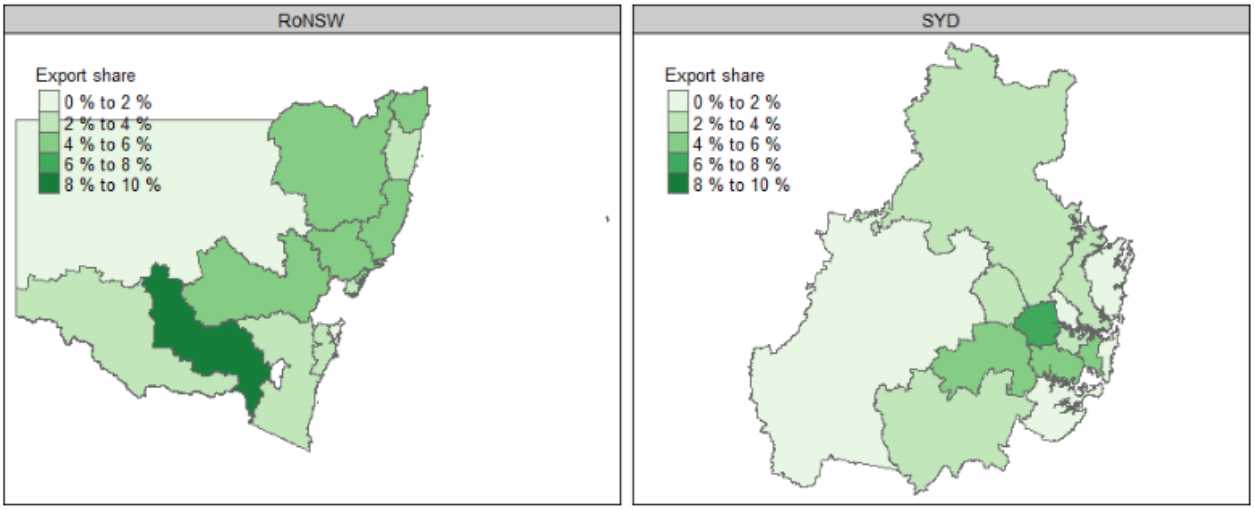


Figure 2.9: Containerised export origins NSW by SA4, 2014-15 (share)



3 Growth challenges

New South Wales is currently facing intensifying challenges in managing its port freight task. The number of containers moved through NSW's ports is expected to break the 5 million TEU mark in the late 2040s, double current levels. Without a diversification plan, this freight will be concentrated on Port Botany and Sydney's major east-west road and rail links.

Increases in population and economic activity fundamentally drive this growth. Overall:

- The NSW population is projected to rise from 7.8 million in 2016-17 to about 11.1 million in 2049-50 an addition of some 3.3 million people, roughly equivalent to the current population of Brisbane and Adelaide combined;
- The Greater Sydney region is expected to grow by around 87,000 people each year on average in the decade to 2019-20, and 70,000 people per year in the decade to 2049-50;
- Growth in Sydney is driven mainly by the Western Sydney region, with more moderate growth through the remainder of the Sydney Region;
- The Hunter Valley (excluding Newcastle) is expected to grow the fastest of the areas surrounding Sydney. By 2050 the population of the Hunter and Newcastle is estimated to be around 840,000; and
- Illawarra and the Central Coast are expected to grow the slowest of the areas surrounding Sydney.

Modelling of the expected population and economic growth in each region in NSW and keeping total TEU forecasts to indicative levels expected in recent forecasts from TfNSW indicates that port freight is expected to more than double between 2015 and 2050, reaching around 5.2 million TEU by 2050 of which approximately 3.6 million TEU will be full containers.

Overall, this growth will take Sydney to around 2 million full TEU annually in 2050, the Port of Newcastle catchment to around 1.1 million full TEU, and Southern NSW to 450,000 full TEU.

These freight forecasts are based on a historical trend analysis; there is the potential for higher growth if port freight policy can lower transport costs and induce greater international trade.

3.1 Population and employment growth

3.1.1 Demographic forecasts for New South Wales

The New South Wales population is expected to grow at an average of 1.4% per annum in the decade to 2019-20 before moderating to 0.9% in the decade to 2049-50.

The State's population is projected to rise from 7.8 million in 2016-17 to about 11.1 million in 2049-50 (Table 3.1).

Table 3.1 Summary population projections

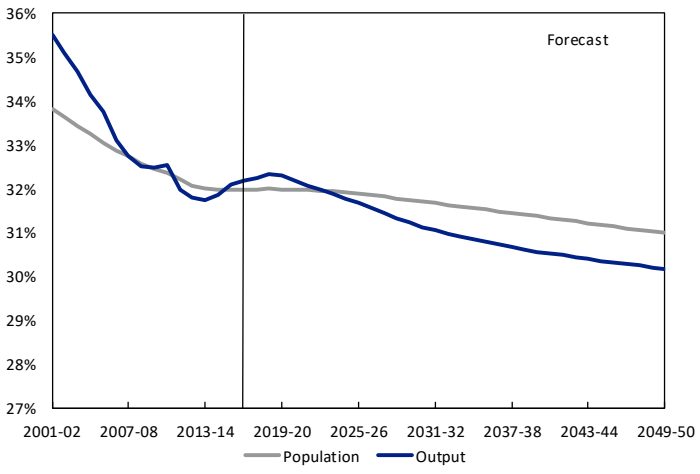
		Historical 2009-10	Forecast 2019-20	2029-30	2039-40	2049-50
Australia						
Population	millions	21.9	25.6	29.2	32.6	35.9
Average annual change[(a)]	per year	312,045	366,078	363,746	336,272	333,200
Average annual change[(b)]	% per year	1.5%	1.6%	1.3%	1.1%	1.0%
New South Wales						
Population	millions	7.1	8.2	9.3	10.2	11.1
Average annual change[(a)]	per year	68,558	106,662	109,109	94,665	90,683
Average annual change[(b)]	% per year	1.0%	1.4%	1.3%	1.0%	0.9%

Source: Australian Bureau of Statistics; Deloitte Access Economics.

Note: (a) Average annual growth of the previous decade; (b) Compound annual growth rate of the previous decade.

The New South Wales population is growing at a slower rate than the rest of Australia, resulting in the State's share of national population continuing to decline (see Table 3.1). In recent years it has been decreasing at a slower rate as population has shifted from the resource-rich States to the south-eastern parts of the country. Despite the decreasing share of national population, New South Wales is still anticipated to remain Australia's largest State regarding population over the outlook period.

Chart 3.1: Population and output as a share of Australia, New South Wales



Source: Australian Bureau of Statistics; Deloitte Access Economics.

Chart 3.1 above shows New South Wales' strong economic performance in more recent years compared to the rest of Australia, where it has increased its share of output produced each financial year.

Over the outlook period, there are expected to be two competing forces of population growth in New South Wales. Firstly, the ageing population will increase the relative size of older cohorts and weigh on population growth. Secondly, net overseas migration will continue to support population growth, partly offsetting the ageing population and below replacement level fertility rates. These drivers are discussed in more detail below.

3.1.2 Employment forecasts for New South Wales

Table 3.2 provides an overview of employment forecasts for Australia and New South Wales, where the latter is based on a place of usual residence basis.

New South Wales recorded employment growth of 0.8% in 2016-17, down from its 4.0% growth in 2015-16 and in-line with national slow employment growth. Strength is expected to rebuild in the State's jobs market with average annual growth of 1.2% in the decade to 2029-30. This growth is expected to moderate over the decade to 2049-50 to 0.7% per annum.

Table 3.2 Summary employment projections

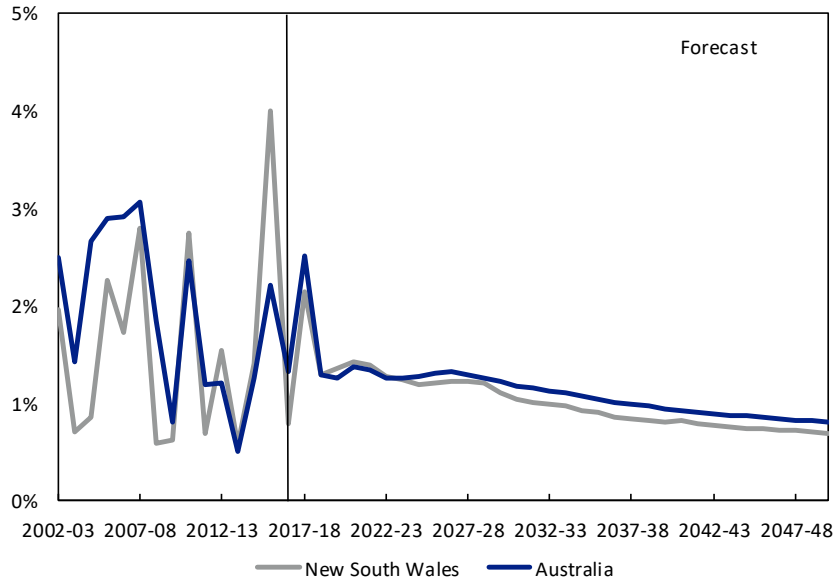
		Historical 2009-10	Forecast 2019-20	2029-30	2039-40	2049-50
Australia						
Employment	millions	10.9	12.6	14.4	16.0	17.4
Average annual change[(a)]	per year	222,355	177,084	172,295	158,891	142,729
Average annual change[(b)]	% per year	2.3%	1.5%	1.3%	1.1%	0.9%
New South Wales						
Employment	millions	3.4	4.0	4.5	5.0	5.4
Average annual change[(a)]	per year	45,894	60,479	52,897	43,196	38,098
Average annual change[(b)]	% per year	1.4%	1.6%	1.2%	0.9%	0.7%

Source: Australian Bureau of Statistics; Deloitte Access Economics.

Note: Employment by Place of Usual Residence used; Average calculations for 2009-10 start in 2001-02; (a) Average annual growth of the previous decade in level terms; (b) Compound annual growth rate of the previous decade.

Chart 3.2 shows that over the long term the rate of employment growth is expected to moderate as population growth and total labour force participation both ease as a result of the changing population age structure. Employment growth in New South Wales is expected to be lower than that of Australia's over the medium to longer term.

Chart 3.2 Employment growth projections, New South Wales and Australia



Source: Australian Bureau of Statistics; Deloitte Access Economics.

3.1.3 Regional population projections

Deloitte Access Economics provide regional forecasts based on the statistical regions defined by the Australian Bureau of Statistics in the Australian Statistical Geography Standard (ASGS). These boundaries are used for a range of statistical output, and provide a consistent geography across a five-year period, with updated boundaries implemented following the release of data from the five-yearly Census of Population and Housing[3]. Statistical Area Level 4 (SA4) is designed to represent labour market regions and are the primary sub-State level of disaggregation used for ABS labour market statistics. There are 28 SA4 regions within New South Wales.

The Greater Sydney region is expected to continue to grow relatively strongly over the full forecast period, with average annual growth between 2016-17 and 2049-50 of 1.3% per annum. This growth is faster than that expected for the State, which reflects a continuation of urbanisation and the tendency for overseas migrants, in particular, to settle within the Sydney region. Average annual growth is forecast to decrease from 1.8% in the decade to 2019-20 to 0.9% over the decade to 2049-50. In level terms, this means that the Greater Sydney region is expected to grow by around 87,000 people each year on average in the decade to 2019-20, and 70,000 people per year in the decade to 2049-50. Table 3.5 sets out expectations for New South Wales and the Greater Sydney region over the forecast period.

[3] The boundaries presented in this report reflect 2016 ASGS boundaries. 2011 ASGS boundaries were used in last year's iteration. Boundary changes are expected to be relatively limited, particularly at the SA4 level, and reflect large scale changes in population, particularly population increase (and therefore the splitting of existing SA2s into two or more regions). Caution should be used when comparing SA2 results from the last iteration of forecasts with this latest iteration because of these classification changes.

Table 3.3 Summary population projections

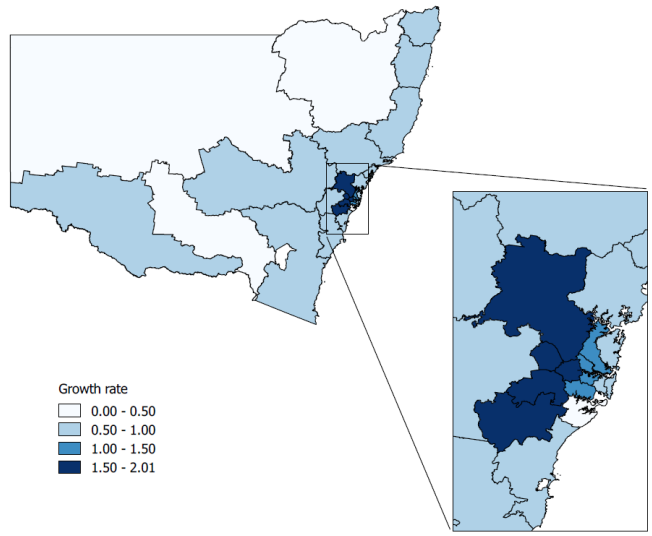
		Historical 2009-10	Forecast 2019-20	2029-30	2039-40	2049-50
New South Wales						
Population	000's	7,113	8,180	9,271	10,218	11,125
Average annual change[(a)]	000's	68,558	133,328	136,386	118,331	113,354
Average annual change[(b)]	%	1.0%	1.2%	1.0%	0.8%	0.7%
Greater Sydney						
Population	000's	4,534	5,399	6,302	7,054	7,750
Average annual change[(a)]	000's	50,682	86,545	90,275	75,208	69,591
Average annual change[(b)]	%	1.2%	1.8%	1.6%	1.1%	0.9%
Share of New South Wales	%	63.7%	66.0%	68.0%	69.0%	69.7%

Source: Australian Bureau of Statistics; Deloitte Access Economics.

