Key Projects around Australia

**National**
- Inland Rail: Brisbane - Melbourne
- ARTC Advanced Train Management System

**Western Australia**
- Perth City Link
- Forrestfield-Airport Link
- LightMax

**South Australia**
- Gawler line electrification
- New electric rolling stock

**Victoria**
- Regional Rail Link
- Cranbourne-Pakenham Rail Corridor
- Metro Rail Capacity
- Melbourne Airport Rail Link
- Yarra Tram’s Route 96
- New rolling stock and E-Class Trams
- Murray Basin Rail Project

**New South Wales**
- North West Rail Link
- Rapid Transit Rail Network, including a second Sydney Harbour Crossing
- CBD and South East Light Rail
- Newcastle and Parramatta Light Rail
- New rolling stock
- Northern Sydney Freight Corridor
- Moorebank Intermodal Terminal

**Queensland**
- Moreton Bay Rail Link
- Brisbane BAT Tunnel
- Gold Coast Light Rail Stage 2
- Sunshine Coast Light Rail

**Tasmania**
- Bell Bay Port expansion
- Freight Rail Revitalisation

**Australian Capital Territory**
- Capital Metro Light Rail

**East Coast**
- High Speed Rail: Brisbane – Sydney – Canberra – Melbourne
This booklet provides a high-level overview of Australia’s rail industry: the services freight and passenger operators provide, our manufacturing sector, and rail's safety and environmental performance.

Australia's rail network is the sixth largest in the world.

Its heavy haul operations in the Pilbara are world leaders as is Australia's rail componentry and systems integration. Moving more goods onto rail has positive flow on effects for the whole supply chain-freeing up our road networks, using less fuel and reducing greenhouse gas emissions.

Continued investment in rail for improved passenger and freight movements around Australia will contribute to the economic growth, as well as overall productivity and prosperity of Australia.

Passenger rail, both heavy and light provide vital transport links around Australia and help meet the growing demands of Australia’s increasing population while helping to reduce road congestion, improve road safety and decrease greenhouse gas emissions.

Currently, more than 110,000 people are employed by rail in a wide range of occupations, disciplines and professions. Our people work in different functions including corporate roles, engineering, customer service, infrastructure and operations.

Rail is a strong, exciting and diverse industry with a prosperous future in Australia.
Freight Rail Key Facts

Australian railways carried in excess of 1 billion tonnes of freight in 2012-13.

Bulk movements account for 97 per cent of the overall rail freight task.

Rail’s intermodal freight task continues to grow. Tonnages have increased by 65 per cent since 2009-10, to 27 million tonnes in 2012-13.

More than 80 per cent of the total land-freight task on the East-West Corridor is moved by rail.

More than 90 per cent of the non-bulk freight task is transported by rail on the Central Corridor between Adelaide and Darwin.¹

Iron ore production has tripled in the last decade.

Black coal production has increased by 45 per cent.²
In 2013, Australian heavy and light rail operators provided 850.3 million passenger trips. Investment in trains and tracks on four passenger railway corridors in Victoria (Ballarat, Bendigo, Geelong, Gippsland–Traralgon) has led to spectacular growth in the last decade, with traffic on each corridor more than doubling.

This is equal to 16.4 million passenger trips per week or 2.3 million people travelling by train every day of the year.

Sydney is home to Australia’s busiest urban heavy rail network, moving more than 300 million passengers in 2012–13 or an average of 800,000 people each day.

Melbourne is home to Australia’s largest heavy and light urban passenger rail networks at 462 route kilometres and 250 route kilometres respectively.

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Freight
Australian railways carried over 1 billion tonnes of freight in 2012-13, an increase of 57 per cent since 2007-08. The growth in freight tonnage has been driven substantially by the resources boom. The freight task has been dominated by bulk movements, which accounted for 97 per cent of total freight transport. The intrastate bulk task in Western Australia alone has grown by 83 per cent in the same period. The intermodal freight task is also improving. Tonnages have increased by 65 per cent since 2009-10 to 27 million tonnes.

Passenger
In 2013, heavy and light rail operations in Australia provided 850.3 million passenger trips. On a weekly basis, this is equal to 16.4 million passenger trips or 2.3 million people travelling by train each day of the year.

Providing an alternative to the car, rail’s key role is weekday commuting. Heavy and light passenger rail services are the dominant transport choice for commuters in Australian cities travelling to and from work in the AM and PM periods. Sydney has the largest journey-to-work market of the rail networks, transporting 46 per cent of Sydneysiders who work in the city centre.
Freight on Rail

Rail now accounts for almost one-half of the freight activity in Australia, an increase of about 36 per cent since the turn of the century.

The underlying reason for rail’s dominance is the increased task of moving iron ore and coal to port for export. These two commodities account for over 80 per cent of Australia’s rail freight tonne-kilometres.

Rail is also central to moving other commodities, such as grains, sugar and mineral sands, where it plays a key logistics role especially with flows to ports.

The largest rail freight flows in Australia are bulk freight. The total freight task was 1.04 billion net tonnes in 2012-13, of which 1.01 billion net tonnes were bulk commodities and 27 million tonnes were intermodal freight.