Note: (a) Average calculations for 2009-10 start in 2001-02; (b) Compound annual growth rate of the previous decade; Average calculations for 2009-10 start in 2001-02.

Table 3.3 details population projections for the 15 regions of Greater Sydney and the rest of New South Wales, along with the compound annual growth rate over the forecast period, between 2016-17 and 2049-50. As shown in Figure 3.1, future growth in New South Wales is expected to be concentrated mainly in the western Sydney region, with more moderate growth through the remainder of the Sydney Region. Although no SA4 region is expected to decline in population over the forecast period, some regions are anticipated to experience very low levels of growth over the coming decades.

Figure 3.1: Average annual population growth rate by New South Wales SA4, from 2016-17 to 2049-50 (%)



Source: Deloitte Access Economics.

The regions expected to have the weakest population growth are *Sydney-Sutherland* and *Central Coast*, which are forecast to grow at average annual rates of 0.4% and 0.6% respectively over the forecast period. Relatively low growth in these regions is mostly a function of the current age structure, combined with an absence of substantial Greenfield developments, as well as the relatively small proportion of overseas migrants (the key driver of future growth) who are expected to settle in the areas based on past trends.

Despite appearing to be growing relatively slowly in comparison to areas within Greater Sydney, the *Central Coast* is one of the fastest growing regions outside Sydney. The slowest growth regions across the Rest of New South Wales included *Far West and Orana* (0.12%) and the *Riverina* (0.37%).

Table 3.4 highlights that Sydney's growth is anticipated to be highest in the outer western suburbs. The economic centre of Sydney is moving west, and as a result, high growth in Sydney's western suburbs is evident throughout these forecasts.

Table 3.4 Small area (SA4) population projections, New South Wales

	Population ('000s)					
	Historical 2009-10	Forecast 2019-20	2029-30	2039-40	2049-50	Annual growth[(a)]
Central Coast	319.2	343.3	361.6	385.8	412.3	0.6%
Sydney – Baulkham Hills and Hawkesbury	216.2	253.8	327.0	393.5	454.1	2.0%
Sydney – Blacktown	306.5	386.6	479.2	570.7	657.4	1.9%
Sydney – City and Inner South	278.3	385.1	446.6	465.0	479.2	1.0%
Sydney – Eastern Suburbs	263.7	298.3	325.3	338.9	352.5	0.6%
Sydney – Inner South West	543.9	636.4	736.0	819.4	895.2	1.2%
Sydney – Inner West	273.1	329.6	380.5	418.8	454.2	1.1%
Sydney – North Sydney and Hornsby	388.2	448.8	501.8	549.9	598.8	1.0%
Sydney – Northern Beaches	247.0	276.5	302.2	328.1	355.1	0.9%
Sydney – Outer South West	240.2	295.3	377.3	455.4	526.8	2.0%
Sydney – Outer West and Blue Mountains	295.6	329.0	359.8	385.9	410.1	0.8%
Sydney – Parramatta	403.5	516.8	639.4	722.4	796.7	1.6%
Sydney – Ryde	168.6	205.8	235.9	257.3	275.4	1.1%
Sydney – South West	371.0	465.0	590.3	716.1	826.3	2.0%
Sydney – Sutherland	219.2	229.1	239.4	247.1	256.1	0.4%
Hunter Valley exc. Newcastle	246.3	280.9	309.3	339.6	370.9	0.9%
Illawarra	285.2	314.8	340.0	358.9	375.3	0.6%
Newcastle and Lake Macquarie	352.7	378.3	407.6	438.0	471.1	0.7%
Rest of New South Wales	**1,695.1**	**1,806.5**	**1,911.8**	**2,026.9**	**2,157.0**	**0.6%**
New South Wales	**7,113.3**	**8,180.0**	**9,271.0**	**10,217.7**	**11,124.5**	**1.1%**

Source: Australian Bureau of Statistics; Deloitte Access Economics.

Key
Greater SYD
PON catchment
Southern NSW

Note: (a) Compound annual growth rate between 2016-17 and 2049-50. Shaded areas indicate this region forms part of the potential Port of Newcastle catchment

For the Port of Newcastle catchment area, Sydney – Baulkham Hills and Hawkesbury is expected to grow the fastest, at 2% annual growth, over the forecast period. Meanwhile, the Central Coast is expected to grow the slowest along with Illawarra in the Southern NSW region. However, the overall deviation of average growth between these areas is minimal.

For the 13 remaining SA4 regions within Greater Sydney, *Sydney – Outer South West*, *Sydney – Blacktown* and *Sydney – South West* are expected to grow the fastest on average over the forecast period. This is primarily due to the development of large Greenfield sites released by the Department of Planning to address Sydney's future housing demand.

3.1.4 Regional employment projections

Table 3.5: Small area employment projections by place of work

	Employment ('000s)					Annual growth (a)
	Historical 2009-10	Forecast 2019-20	2029-30	2039-40	2049-50	
Central Coast	109.0	131.0	137.9	146.1	156.6	0.4%
Sydney – Baulkham Hills and Hawkesbury	84.5	101.0	125.0	145.4	164.4	1.7%
Sydney – Blacktown	107.9	127.1	153.2	174.9	192.3	1.5%
Sydney – City and Inner South	579.5	715.3	809.2	871.1	909.2	0.9%
Sydney – Eastern Suburbs	96.2	117.3	132.8	143.0	147.4	1.0%
Sydney – Inner South West	155.7	188.0	218.8	243.2	262.6	1.2%
Sydney – Inner West	115.2	144.8	169.9	188.7	201.8	1.2%
Sydney – North Sydney and Hornsby	234.3	283.4	326.7	358.8	383.8	1.1%
Sydney – Northern Beaches	97.5	109.8	122.2	130.3	136.1	0.7%
Sydney – Outer South West	79.7	95.2	120.0	141.9	161.2	2.0%
Sydney – Outer West and Blue Mountains	112.7	125.0	143.2	157.0	168.7	1.1%
Sydney – Parramatta	225.2	278.3	334.3	378.6	411.8	1.4%
Sydney – Ryde	98.8	124.4	146.0	162.2	174.8	1.3%
Sydney – South West	123.6	152.8	191.2	232.2	277.5	2.1%
Sydney – Sutherland	71.7	78.9	84.2	88.2	91.6	0.5%
Hunter Valley exc. Newcastle	109.0	123.4	134.2	146.1	157.6	0.8%
Illawarra	104.0	126.7	137.0	143.8	150.3	0.5%
Newcastle and Lake Macquarie	167.7	188.2	202.8	219.6	235.5	0.6%
Rest of New South Wales	**1,090.8**	**1,209.4**	**1,290.6**	**1,371.4**	**1,470.8**	**0.6%**
New South Wales	**3,382.3**	**3,981.6**	**4,505.3**	**4,933.0**	**5,310.7**	**1.0%**

Source: Australian Bureau of Statistics, Deloitte Access Economics.

Note: (a) Compound annual growth rate between 2016-17 and 2049-50.

Key
Greater SYD
PON catchment
Southern NSW

Employment projections for the Port of Newcastle catchment area, the other 13 regions of Greater Sydney, Illawarra and the rest of the State are shown in Table 3.5. This data indicates the number of people working within an area; that is, employment by 'Place of Work'.

For the Port of Newcastle catchment area, Sydney – Baulkham Hills and Hawkesbury is expected to grow the fastest, at 1.7% annual growth, over the forecast period and Central Coast is expected to grow the slowest (reflecting sluggish population growth). The lowest level of growth, in Table 3.5, is projected in *Illawarra* during the decade to 2029-30, which is only slightly lower than the growth expectation for the rest of New South Wales for that decade.

Greater Sydney's employment growth closely follows the results presented for population growth since business and industry typically locate themselves close to major city and population centres.

Table 3.5 also outlines expectations for future employment in Sydney's regions. 'Sydney – South West' is expected to grow at an average rate of 2.1% per annum over the forecast period. This is in line with the State's commitment to develop Western Sydney to facilitate Sydney's growing employment and housing needs.

The highest growth expected over the forecast period is 2.3%, which is seen in *Sydney – Inner West* and *Sydney – Ryde* over the decade to 2019-20, and *Sydney - South West* over the decade to 2029-30. Growth rates in all regions experience a slowing of growth towards the end of the forecast period in line with population expectations, however as expected, the majority of employment growth over the period is focussed on the major population centres within Sydney.

Overall, the current pressure on freight movement will intensify as employment and population increase over the next 30 years in Sydney and its surrounding regions. The significant increase in population and increase in employment will also increase regional demand. This would lead to substantial growth in the number of containers that need to travel through NSW Ports to meet rising demand. The level of NSW exports will also increase as output increases, driving even more Port activity. Furthermore, unless relieved by appropriate freight and regional planning, this pressure is likely to be located in the Sydney region as this is where the vast majority of future growth occurs.

When comparing the North of Sydney to the South, the North is forecast to have higher population and employment along the coastal regions (comparing Newcastle and the Central Coast to Illawarra).

3.2 Future port freight volumes

This forecast strong population growth, combined with ongoing broader economic growth, will mean that there will be an increase in the number of containers moving through NSW.

Modelling of the expected population and economic growth in each region in NSW and keeping total forecasts to indicative levels expected in recent forecasts from TfNSW indicates that port freight is expected to more than double between 2015 and 2050, reaching around 5.2 million TEU by 2050 of which around 3.6 million TEU will be full containers. Table 3.6 shows how this growth is split across each region in NSW, both in import and export terms.

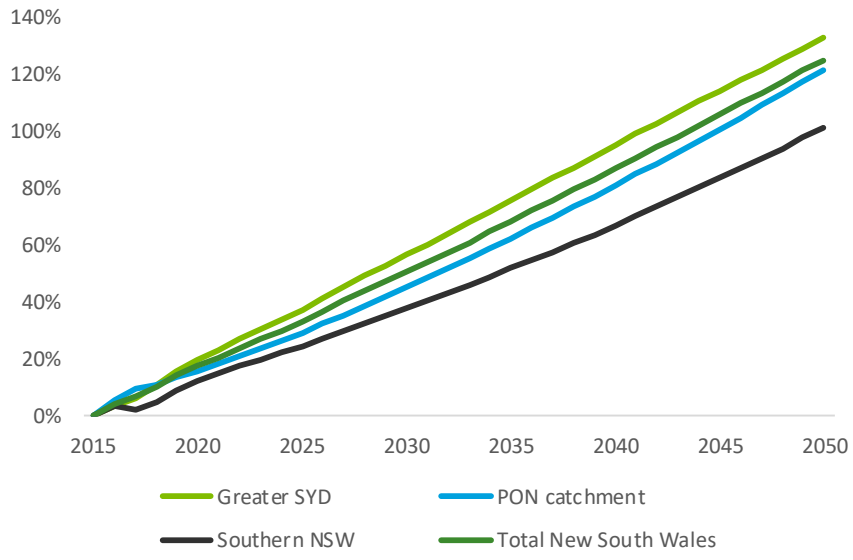
Table 3.6: Full import, export and total TEU volumes in NSW

Region	2020	2030	2040	2050
Greater Sydney				
Imports	828,494	1,087,059	1,354,320	1,617,977
Exports	244,398	320,672	399,511	477,288
Total	1,072,892	1,407,732	1,753,832	2,095,265
PON catchment				
Imports	364,600	457,561	570,462	699,265
Exports	210,747	264,480	329,740	404,190
Total	575,346	722,042	900,202	1,103,455
Southern NSW				
Imports	153,699	189,057	228,823	276,144
Exports	97,288	119,670	144,841	174,794
Total	250,987	308,727	373,664	450,938
Total NSW				
Imports	1,346,793	1,733,678	2,153,606	2,593,386
Exports	552,433	704,822	874,092	1,056,272
Total	1,899,226	2,438,500	3,027,698	3,649,658

Source: DAE modelling

Greater Sydney is expecting the largest growth – growing at an average annual rate of around 2.4% a year between 2015 and 2050. This is followed by the Port of Newcastle catchment area, predicted to grow at a slightly lower rate of 2.3% a year over the same period. Southern NSW is expected to grow at 2% a year due to lower population growth rates and periods of lower economic activity.

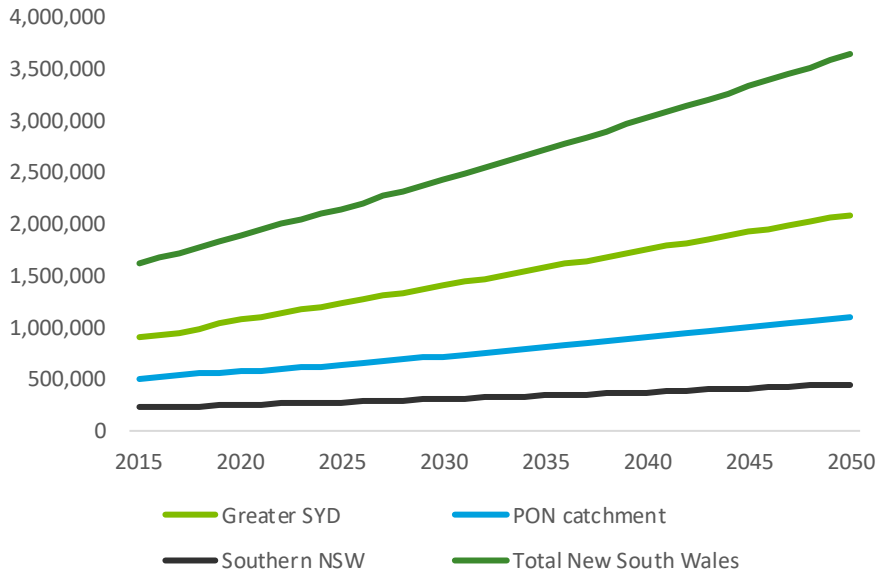
Chart 3.3: Forecast percentage change in TEU for each region in NSW



Source: DAE modelling

As Chart 3.4 shows, this growth will take Sydney to around 2 million full TEU annually in 2050, Port of Newcastle catchment to around 1.1 million full TEU and Southern NSW to 450,000 full TEU.

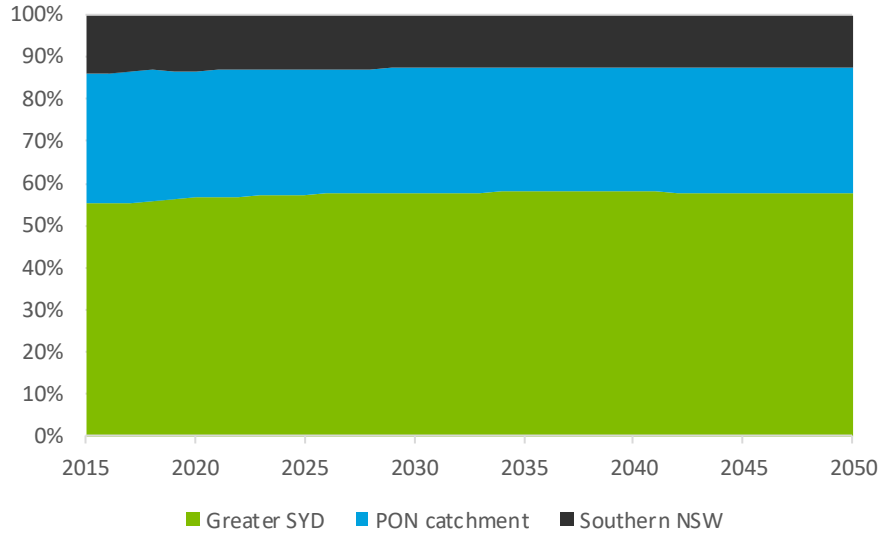
Chart 3.4: Forecast TEU for each NSW region



Source: DAE modelling

The share of TEU by region is not expected to change significantly in the future. Chart 3.5 shows that Sydney's share will grow from 55% in 2015 to 57% in 2050 and the Port of Newcastle catchment will fall marginally – down from 31% in 2015 to 30% in 2050. The South is expected to decline from 14% to 12%.

Chart 3.5: Share of TEU in each region over time



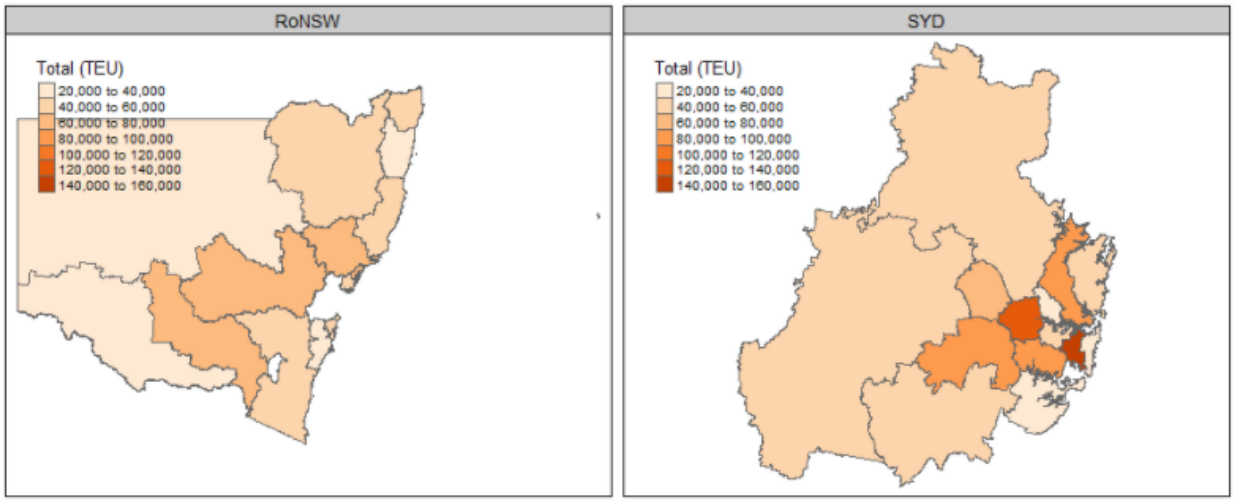
Source: DAE modelling

Figure 3.2 maps the change in TEU by SA4 region over time. In Sydney, growth will largely come from the South West, Outer South West and

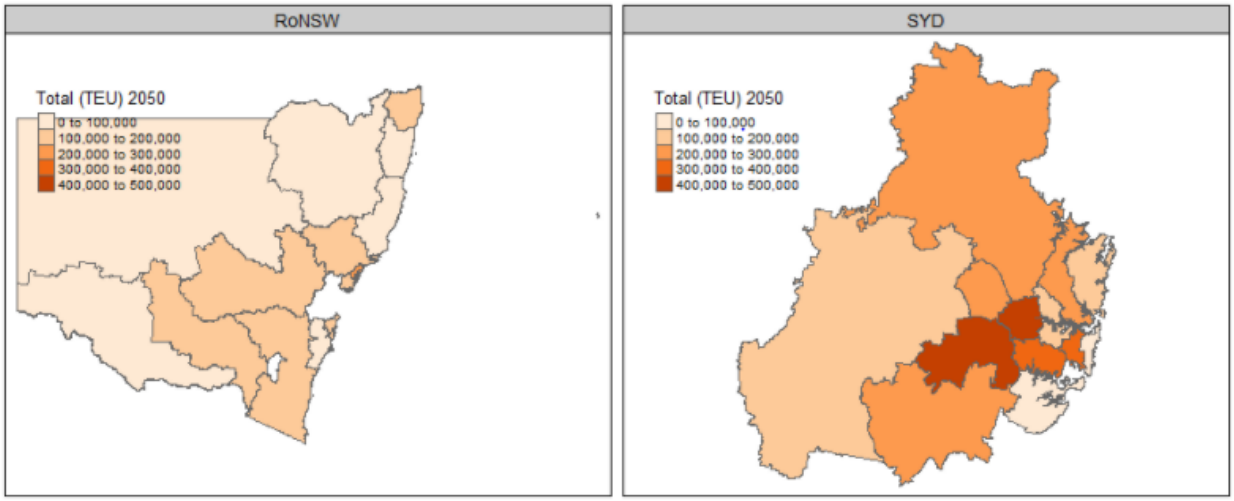
Blacktown areas. In the rest of NSW, the largest growth areas are the Hawkesbury, Richmond, and the Hunter Valley.

Figure 3.2: TEU by SA4 region, 2015 and 2050

2015



2050



Source: DAE modelling

3.2.1 Import destinations

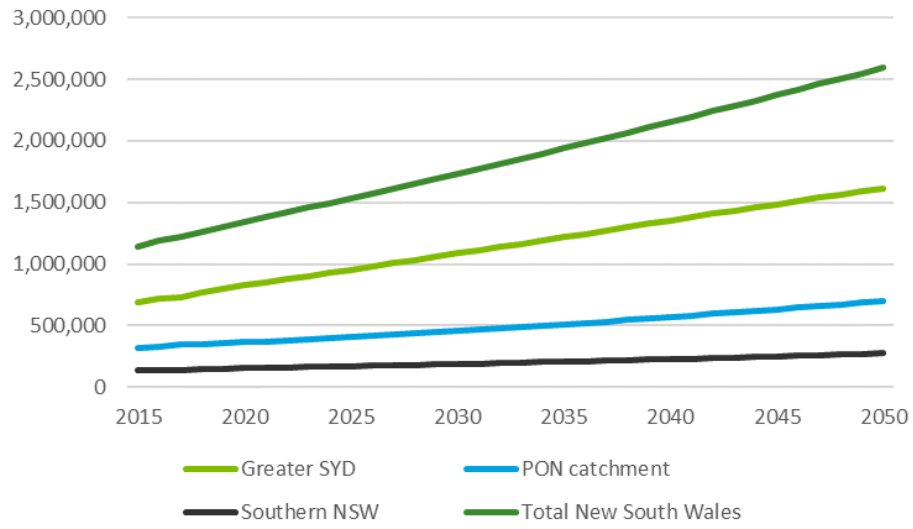
While most freight is initially unloaded in Sydney, much of it is then transported around the state to different destinations for use. Chart 3.6 projects where imports will enter into the supply chain.

Sydney will remain the largest consumer of imports, growing from 690,000 TEU in 2015 to 1.6 million TEU in 2050. The Port of Newcastle catchment will grow from 315,000 TEU to 700,000 TEU over the same period. Southern NSW will increase from 137,000 TEU to 276,000 TEU (around 39% of the PON catchment).

This analysis indicates that a significant proportion, over a quarter, of the imports that are currently being brought in through Port Botany are actually destined for use in parts of the state that are closer to the Port of

Newcastle. This suggests that the Port of Newcastle could play a role in more efficiently moving this freight into the supply chain.

Chart 3.6: Forecast full imports (TEU) by region

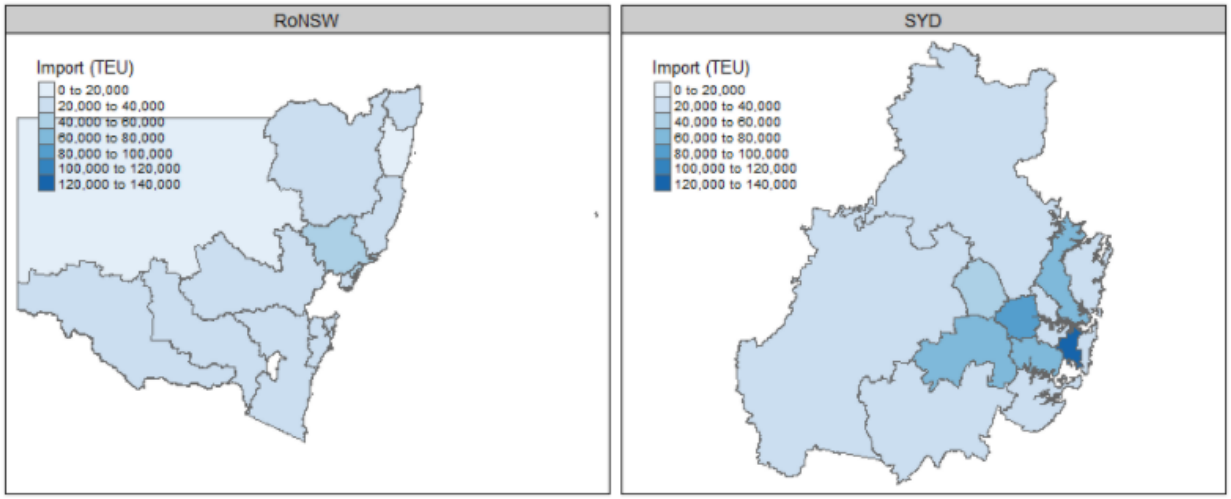


Source: DAE modelling

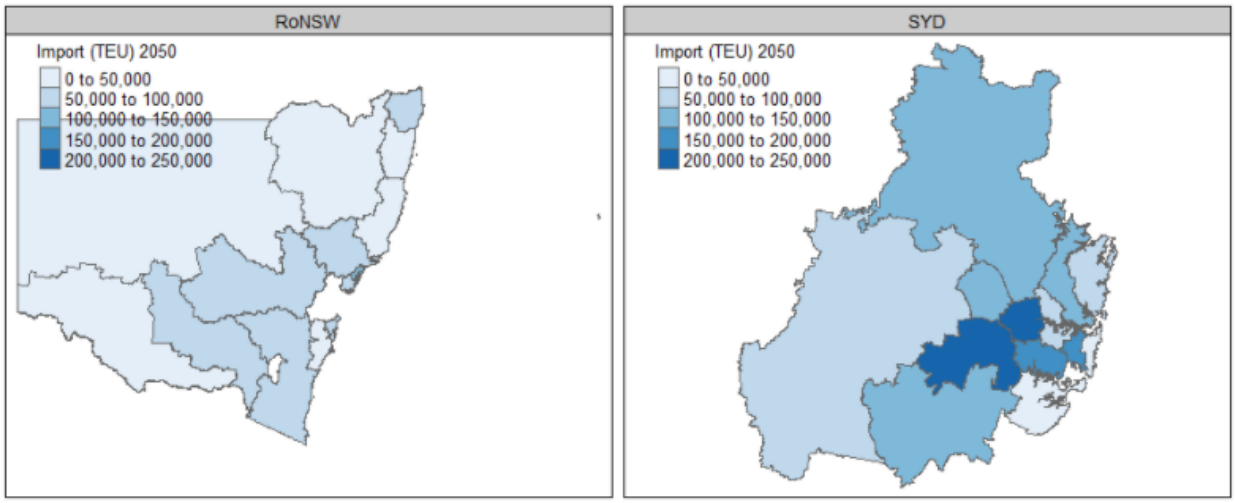
Figure 3.3 shows this unpacked destination of imports by SA4 region. By 2050 the largest import destinations in Sydney will be the South West, Parramatta, and Inner South West. Outside Sydney, the largest importing regions will be the Hawkesbury, Newcastle and Hunter Valley.

Figure 3.3: Imports by SA4 region, 2015 and 2050

2015



2050



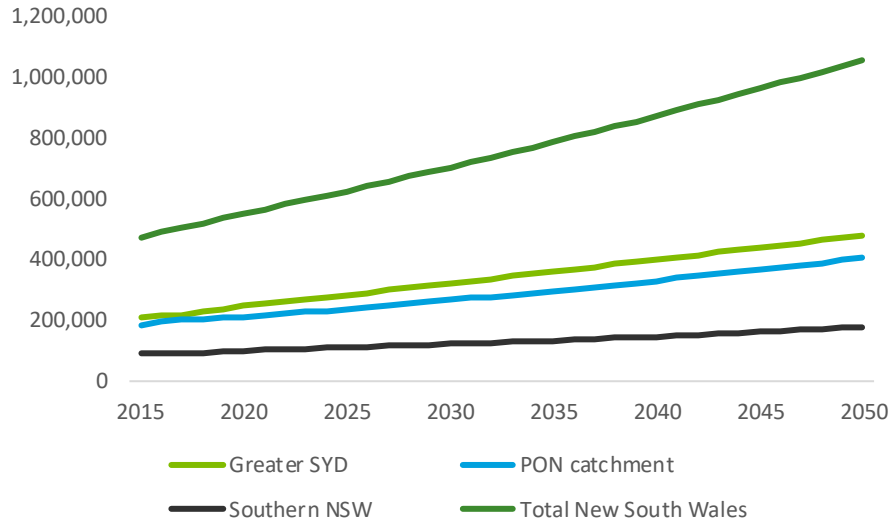
Source: DAE modelling

3.2.2 Export origins

As with imports, a port in the north able to export internationally would cut down on transport costs and increase production efficiency for a significant proportion of exports that come from NSW.

As Chart 3.7 shows, the PON catchment will continue to generate around one-third of NSW exports. Sydney's exports are expected to more than double between 2015 and 2050 – reaching 477,000 TEU. The PON catchment is forecast to increase to 404,000 TEU over the same period. Southern NSW is also forecast to grow, although not as quickly as the rest of the state and is expected to reach 175,000 TEU by 2050.

Chart 3.7: Forecast exports (TEU) by region over time

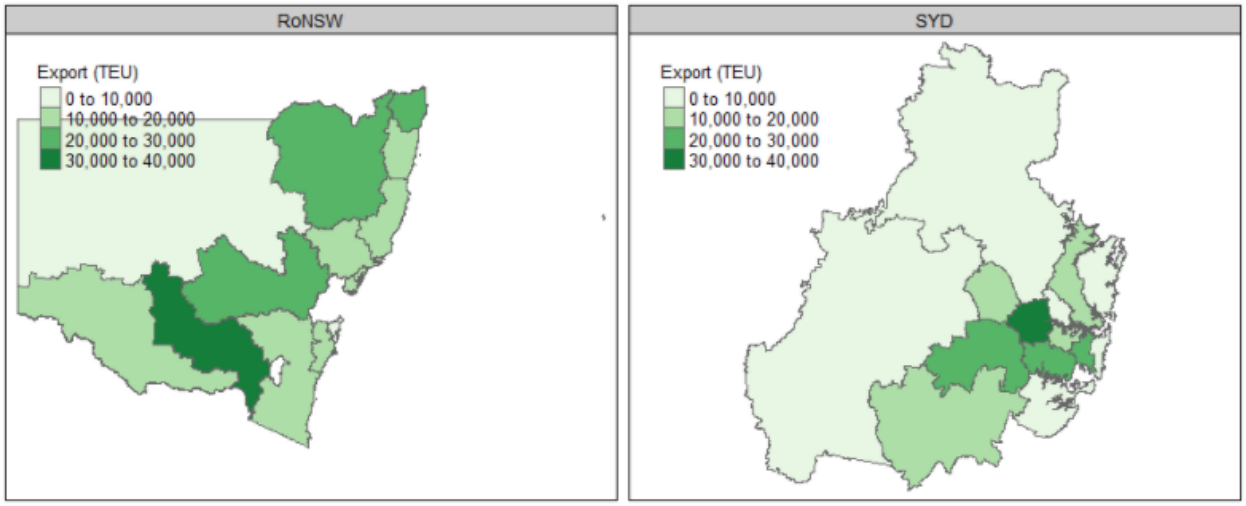


Source: DAE modelling

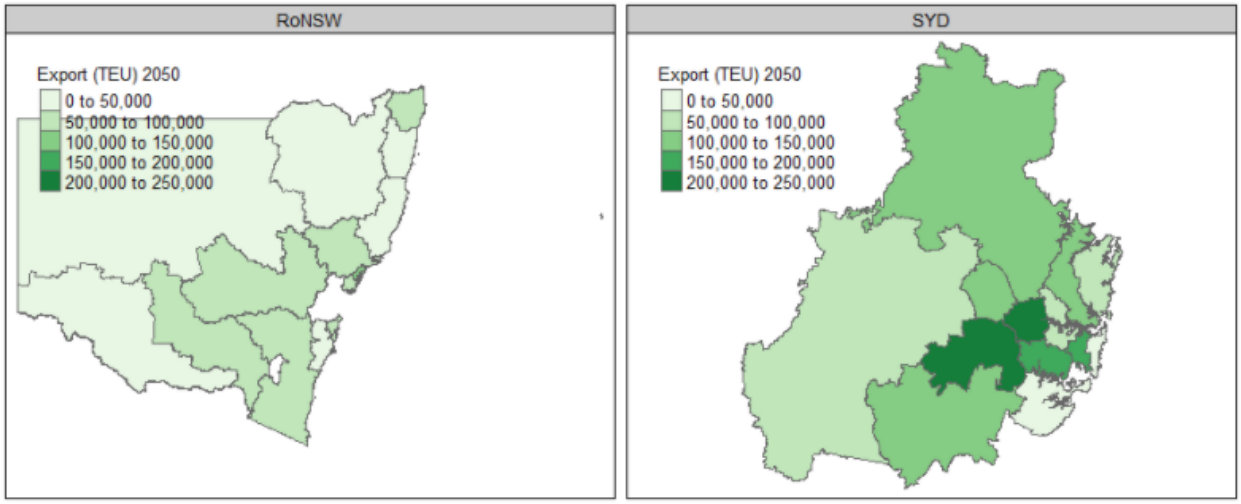
Figure 3.4 maps export origins by SA4 region in 2015 and forecasted in 2050. In Sydney, the largest exporting regions in 2050 will be Parramatta, the South West and the Inner South West. Outside of Sydney, the Riverina, Richmond and the Central West will be the largest exporters.

Figure 3.4: Exports by SA4 region, 2015 and 2050

2015



2050



Source: DAE modelling

4 Planning for growth

With the forecast for strong growth in both population and containerised freight, there is clear role for the NSW Government to be developing plans and investments which can help accommodate this increasing freight task.

Past and current Transport plans and strategies acknowledge the challenges facing existing freight network such as: (i) bottlenecks on road and rail networks, (ii) capacity of freight network, and (iii) community and environmental impacts of freight.

A common theme among the plans and strategies is that, over the next 20 years, ports in NSW will need to focus on their primary markets. Port Botany is generally seen as remaining the key container port in NSW, Port Kembla will be the primary port for motor vehicle imports in NSW and Port of Newcastle will need to support forecasted growth in coal exports (Transport for NSW, 2013, p. 111).

The documents recognise that Port Botany might approach its natural capacity between 2030 and 2040, due to the growth in freight outstripping future capacity of Port Botany, and therefore, an additional container port will be required to supplement Port Botany (Transport for NSW, 2013, p. 30).

Existing and current plans are consistent in their indication that Port Kembla will act as the overflow port for NSW freight (Transport for NSW, 2013, p. 108). While there is allowance for the Port of Newcastle to expand its capacity to meet projected increase in coal exports, there is no discussion on the potential for Port of Newcastle to help accommodate the growth in container trade that is expected, particularly for Northern NSW.

There is also a lack of consideration for how Port of Newcastle could assist in developing the north-south connections described in the Greater Sydney Region Plan; contribute to the ongoing diversification and revitalisation of the Newcastle and Hunter economy or enable efficient export of a diversified mix of commodities from NSW.

The growth in freight will also impose capacity constraints on the road and rail networks, intermodal terminals and freight corridors. Capacity across the freight network varies, but key parts of the network are already under pressure to match demand.

To address these constraints, governments at various levels have identified a number infrastructure projects requiring investment. These projects will not only allow for the improved movement of freight across NSW, but will also support the growth in each of NSW’s ports.

4.1 Past ports strategy

A number of past strategies are important for determining the current approach to the three major ports in NSW: Port Botany, Port Kembla and Port of Newcastle. The past plans and strategies generally focus on development of and investment in Port Kembla as a second port for NSW, while Port of Newcastle retains its existing role as major coal export port.

The main historical planning and strategy documents considered here are:

- Long Term Transport Master Plan (2012)
- NSW Freight and Ports Strategy (2013)
- NSW Ports Master Plan (2015)

4.1.1 Long Term Transport Master Plan (2012)

The Long Term Transport Master Plan 2012 (the Master Plan 2012) identified a number of challenges facing the existing freight network over the next 20 years, as it prepares to service significant increases in demand, and increasingly globalised supply chains and industries.

Overall the Long Term Transport Master Plan was considered in the context of the collective transport needs for the people of NSW increasing and becoming more complex. As a result, the transport system has to be adapted to enable people to move seamlessly across transport modes and allow freight to move efficiently. Within this plan, freight logistics was seen as an enabler of almost all economic activity in NSW.

The key challenges facing the existing freight network are:

1. Bottlenecks on road and rail network;
2. Capacity of freight network; and
3. Community and environmental impacts of freight.

At the time, the container throughput at Port Botany was growing between six and seven percent annually. This was expected to create capacity issues at Port Botany but also contribute to already increasing congestion in the precinct. The growing volumes of freight moving through the Port was seen to make the maintenance of efficient links between the port precinct, the CBD and the Global Economic Corridor one of the most important transport challenges – not just for Sydney, but for NSW and the national economy.

A range of investments in new infrastructure were identified to deliver greater capacity across the freight transport network:

- $1 billion investment in establishing the third container terminal at Port Botany;
- Outer Harbour Expansion at Port Kembla; and
- Further development of the Port of Newcastle, including the T4 coal facility.

At the time, there was a strong growth forecast for the NSW resources sector which raised the challenge of ensuring adequate infrastructure access for non-resource industries, including efficient connections to the ports at Newcastle and Port Kembla.

At the Port of Newcastle, over 121 million tonnes of coal was handled in 2011-12, with the total overall trade reaching nearly 129 million tonnes. Approved expansion at the Port of Newcastle provides potential for coal export capacity to increase to 300 million tonnes per annum. In addition, the landside transport infrastructure is struggling to meet this rise in

demand, resulting in the requirement for ships to queue off the coast of Newcastle while awaiting loading.

In order to address the challenges facing freight capacity and to meet the future demand in NSW, the Master Plan 2012 proposes the following actions pertaining to ports of NSW:

- Finalise and implement the new NSW Freight and Ports Strategy, discussed below;
- Develop Port Growth Plans for NSW Ports with the Port Corporations and the new long term lessees of Port Botany and Port Kembla. The focus will be on driving efficiencies, transparency and investment;
- Implementing a market-driven approach to port operations for identified ports; and
- Prepare an action plan for the Port Botany Precinct.

4.1.2 NSW Freight and Ports Strategy (2013)

At the time of this strategy, by 2031, the freight task in NSW was projected to nearly double to 794 million tonnes in comparison to the existing 409 million tonnes.

The NSW Freight and Ports Strategy designates Port Botany as the primary port of NSW. The Freight and Ports Strategy 2013 (the Strategy 2013) states that, depending on the rate of growth, from a planning perspective it appears reasonable to expect that Port Botany might approach its natural capacity between 2030 and 2040. Therefore, new port infrastructure at Port Botany and/or Port Kembla may be required to help relieve these pressures, and will need to be supported by significant land freight network improvements due to interregional movements of freight.

The Strategy also states that, over the next 20 years, NSW ports will need to focus on their primary markets. Port Botany will remain the key container port in NSW, given current planning and investments to date. Port Kembla is the primary port for motor vehicle imports in NSW and will continue to support export trades such as coal, minerals and grain.

The Strategy sets out that the Port of Newcastle will need to support forecast growth in coal exports, given its pivotal location serving the Hunter coal network. The Port of Newcastle has significant opportunities for growth and development and has prepared plans to improve general cargo handling and bulk liquids capabilities.

One of the actions from the Strategy 2013 is to develop effective port growth plans to meet freight volume growth. Individual port plans need to demonstrate how infrastructure will be provided to meet the forecast trade volume, with an outlook horizon of a minimum of 20 years.

4.1.3 NSW Ports Master Plan (2015)

The NSW Ports Master Plan 2015 (the Master Plan 2015) was developed by NSW Ports, the custodian of Port Botany, Port Kembla, Cooks River Intermodal Terminal and the Enfield Intermodal Logistics Centre.

The Masterplan 2015 is focussed on the long-term sustainability of NSW port and intermodal assets: Port Botany, Port Kembla, Cooks River Intermodal Terminal and Enfield Intermodal Logistics Centre. NSW Ports is planning for:

- Port Botany to remain Australia's premium port and NSW's primary container, bulk liquid and gas port servicing Australia's largest population centre;
- Port Kembla, as the NSW port of growth, to continue to be NSW's largest motor vehicle import hub and bulk grain export port while catering for a growing range of dry bulk, bulk liquid and general cargo. It will be home to NSW's second container port; and
- Enfield and Cooks River Intermodal Terminals to be inland extensions to Port Botany, with Cooks River operating as an extended port gate and the Enfield Intermodal Logistics Centre a key logistics hub in the central-west of Sydney.

4.1.4 Summary on existing port plans and strategies

As the reports reviewed here were all published after 2012, there is a clear preference for the development of Port Kembla as the overflow port for Port Botany. The main challenges identified in these strategies generally relate to managing an expected growth in both bulk freight and containerised freight with a general preference for specialisation in each port to manage different types of freight.

4.2 Current NSW Government plans and strategy

An understanding of current NSW Government plans and strategies is crucial to understand the implications for ports in NSW and their significance in metropolitan planning in NSW. The major planning and strategy documents that currently relate to ports and freight are:

- State Infrastructure Strategy 2018-2038
- Future Transport Strategy 2056
- Draft Greater Newcastle Future Transport Plan
- Draft Freight and Ports Plan
- Greater Sydney Region Plan

4.2.1 State Infrastructure Strategy 2018-2038

The *State Infrastructure Strategy 2018-2038: Building Momentum* recommends reforms, policies and projects that respond to NSW's changing economic, social, technological and environmental outlook and build on the benefits already delivered by the largest infrastructure program in Australia. The Strategy is set out to work on tandem with *Future Transport Strategy 2056*, *Greater Sydney Region Plan* and *Regional Plans*.

One of its strategic objective is to ensure the transport system creates opportunities for people and businesses to access the services and support they need.

More specifically, the Strategy emphasises the importance of maintaining efficient access to global gateways as various major cities in NSW grow, such as Sydney, Wollongong and Newcastle. It highlights that the importance of Port Kembla as an international trade gateway will increase as it progressively serves as an overflow facility for Port Botany (with Port Botany expected to reach operational capacity after 2040).

The Strategy recommends that future investments pertaining to ports should:

- Focus on growing the capacity of the port at Port Kembla as an international trade gateway, enabled by dedicated rail connections;
- Support import/export industries with connections between international gateways and the National Land Transport Network and recognise the increasing importance of Port Kembla; and

- Maintain the Maldon-Dombarton rail link as the most appropriate rail freight connection between Sydney and Port Kembla, although it is unlikely to be needed until 2030. This link will connect Port Kembla to intermodal facilities in the Western Parkland City via the Southern Sydney Freight Line and future Western Sydney Freight Line, as well as improve travel times and reliability for the 60-65% of freight that currently enters or leaves Port Kembla by rail.

The Strategy also points out that as Sydney grows, competition for valuable land will intensify. Pressure to accommodate population growth may have unintended consequences for the operation of freight infrastructure, including impacts on the efficiency of supply chains. Infrastructure NSW recommends that:

- Transport for NSW lead the development of a bulk materials transport and handling plan for Greater Sydney by the end of 2019 to support the construction and waste management sectors; and
- The Department of Planning and Environment update the relevant State Environmental Planning Policies by the end of 2019 to further protect strategically important ports, airports, industrial lands, freight precincts and key corridors from incompatible uses to ensure the efficient movement of freight in Sydney and NSW, now and into the future.

4.2.2 Draft Greater Newcastle Future Transport Plan

The Draft Greater Newcastle Future Transport Plan is undertaken in a context of Greater Newcastle undergoing transformation from its heavy industrial past to an urbanised, service-based economy. It is benefited by its access to international markets through its port and airport.

The plan recognises that freight is crucial to Greater Newcastle's economy and role as a Global Gateway City. The NSW Government will protect freight through movements and reinforce key links to the Port and Airport that serve Greater Newcastle as well as reduce the volume of freight trains travelling through urban areas.

The plan identifies that one of the initiatives for investigation in the 0 to 10 years is port efficiency, access and integration package.

4.2.3 Freight and Ports Plan

The draft Freight and Ports Plan (the Plan) builds on the NSW Freight and Ports Strategy (2013). It highlights that in the next 40 years, freight volumes are estimated to double in the Greater Sydney area and grow by a quarter in Regional NSW. The major commercial ports at Port Botany, Port Kembla and Newcastle are managing increasing volumes of imported and exported goods, which require faster, more efficient road and rail access channels with Sydney and Regional NSW markets.

Port Kembla will act as a progressive overflow facility for Port Botany once its operational capacity has been reached. This is expected to occur after 2040, with Port Kembla requiring development to increase its capacity to accommodate the overflow.

The Port of Newcastle will continue to be the primary coal export facility for NSW, and will continue to diversify into other commodities including fuel. Two hundred hectares of vacant port land is available for future port capacity development, representing over 25% of total land holdings at the Port of Newcastle. The growth and diversification of the Hunter region will stimulate a requirement to expand the port's facilities.

The Plan highlights priority action areas and infrastructure initiatives to address opportunities and challenges for the freight network in NSW, such as protecting existing freight precincts and ensuring sufficient future land use.

One of the initiatives for the Port of Newcastle is to support private sector investment in the development of the Kooragang Island Terminal 4 at Newcastle. The Port of Newcastle is currently preparing a 20 years Port Master Plan to outline this and other port development opportunities.

4.2.4 Greater Sydney Region Plan

The plan indicates that by 2056 the combined population of Greater Sydney, Newcastle and Wollongong will be approximately 10 million. Improving the north-south transport connections between Greater Sydney, Newcastle and Wollongong will enable greater economic efficiencies and opportunities.

Efficient trade gateways and freight and logistics networks are required for the region to be more internationally competitive. It is likely that Port Botany will need to be complemented by Port Kembla to handle the projected growth in shipping trade, especially containers. Providing for a growing Greater Sydney requires an efficient and effective road and rail freight network integrated with ports and airports.

The forecast TEU growth is beyond the future capacity of Port Botany. This growth will trigger the need to develop an additional container port location to service Greater Sydney's container logistic needs. The plan identifies that this is most likely to be Port Kembla, which has an approval to expand container handling capacity at a cost of $1 billion. This will help manage some projected growth, but not all.

In addition, regional transport connections will connect Port Botany, Port Kembla and the Port of Newcastle, which are internationally important trade gateways, facilitating the import and export of significant volumes of container and bulk freight such as coal, motor vehicles and other agricultural products.

4.3 Capital investment to support port growth

Ongoing population growth and the increased demand for freight has placed significant pressure on NSW's existing ports and the freight transportation infrastructure. In some places, the freight network is at capacity and the potential for efficiently increasing the number of freight movements is limited, leading to higher levels of congestion, longer journey and access times, and increased safety risks.

To address these constraints, governments at various levels have identified a number of infrastructure projects requiring investment. These projects will not only allow for the improved movement of freight across NSW, but will also support the growth in each of NSW's ports.

The table below identifies a number of road and rail projects outlined within various government plans and strategies, including the *NSW Draft Freight and Ports Plan*, the *2015-2024 Sydney Metropolitan Freight Strategy*, and the *Infrastructure Priority List*. It also lists a number of port-specific projects identified within port development plans, including NSW Ports' *Navigating the Future* and Port of Newcastle's *Port Development Plan 2015 – 2020.*

The table also provides the estimated costs of projects, and identifies which ports will be impacted. More details on the projects, including the planned timeframe for delivery of the project and the status of project funding or construction are provided in Appendix B.

The total cost of projects supporting Port Botany, Port of Newcastle and Port Kembla is $27.6 billion.

Considering how these projects support Port Botany, Port of Newcastle and Port Kembla is challenging as many of the investments will support freight more broadly in NSW and may benefit more than one port. In the table below, projects directly related to a port are identified with an R and projects that support a port are identified with an S.

- **Port Botany**
  There is a considerable degree of existing infrastructure which supports Port Botany. However, growing congestion on the metropolitan road network, particularly around the airport, is increasingly impacting the productivity of the port.[4] The Sydney Gateway project and the Airport East Upgrades will ensure that there are high capacity road links to the port. Many of the other projects supporting Port Botany, such as duplication of the Port Botany Rail aim to reduce the dependency on roads by achieving a modal shift to rail freight.

- **Port Kembla**
  It has been recognised that Port Kembla will face capacity constraints in the absence of any rail network improvements.[5] Development of the Maldon to Dombarton Railway Line, and upgrades to the Southern Sydney Freight Line will improve freight rail access to the port. Improvements M1 Princes Motorway will also reduce constraints faced on the Illawarra region's road network. Additionally, developments to the Outer Harbour will allow the port to attract greater overflow container traffic from Port Botany.

- **Port of Newcastle**
  A dedicated freight rail corridor in the Lower Hunter and upgrades to the existing Northern Sydney Freight Corridor will increase the efficiency of freight movements between Newcastle and Sydney, and increase the viability of Port of Newcastle as a container port. No significant direct investment in port infrastructure is required to enable an increase in container movements.

However, reviewing these projects indicates that the investments planned to support Port Botany generally focus on enhancing capacity of connections between the port and western Sydney with little need for expenditure at the port itself. For Port Kembla, investments are required in both the port itself and to better connect it to the NSW freight network. Minimal NSW Government investment is required to establish a container terminal at the Port of Newcastle, as the Port has the land, channel, and existing road and rail connections to develop a container terminal now. Much of the investment identified in NSW Government strategies is actually focussed on enhancing connections between Sydney and Newcastle with no significant

[4] Infrastructure NSW (2014), *State Infrastructure Strategy Update 2014 – Recommendations to the NSW Government*
[5] Infrastructure Australia (2017), *Infrastructure Priority List – Australian Infrastructure Plan Project and Initiative Summaries*

planned or required direct investment in port infrastructure to enable an increase in container movements.

The investments that have been identified to support the Port of Newcastle would also most likely be needed regardless of the policy approach to port freight. These investments will support general freight movements between Sydney and Brisbane and also a growing number of passenger movements between Sydney, the Central Coast and the Hunter.

It's also important to note that the Lower Hunter Freight Rail Corridor is still in early stages of development and may not provide additional beneficial capacity without the Northern Sydney Freight Corridor.

Additionally, these projects increase the capacity of the wider transport network, supporting the general movement of people. The total costs of a project, therefore, cannot be solely attributed to a single port. Aggregating the cost of all projects, however, provides an indicative estimate of the level of investment that is needed to support freight movements to and from each of the ports.

Table 4.1: Infrastructure projects supporting freight and ports

Project	Estimated Costs	General Freight Investment	Port Botany	Port Kembla	Port of Newcastle
Sydney Gateway	*$800 million*	✓	Required		
NorthConnex	*$3.1 billion*	✓			Supports
Port Botany freight rail duplication	*$200 million*		R		
Development of the Moorebank Intermodal Terminal	*$1.8 billion*	✓	R		
Airport East Upgrades	*$170 million*		R		
Maldon - Dombarton Railway Line	*$800 million*			R	
Bells Line of Road improvements	*$50 million*	✓	S	S	
M1 Pacific Motorway Upgrades	*$390 million*	✓	S		S
M1 Princes Motorway improvements Picton Road to Bulli Tops	*$80 million*			S	
Bridges for the Bush	*$290 million*	✓	S	S	S
The Lower Hunter Freight Rail Corridor	*Assessment not available*	✓			S
Northern Sydney Freight Corridor	*$5 billion*	✓	R		S
Inland Rail	*$9.9 billion*	✓	S	S	S
Southern Sydney Freight Line upgrade	$80 million	✓	R	R	
Regional Road Freight Corridor	*$2 billion*	✓	S	S	S
Western Sydney Freight Line and Intermodal Terminal access	*$2.2 billion*	✓	S	S	
Outer Sydney Orbital	*Assessment not available*	✓	S	S	S
Development Port Kembla's Outer Harbour	*$700 million*			R	
Capacity upgrades to Port Botany	*Assessment not available*		R		

Source: Deloitte Access Economics

5 NSW regional Development

Moving beyond freight, the Port of Newcastle also has the potential to play a significant role in terms of the regional development of NSW. The Port of Newcastle is well placed to be a gateway for northern NSW (and even into southern Queensland) as well as serving the growing population of the Hunter region.

Indeed, two of the 12 priorities of NSW Premier Berejiklian are directly supported by the PON now and in the future: job creation and infrastructure delivery.

> "Our regional communities are the beating heart of New South Wales … With our regional population expected to reach 3.4 million by 2031, regional growth will become an even more important driver of our prosperity."
>
> The Hon. Dominic Perrottet MP, 2017-18 Budget Speech

The economic and regional development priorities for NSW are set out in a selection of key strategic, policy and planning documents. While the priorities are not articulated in any single place, the key messages are consistently repeated and focus on developing the comparative advantages of different regions through support and selective investment in order to encourage the development of skills and employment.

The PON has the potential to play an integral role in fulfilling the strategies and plans for regional development in NSW. For example, the Hunter Regional Plan, developed by NSW Government (2016a), outlines the Government's goals and aspirations for the region to 2036. A key goal for the plan includes positioning the Port of Newcastle and Newcastle Airport as a global gateway, through improved interregional links and infrastructure for freight movements.

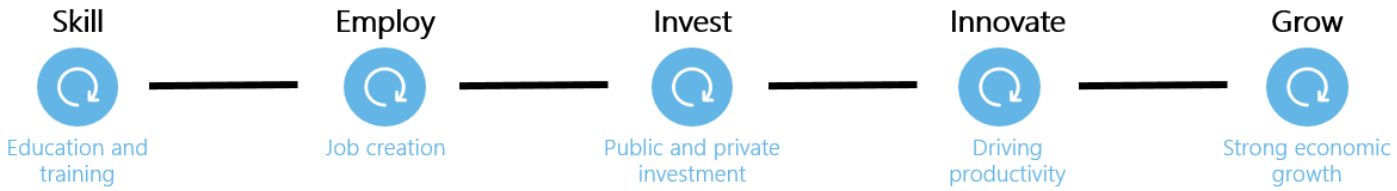
While current regional development plans do not tend to focus strongly on the role of the PON in regional development, there is a potential intuitive role for the port in regional development through:

- Supporting NSW's globally competitive growth segments by acting as a key facilitator and connector, particularly those located north and west of Sydney. A well-connected port provides businesses with access to the markets needed to develop new product offerings (via importing inputs) and capitalise on new markets (via exporting products);
- Acting as a key economic asset and a direct source of employment and economic activity in the Hunter region;
- Supporting economic diversification within the Hunter region by enabling trade in the advanced manufacturing industry;
- Supporting growth in NSW's industrial base by acting as a key enabler for existing economic clusters in the Hunter region; and
- Reinforcing the broader strategic economic priorities of NSW Government.

5.1 NSW regional planning and strategy

The NSW Government, in conjunction with business and the community, has committed to a number of economic priorities, recognising that investing in the building blocks of the economy is what drives growth. In particular, skills and jobs growth, (infrastructure) investment and innovation are key areas of focus.

Figure 5.1 Economic priorities



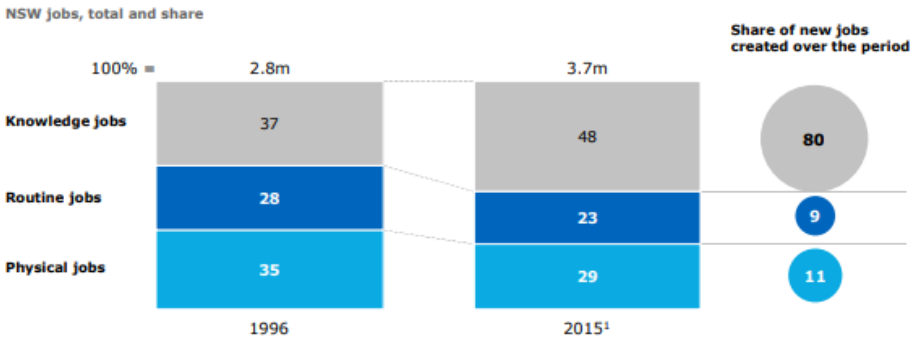
The economic and regional development priorities for NSW are set out in a selection of key documents. The main documents that set out the NSW Governments approach to regional development are:

- Jobs for the Future (NSW Government, 2016)
- Making it Happen in the Regions (Department of Industry, 2017)
- Regional Economic Growth Enablers (Centre for Economic and Regional Development, 2017)

5.1.1 Jobs for the Future (2016b)

Jobs for the Future is a state-wide plan for creating an additional 1 million jobs in NSW by 2036 (NSW Government, 2016b). Led by Jobs for NSW, the plan advises government on how it can help create jobs over the next 5 years to ensure secure employment opportunities exist over the next 20 years. The plan is set within the context of the challenges facing NSW's economy, and the expected drivers of jobs growth (see Chart 5.1).

Chart 5.1 Drivers of NSW jobs growth



Source: Jobs for NSW, *Jobs for the future,* August 2016

The plan sets out four strategies of jobs growth.

- **Nurture globally competitive growth segments**, through:
  - Focusing government reform and resources on supporting competitive environments and unlocking barriers for target segments; and
  - Promoting distinctive geographic clusters as a focus for policy, development and energy (which includes coal mining in the Hunter Valley).

- **Open doors for entrepreneurs**, through:
  - Building a supportive ecosystem for entrepreneurs that nurtures networks, mentorship, skills and business opportunities;
  - Simulating early-stage investment in future gazelles;
  - Supporting and signalling a strong culture of entrepreneurship; and
  - Making NSW the easiest state to start and grow a business.
- **Skill up for the knowledge economy**, through:
  - Accelerating reform of the K-12 curriculum, delivery models and teacher professional learning to be more focussed on building interactive skills to prepare the next generation; and
  - Ensuring the VET system is stackable, agile, outcomes-based and responsive for a lifetime of effective learning and re-skilling.
- **Draw on all people**, through:
  - Making NSW the best place to work for people 65 and over;
  - Making NSW the best place to work for women with children;
  - Promoting thriving regional centres that create work opportunities for youth; and
  - Making NSW the most liveable state.

5.1.2 Making it Happen in the Regions (2017)

The Department of Industry's *Making it Happen in the Regions: Regional Development Framework* presents the Government's priorities and programs for regional development (Department of Industry, 2017). Home to 40% of the population and producing one-third of gross state product, economic development in regional NSW has been identified as a strategic priority.

The framework sets out three prioritised regional development programs.

1. **Providing quality services and infrastructure in regional NSW**
   - All people in regional NSW should have access to essential services and infrastructure including hospitals, schools, roads, water, police and emergency services.

2. **Support growing centres**
   - There are some regional centres that are experiencing strong growth in population, productivity, economic output or jobs. The strength and resilience of regional centres is a major contributor to the prosperity of NSW.
   - Regional centres along the north coast are well represented in this list, including Tweed, Coffs Harbour and Port Macquarie.
   - The program is designed to ensure that investment is concentrated in growing regional centres.

3. **Identify and activate economic potential**
   - Some regions and regional centres are struggling economically and demographically, and there are opportunities to enliven local economies through strategic investment.
   - This program recognises that often the economic landscape in a region can improve rapidly when government and private sector actors collaborate to capitalise on particular opportunities.
   - As an example, the program suggests that when a traditional industry is declining in a region, there is scope for Government to support emerging alternative industries.

5.1.3 Regional Economic Growth Enablers (2017)

The Department of Premier and Cabinet's Centre for Economic and Regional Development produced the *Regional Economic Growth Enablers* report in

2017 to present the findings of their analysis of the potential enablers to economic growth in regional areas (Centre for Economic and Regional Development, 2017).

- **The economic base of NSW's regions is narrowing and deepening:** there are fewer key sectors employing a larger proportion of the regional workforce, and these key sectors are consistently dependent on the regions' local endowments.
  - While growth in these key industries and the emergence of new endowment-based industries is expected, numerous sources of market failure may be hindering growth.
  - Policies and investments to address these market failures are considered 'growth enablers'.
- **Market failures in regional development:** the analysis revealed that the market failures most applicable to regional development in NSW relate to skills, particularly technical and vocational training, and public infrastructure provision.
  - The market for skills is affected by several impediments, including instances of information asymmetry, positive externalities and instances of natural monopoly.
  - Investment in public infrastructure is subject to the 'first mover and free rider' problem (where businesses have an incentive to wait for another firm to invest first), natural monopoly and network externalities. Underinvestment in some forms of infrastructure is likely to be an issue in most or all regional economies.
- **Economic diversification is required to support regional resilience:** regional economies are typically exposed to the boom and bust cycles of the one or two key local industries. To foster sustained economic resilience, government support of industrial diversification – for endowment-based industries only – is required.
  - The key local industries will vary from region to region, as will the support industries that provide specialised inputs. Policy responses should therefore be place-based.

5.2 Economic priorities of the Hunter region

The Hunter region is a nationally significant regional economic centre and is the 7th largest urban area in Australia (Regional Development Australia , 2013). With a strong economic history, the region has been a key contributor to the economic success of NSW.

Cognisant of the challenges and opportunities presented by global megatrends, the region has started on a journey of transition, restructuring its industry mix and placing a renewed focus on liveability. It has successfully achieved the first phase of this transition and is now moving into the second phase – where a diversified, knowledge-based economy will be crucial.

Phase one involved strengthening its position as a regional leader through job creation and increased connectivity within the region, and growing the industrial base.

Phase two is centring on strength through diversity, with the economic base repositioned to focus on science, technology and advanced manufacturing. This diversity will be critical to ensuring NSW achieves its long term goals for economic growth and prosperity.

To support this ongoing development and transformation within the Hunter, the state level regional development plans are supported by regional level

plans. For the Hunter, the regional strategy and planning documents generally seek to continue:

- Building on the region's position as one of Australia's leading regional centres;
- Developing a modern and vibrant urban centre in Newcastle;
- Growing the industrial base of the region, including coal and heavy industries; and
- Investing in the transition to a diversified economy, with a strong science, technology and advanced manufacturing base.

Overall, the local strategies reflect the fact that the Hunter region has the capacity to take pressure off Sydney, both in terms of population and employment. However, for this to work, it is critical that decisions around infrastructure planning make best use of existing regional specialisations and encourage development of engine industries.

5.2.1 Prospects and challenges for the Hunter region (2013)

Deloitte Access Economics (2013) conducted an economic study of the Hunter Region in 2013, which examined the major drivers and trends likely to influence the Hunter region over the period to 2036, and their impacts on industry, businesses and the community.

As the region transitions away from mining and energy-based industries, the report identified the need to capitalise on emerging megatrends and mitigate any associated risks. Four major influences on the region were identified:

- **Moderating demand from Asia** in commodities and other related services, which will affect the current energy based industries located in the region. The Hunter region has benefited greatly from the growth in commodities exports (such as coal and agricultural products) resulting from demand in China. Going forward, the region will need to consider how to leverage Asian demand for new industry outputs, such as advanced manufacturing, that the region is looking to grow.
- **Developments in digital technology,** which will shape future business conditions and the way in which individuals learn and work. Technological advance has reduced barriers to entry and allowed businesses in the Hunter to compete with metropolitan businesses when in the past a physical presence in Sydney may have been required. With the new focus on developing knowledge-based industries in the Hunter, keeping current with and utilising cutting-edge technologies will be increasingly important for the region.
- **Population growth and changing demographic trends,** which will put increasing demand on the local region's infrastructure. It is expected that the Hunter region will have 860,000 residents by 2036 (an increase of 130,000 from 2017), and 25% will be over the age of 65 (Planning and Environment, 2016). While a growing population will help to revitalise the region, the additional people (particularly older people) will pose a significant challenge for local infrastructure. Careful development planning, including transport and housing decisions, will be required to set the area up for ongoing success.
- **Climate change,** which is particularly important for the Hunter because of its comparative strength in electricity generation and metals processing. The shift towards carbon restrained environmental policies could see these industries downsize, affecting the broader Hunter region – making the focus on diversifying the local economy particularly important for the future prosperity of the region.

This will require planning, co-ordination and investment in order to adapt to the changing trends and mitigate any risks. This includes investing in:

- **Current comparative advantages,** through the continued development of existing economic strengths in resources, energy generation and heavy industries, as well as growth in related supporting services.
- **Industries with strong growth potential,** like defence, selected high value manufacturing and premium agriculture, where existing capabilities and skill sets can be harnessed and built upon to foster growth.
- **Tourism and education related services,** which will represent a large and expanding part of the regional economy and will generate a range of new opportunities. New initiatives to reinvigorate these areas could drive significant benefits.
- **Infrastructure,** to support the population growth, enable greater regional mobility, and assist the relocation of labour and capital to revitalised urban centres. This will involve investing in the region's infrastructure, transport system and adequate housing.

5.2.2 Smart specialisation strategy for the Hunter region (2016)

The Hunter region is undergoing an economic transition, and 'smart specialisation' is a key component of that. Smart specialisation is an OECD framework used throughout the EU to deliver regional economic transformation by identifying local strengths and opportunities. The Hunter's peak economic development organisation, Regional Development Australia Hunter (RDA Hunter) has developed a smart specialisation strategy (S3), with the aim of "forging a path for the Hunter that maximises our competitive advantages and strengthens our capabilities as a region…" (Regional Development Australia, 2016). Implementation of the strategy is expected to help the Hunter region be at the forefront of the shift toward knowledge-based industries, and be a more innovative and efficient regional economy.

RDA Hunter's strategy identified seven industries as potential strengths and growth areas in the Hunter region. These include:

- advanced manufacturing;
- creative industries;
- defence;
- food and agribusiness;
- mining equipment;
- medical technologies and pharmaceuticals; and
- oil, gas and energy resources.

These industries have established centres and organisations in the Hunter region, existing hotspots for innovation and/or case studies of successful entrepreneurship. Importantly, each of these industries is likely to require good trade and port connectivity to be successful.

The Strategy sets out priorities for investment and research including:

- **Building inclusive leadership** within the Innovation System, by inviting education institutions and research organisations and linking businesses and entrepreneurs with services and facilities to accelerate their innovation and growth.
- **Encouraging entrepreneurship**, developing skills for innovation and supporting university–business collaboration.

- **Coordinating** RDA Hunter policies with Local, State and Commonwealth Governments programs.
- Establishing a **Hunter regional innovation initiative fund**, which would invest in innovation infrastructure.

5.2.3 Hunter Regional Plan 2036 (2016a)

The Hunter Regional Plan, developed by NSW Government, outlines the Government's goals and aspirations for the region to 2036 (NSW Government, 2016a). Four key goals include:

1. **Leading the regional economy in Australia,** by boosting the productivity of Greater Newcastle. This requires:
   - **Connecting Newcastle City Centre and other strategic centres** like Glendale and Broadmeadow in Greater Newcastle with improved transport, recreation facilities and services. This is to improve connectivity of the community, labour and resources;
   - **Creating a centre of excellence in health and education** in Newcastle, through existing institutions like the John Hunter Hospital, Hunter Medical Research Institute and Newcastle Institute for Energy and Resources and expanding University of Newcastle;
   - **Positioning Port of Newcastle and Newcastle Airport as a global gateway**, through improved interregional links and infrastructure for freight movements; and
   - Establishing a **governance system to co-ordinate the economic development infrastructure plans** necessary to grow the Greater Newcastle region.

2. **Protecting and sustaining its biodiversity-rich natural environment,** including the Greater Blue Mountains and Port Stephens Great Lakes Marine Park, which provide regional recreational and tourism benefits**.**
   This involves:
   - Protecting and connecting natural areas, by investing in biodiversity corridors for the purpose of conservation;
   - Sustaining water quality and security in the Hunter Water network, to ensure ongoing supply of water and support; and
   - Increasing resilience to hazards and climate changes.

3. **Supporting thriving communities,** by
   - Creating healthy built environments, and enhancing access to recreational facilities and open spaces through walking and cycling infrastructure;
   - Identifying and protecting the region's heritage; and
   - Revitalising existing communities.

4. **Delivering greater housing choice and jobs,** to meet the growing demand from population growth. This requires:
   - Creating compact communities, identifying locations for urban redevelopment and small scale renewal projects;
   - Fostering growth in existing strategic centres, which specialise in a service or role for the region, and developing new centres, such as the Newcastle-Lake Macquarie Western Corridor and Maitland Corridor; and
   - Improve monitoring of housing, employment and land supply to better inform future infrastructure needs, priorities and planning.

5.3 Role of the Port of Newcastle in supporting economic development in NSW

The PON currently plays a critical economic role in NSW, particularly in the Hunter region. An expanded role for the PON in managing NSW port freight transport would support the future growth potential of NSW through a number of channels:

- Supporting NSW's globally competitive growth segments by acting as a key facilitator and connector, particularly those located north and west of Sydney. A well-connected port provides businesses with access to the markets needed to develop new product offerings (via importing inputs) and capitalise on new markets (via exporting products);
- Acting as a key economic asset in one of Australia's leading regional centres, ensuring the Hunter region stays an appealing employment location for a range of workers across industries, skill levels and ages;
- The Hunter region is actively pursuing economic diversification in recognition of its historical exposure to a small number of key industries. The PON can support this pursuit, particularly for attracting advanced manufacturers to the region;
- Supporting growth in NSW's industrial base by acting as a key enabler for existing economic clusters in the Hunter region; and
- Reinforcing the broader strategic economic priorities of NSW Government through:
  - Job creation;
  - Making the right investments in enabling infrastructure;
  - Decentralisation of economic activity, particularly away from central Sydney; and
  - Regional development (through trade facilitation).

6 Benefits of pro-competitive policy for NSW's ports

A lack of competition in container ports creates significant costs for the NSW economy. NSW relies on ports for almost all of our international trade and so a lack of competition both reduces port efficiency and increases landside transport costs.

6.1 Port productivity and efficiency benefits

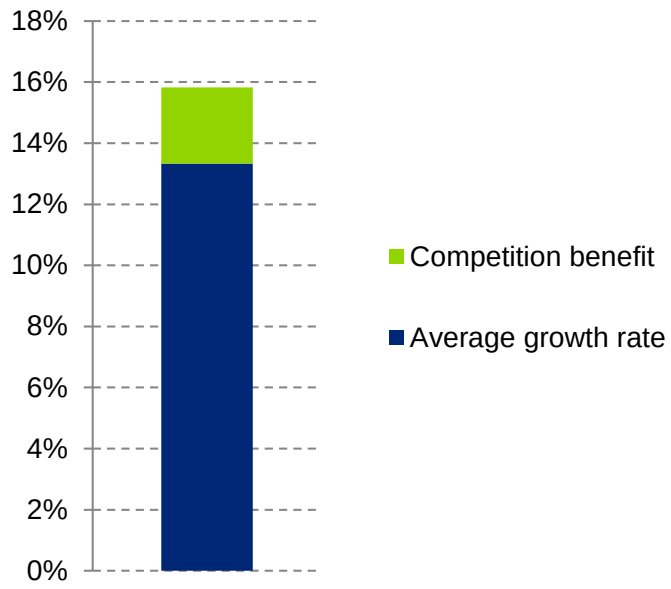
Comparisons of ports internationally indicates that there are demonstrable benefits to competition between ports and stevedores in terms of productivity. More competitive and productive ports and stevedores would help to reduce the costs of trade in NSW and, ultimately, enhance regional development.

An additional container port operating in NSW would increase options for shipping services and would create pressure for ports on prices and also pressure to improve the quality of service. These effects would lead to greater productive efficiency, where outputs are produced from the lowest cost combination of inputs.

A greater level of competition may also improve efficiency in the long run as ports adopt new technologies or organisational approaches to allow for reductions in cost. Lower costs for shipping services will ultimately be passed through to customers in the form of reduced prices for goods.

The gains in efficiency will allow for improvements in labour and capital productivity, which translates to the number of TEU moved per hour. Analysis of international ports suggest that increased port competition could add, on average, 2.5 percentage points to port productivity growth rates (Yuen et al 2011). Analysis of productivity growth rates following past port reforms in Australia indicate that, after the first year, these benefits will tail off over a period of around six to seven years.

Chart 6.1: Increase in productivity growth rate from an increased competition

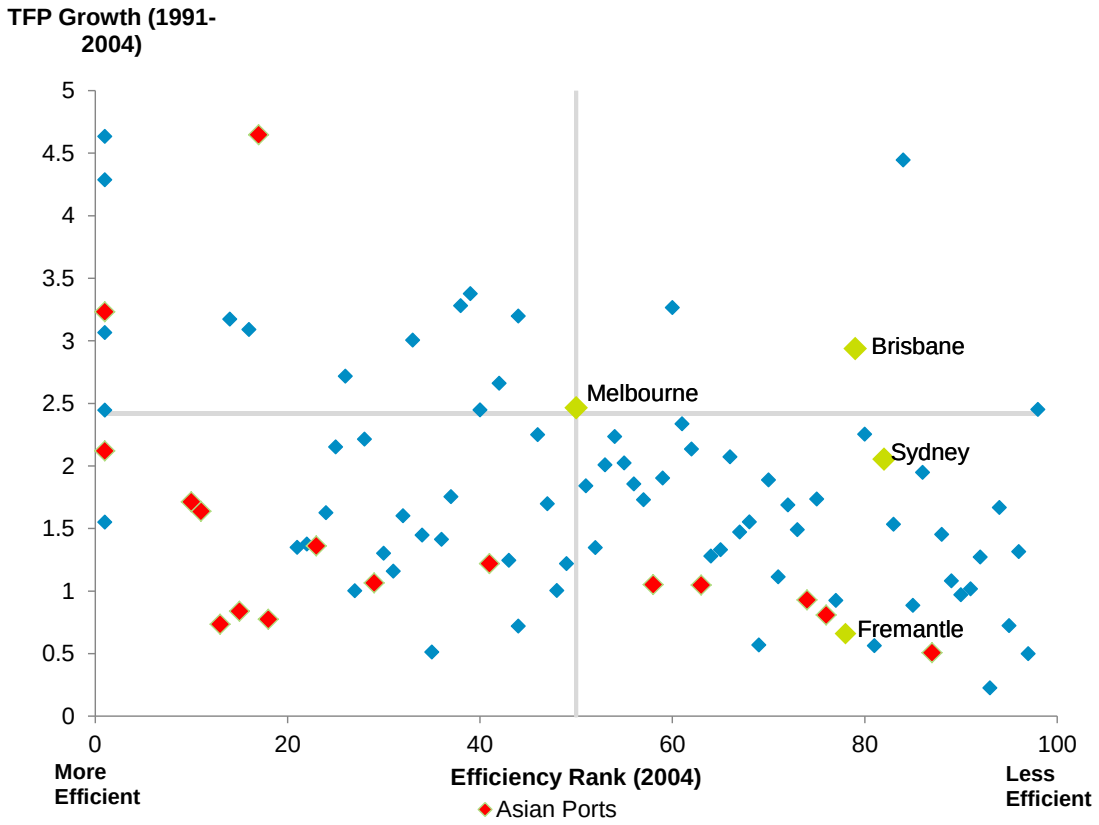


Source: Yuen *et al* (2011)

Pursuing productivity gains in Australian ports is critical as, historically, Australian ports have not been as productive, nor grown their productivity as quickly as international competitors. Cheon (2007) undertook an analysis of productivity improvements for around 100 ports worldwide over the period from 1991-2004. The average total factor productivity improvement[6] across Sydney, Melbourne, Brisbane and Fremantle was about 2.02 times from 1990 to 2004; this is an average annual growth rate of 5.15%. In the same period, the improvement in total productivity across the world was 2.42 times, an average annual growth rate of 6.48%. Hence, despite productivity improvements at Australian ports, by competitive international standards these ports are in fact lagging further behind.

[6] Total factor productivity is a different measure of productivity to that used by the ACCC and BITRE.

Chart 6.2: Productivity and Data Envelope Analysis (DEA) Rank (1990-2004)



Source: Cheon (2007)

Past research by Deloitte Access Economics using a Computable General Equilibrium (CGE) model has indicated that a 1% increase in port efficiency leads to a roughly 0.008% increase in state GSP in the long run. Given the size of the NSW economy, this represents a significant increase in economic activity. For example, a 0.008% increase in GSP would be worth around $40m per year. This means that the estimated increase in port efficiency (2.5%) could be worth around $111m a year.

In practical terms, an efficient freight network is essential to the economic development of the state. Ports, as key import and export gateways, are a key part of the network. An increase in the efficiency and productivity of ports therefore, will translate to wider improvements across the economy.

Many of the economic benefits received from increased competition would be received in regional areas connected by the freight network. This promotes growth and contributes towards the achievement of a number of government objectives. Revitalising Newcastle, for example, is a NSW Government program focussed on attracting people and jobs to the city, particularly around the centre and waterfront where the port is located.

Additionally, the greater level of freight activity received by ports outside of Sydney will allow for greater value for money from government investment in regional infrastructure. For example, programs such as Bridges for the Bush will not only support the efficient movement of people but also benefit regional ports.

6.2 Landside transport benefits

Currently, port freight from PON's catchment area must travel to or from Port Botany for export. Much of this freight would travel a shorter distance if it were able to be exported from Port of Newcastle. In the long run, under current policy to have Port Kembla as the overflow container port for Port Botany, some of this freight may have to travel even further.

In addition to the extra distance that this freight travels, it also enters the Sydney road and rail networks, both of which face capacity constraints in key locations at key times of day and which will require significant capital investment to manage over the coming decades. Freight moving from Port of Newcastle's catchment to Port Botany therefore places a potentially unneeded additional strain on the Sydney freight network.

The potential benefits of allowing this freight to be exported though Port of Newcastle can be considered through its effect on road and rail transport costs and on transport related externalities such as:

- road congestion costs;
- road accident costs;
- air pollution;
- greenhouse gas emissions;
- noise pollution; and
- road maintenance costs.

For road and rail transport costs, Port of Newcastle recently commissioned a report from Lycopodium (2016) which analysed how road and rail costs compare for a number of locations in NSW when travelling to Port of Newcastle and Port Botany. Costs in this report are provided on a per TEU and a per tonne basis. On average, this analysis indicates the per tonne cost for transport could be around 32% lower for rail and 18% lower for road for locations within PON's catchment.

For the purposes of this calculation, these cost reductions were converted to a per tonne kilometre basis using estimated transport distances from within PON's catchment to both Newcastle and Port Botany. For this calculation it was also assumed that Rail makes up around 90% of freight movements from PON's catchment and that this share would not change if this freight moved to the PON instead of Port Botany.

For externalities, the values used are based on the methodology set out in Transport for NSW's Guidelines on economic appraisal. These costs, given on a per net tonne kilometre basis, have been updated for inflation. These estimates give a total external cost for rail of around 0.8 cents per net tonne kilometre and costs for road of 18 cents per net tonne kilometre.

Putting these values together with the earlier estimates of freight generated within PON's catchment provides the following results:

Table 6.1: Transport related costs for the PON catchment

Project	$m in 2018	$m NPV
Landside transport costs	63.5	1,108
Congestion	4.5	78
Road damage	0.5	9
Accident costs	0.5	8
Air pollution	3.1	53
All others externalities	3.4	60
Total	**68.0**	**1,317**

Note: NPV is calculated to 2050 using a discount rate of 7%
Source: Deloitte Access Economics

Combining assumptions about the distances this freight moves with information from a Lycopodium report on freight costs indicates that landside transport costs for freight in PON's catchment could be reduced by around $60 million a year, a NPV of around $1.1 billion over the period to 2050. Standard values for transport externalities from TfNSW indicate that the externalities associate with these freight movements are likely around $12 million a year, or $209 million in NPV terms.

All up, a lack of container port competition in NSW could therefore generate around $1.3 billion in additional landside transport costs in NSW over the period to 2050.

In addition, movement of containers to the Port of Newcastle rather than Port Botany would reduce the need for imports and exports to rely on Sydney's toll road network. While a reduction in tolls is not a genuine economic benefit, as a toll is a transfer payment between two parties, tolls are a significant cost item for transport businesses and of genuine concern for the trucking industry.

Previous consultation with trucking businesses in Sydney indicates that a single trip from Port Botany to Western Sydney costs around $80 in tolls. Under the assumption that there are two TEUs on each truck on average and each TEU weighs around 12 tonnes indicates a toll cost of $3.33 for each tonne of freight moved in Sydney's toll road network. Further, empty containers must also pass through the toll network and face charges, adding an inflation factor of 1.42 (the ratio of total to full containers in NSW) results in a total toll cost per tonne of freight of around $4.73. This toll cost can be applied to the proportion of freight from PON's catchment that travels by road – assumed to be around 10% - to arrive at a total annual toll cost of around $2.5 million.

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Appendix A: Supporting Infrastructure

Time Frame	Project Description	Estimated Costs	Project Status
Near term	**Sydney Gateway** This project will provide an integrated high capacity road connection from the WestConnex–St Peters Interchange to the Sydney Airport and Port Botany precinct. This will allow airport and port traffic to avoid local arterial roads when accessing WestConnex.	*$800 million* Source: Infrastructure Australia (2016), *'Project Business Case Evaluation, WestConnex'*	Design concepts and a final business case are being prepared
Near term	**NorthConnex** NorthConnex is a nine kilometre tunnel that will link the M1 Pacific Motorway at Wahroonga to the M2 Motorway at West Pennant Hills. It will provide a more efficient trucked freight route.	*$3.1 billion* Source: NSW Auditor General's Office https://www.audit.nsw.gov.au/publications/latest-reports/performance/northconnex/introduction/2-introduction	
Near term	**Port Botany freight rail duplication** This project will duplicate 2.8 km of the Port Botany Line, from Mascot to Port Botany, and extend signalling. This would deliver increased rail capacity, and improve the ability to stage freight trains.	*$195 million* Source: Infrastructure NSW (2014), *'State Infrastructure Strategy Update 2014'*	NSW Government is currently exploring potential partnerships and funding arrangements
Near term	**Development of the Moorebank Intermodal Terminal** This initiative proposes a package of inter-related road infrastructure improvements to increase network efficiency and improve access to the Moorebank Intermodal Terminal.	*$1.8 billion* Source: Infrastructure Australia (2016), *'Project Business Case Evaluation – Moorebank Intermodal Terminal'*	Construction is due for completion at the end of 2020.
Near term	**Airport East Upgrades** This project will upgrade roads east of Sydney Airport and remove the General Holmes Drive rail level crossing by	*$170 million* Source: Roads and Maritime Services (2016), *'Major work contract awarded for Airport East project',*	Construction began in 2017.

	constructing a road underpass. This will improve the movement of rail freight facilities to Port Botany and improve traffic flow.		Due for completion in late 2018
Near term	**Maldon-Dombarton Railway Line** This project involves the construction of a 35km freight line connecting the Main South line at Maldon with the Moss Vale to Unanderra line at Dombarton. This would provide a faster link between the Main South line and Port Kembla.	*$805.9 million* Source: Infrastructure Australia (2017), *'Project Business Case Evaluation, Maldon-Dombarton Rail Link'*,	Planning has been funded. Proponents to undertake construction, operation and maintenance are being investigated.
Near term	**Bells Line of Road improvements** This project involves linking the Bells Line of Road with the Sydney motorway network, undertaking safety works, making realignments, and improving overtaking opportunities.	*$48 million* Source: Roads and Maritime Services http://www.rms.nsw.gov.au/projects/sydney-west/bells-line-of-road/index.html	Project recently completed
Near term	**M1 Pacific Motorway Upgrades** This project includes 3 major upgrades to the M1. These improvements to the motorway will improve the movement of freight between the Central Coast and Hunter region and Sydney	*$392 million* Source: Roads and Maritime Services (2017), '*M1 Pacific Motorway Upgrades*'	Project has been funded. Construction of the final component will begin in 2018.
Near term	**M1 Princes Motorway improvements Picton Road to Bulli Tops** This project will provide additional lanes in both directions and improve the curves on the M1 Princes Motorway between Picton Road and Bulli Tops. This will improve the reliability of freight access in and out of the Illawarra.	*$84 million* Source: Roads and Maritime Services (2016), *'M1 Princes Motorway improvements'*	Project has been funded. Detailed design work for Stage 1 will be completed in late 2018.
Mid term	**Bridges for the Bush** This project will enhance freight productivity in regional NSW by replacing, upgrading or strengthening rural bridges and roads at high priority locations across the NSW road network. This will release significant freight pinch points.	*$290 million* *Source:* Transport for NSW (2013), *NSW Freight and Ports Strategy*	Project is partially funded. NSW Government made a submission to the Australian Government seeking the funding.

Mid term	**The Lower Hunter Freight Rail Corridor (LHFC)** This project will provide a dedicated freight link that bypasses Newcastle. The LHFC diverts freight from sensitive suburban areas in the Newcastle region, and provides capacity to accommodate the expected growth in freight demand.	*No assessment of project costs has been made*	Funding sources to be determined. Preliminary investigations to assess options are being undertaken.
Mid term	**Northern Sydney Freight Corridor** The second stage of this project comprises additional tracks at multiple stages of the Sydney to Newcastle rail line. This will resolve rail constraints and allow for medium to long-term freight demand to be met.	*$5 billion* Source: Transport & Logistics News (2015), ' NSW freight at the cross(rail)roads'	Funding sources to be determined. A business case has been identified as the next step.
Mid term	**Inland Rail** This project will complete a new rail connection between Melbourne and Brisbane, via Wagga, Parkes, Moree and Toowoomba. The new line will be a more efficient route that bypasses the Sydney rail network, significantly altering the pattern of freight operations through Sydney.	*$9.9 billion* Source: Infrastructure Australia (2017), *'Infrastructure Priority List'*	Project is partially funded. State Government contribution is to be determined.
Mid term	**Southern Sydney Freight Line upgrade** The project involves track duplications and additional passing loops on the Southern Sydney Freight Line. This will support the movement of freight by rail through the city, particularly between Port Botany and the Moorebank Intermodal Precinct.	$75 million Source: The Daily Telegraph (2017), *'Federal Budget allocates $20m for upgrade of freight line at Sydney's port but no cash for duplication'*	Project has been funded.
Mid term	**Regional Road Freight Corridor** This project will upgrade key regional roadways, including the New England, Princes, Mitchel, and Newell highways. This ensures regional producers can transport goods on time and in a cost effective manner.	*$2 billion* Source: Department of Infrastructure, Regional Development and Cities (2016) *'Media Release - Building our Future: Strengthening Australia through critical and innovative infrastructure investment'*	Project is partially funded.

Long term	**Western Sydney Freight Line and Intermodal Terminal access** This project will deliver a dedicated rail freight line connecting Western Sydney to the Sydney Metropolitan Freight Network, with connections to intermodal terminals. This will reduce delays to freight trains on the main Western Line, where passenger trains take priority.	*$2.2 billion* Source: Infrastructure NSW (2014), *'State Infrastructure Strategy Update 2014'*	Project is partially funded.
Long term	**Outer Sydney Orbital** The Outer Sydney Orbital (M9) is a 76km transport corridor running from the Central Coast to the Illawarra. It will connect the growth centres, provide links to the future Western Sydney Airport, and support the freight network.	No assessment of the project costs has been made	Funding sources are to be determined. An assessment of potential project options is being made.
Long Term	**Development Port Kembla's Outer Harbour** This project includes dredging and reclamation for the creation of multi-purpose and container terminals This will allow the Outer Harbour to be readily developed to meet demand.	*$700 million* *Source:* Transport for NSW (2013), *'NSW Freight and Ports Strategy'*	Project has been funded. Stage 1A of the project has been completed.
Long Term	**Capacity upgrades to Port Botany** Brotherson dock will be deepened to allow for unrestricted access by 10,000 TEU container vessels. The Hayes Dock Services Area will also be developed to provide additional accommodation for small service boats.	*Assessments of costs are not available*	The timing and delivery of increased capacity will depend on actual trade volumes, productivity improvements and wider industry changes.

Appendix B: Modelling freight in NSW

Given the lack of data available on freight movements by origin and destination, we have developed a basic model to estimate how freight is likely to be moving within NSW. This model starts with data from the ABS (2011) on employment and industry production and uses an economic structure to generate freight movements that match the overall data that is available on freight in Australia.

More specifically, the model starts with employment data from the 2011 census for each local government area in Australia. This employment data is at a very detailed level. For example, the data indicates that the "Motor Vehicle and Parts" industry in Albury employs 251 people.

This employment data is used to disaggregate production data from another data source from the ABS (2017): the input-output table. The input-output table shows how different industries in Australia are connected to each other. For example, it shows that the domestic textile manufacturing industry supplied $1 million of inputs into the footwear manufacturing industry in 2014-15. The input-output table is consistent with the national accounts and so aligns with common measures produced by the ABS such as GDP and employment.

An economic gravity model is then used to estimate how the production occurring in each LGA is used as inputs into production occurring in other LGAs. A gravity model assumes that trade is more likely to occur the closer two trading partners are and the larger each trading partner is. For example, producers in Sydney are more likely purchase goods from Wollongong than Canberra despite their similar size as Wollongong is closer. Similarly, producers in Sydney are more likely to purchase goods from Melbourne than Brisbane despite their similar distance from Sydney as Melbourne is economically larger.

At this stage, trade between locations is measured in dollars. This is converted to tonnes based on UN Comtrade (2015). The data from UN Comtrade records average value per tonne for all varieties of goods moving through Australia's ports. For example, the data indicates that, on average, output from beer manufacturing is worth around $550 per tonne while output from Veterinary Pharmaceuticals is worth in excess of $100,000 a tonne.

The gravity model is calibrated using numerical optimisation techniques (Nelder and Mead 1965) to ensure that the total volume of freight occurring within the model matches the total volume of freight occurring within Australia as reported by the ABS (2017).

That is, the freight movement model brings together data from the ABS on employment, linkages between industries and total freight volumes into a coherent economic framework, which allows the origin and destination of freight to be modelled. The model can provide outputs measures in dollars, tonnes and TEUs.

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