**Bulk**

Iron ore and coal are the rail industry’s two largest bulk freight commodities. The majority of iron ore produced in Australia is shifted by rail to ports.

Bulk rail traffic is mostly ‘intrastate’ or within state borders. The biggest task is the Pilbara region in Western Australia with the transport of iron ore accounting for 56 per cent of national rail freight tonnes.

Bulk movements in Queensland and New South Wales (principally coal), equated to 22 per cent and 17 per cent, respectively.

The Port Hedland Chichester Range Corridor is the third busiest and heaviest rail freight corridor for export in the world and is on course to being the busiest in the world in a few years, overtaking China’s DAQIN coal railway and USA’s Powder River Basin BNSF/Union Pacific main line.†
Iron ore

The largest flow of iron ore freight traffic is in the Pilbara where more than 94% of Australia's iron ore is moved.

Key railways in the Pilbara include Rio Tinto, BHP Billiton, Fortescue Metals Group and Roy Hill Holdings.

Interesting facts about Pilbara railways include:

• Rio Tinto: As of 2012, trains on the Hamersley railway were approximately 2.4 kilometres long with a capacity of 26,000 tonnes each.

• BHP Billiton: Each train on BHP's Newman line is able to carry around 37,000 tonnes.

• Fortescue Metals Group: Trains on Fortescue's Hamersley and Christmas Creek Lines are able to haul approximately 33,000 tonnes each. Fortescue was also mentioned in the 2010 Guinness Book of World Records for the heaviest wagon-load capacity (40 tonnes per axle).

• Roy Hill Holdings: The 344 route-kilometre railway from Roy Hill to Port Headland is under construction, to be completed in 2015.

Coal Traffic

The majority of Australia’s coal is from Queensland and New South Wales. Due to the coal freight task, rail is the most efficient and cost-effective option for delivering coal from the mine to port. Australia’s main coal haulage is on the Central Queensland Coal Network and the Hunter Valley Coal Railways.

Rail has an unmatched ability to undertake rapid expansion. Despite its considerable size, coal throughput at the world’s largest coal exporting port, Newcastle, more than doubled in the decade to 2013-14, which would not have been possible without the ability to expand rail capacity along the existing corridors.

Annual Coal traffic, 2013-14

<table>
<thead>
<tr>
<th>Location</th>
<th>Net Tonnes (m)</th>
<th>Net Tonne Kms (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blackwater</td>
<td>63.08</td>
<td>22.0</td>
</tr>
<tr>
<td>Goonyella</td>
<td>114.40</td>
<td>24.1</td>
</tr>
<tr>
<td>Moura</td>
<td>12.40</td>
<td>2.0</td>
</tr>
<tr>
<td>Newlands</td>
<td>12.00</td>
<td>1.7</td>
</tr>
<tr>
<td>GAP</td>
<td>12.50</td>
<td>4.3</td>
</tr>
</tbody>
</table>

Queensland

New South Wales

Coal Traffic

Queensland:

- Blackwater: 63.08 m net tonnes, 22.0 b net tonne km
- Goonyella: 114.4 m net tonnes, 24.1 b net tonne km
- Moura: 12.4 m net tonnes, 2.0 b net tonne km
- Newlands: 12.0 m net tonnes, 1.7 b net tonne km
- GAP: 12.5 m net tonnes, 4.3 b net tonne km

New South Wales:

- Hunter Valley: 154.8 m net tonnes
Intermodal

Containerised goods moved on rail include refrigerated goods (such as meat) and wine, paper, logs, pet food, cotton, rice, lead and even pork belly. The majority of these products move out of Australia’s major ports for export to be transported to countries around the world.

Australia’s intermodal freight task is growing. Tonnages have increased by 65 per cent since 2009-10, to 27 million tonnes.

Rail and road compete strongly over long-distance journeys on the East–West corridor, with rail moving around 60 per cent of containerised freight in the market. On the North–South corridor, however, rail currently does not compete strongly with road, moving an estimated 30 per cent of freight between Melbourne and Brisbane.

National Rail Freight Task, 2007-08 to 2012-13

Australia’s bulk and intermodal freight task has grown since 2007-08. The growth in bulk freight has been driven by the resources boom particularly in Western Australia where the task has increased by 83 per cent.

The decline of intermodal traffic between 2007-08 and 2009-2010 occurred due to the economic slowdown. However since 2009-10, the intermodal task has increased by 65 per cent.
Agricultural Freight

Australia's agriculture sector relies on rail to transport goods from rural areas to port for export and to warehouses for processing onto supermarket shelves.

Rail in the agriculture sector dominates for movements over long distances between the grain-growing hinterland and coastal market or port.

In 2012-13, rail carried 20 million tonnes of wheat, 7.5 million tonnes of barley, 2 million tonnes of oilseeds and smaller volumes of sorghum, other pulses, oats, triticale and corn.

Of the eighteen major grain ports in the nation, fifteen have rail links, with trains the dominant mode to convey grain to ports and domestic processors. To support this task, beyond the mainline railways, a web of 5,400 route-kilometres of operational grain lines are used largely or exclusively for grain haulage.
Passenger Rail in Australia

Australian heavy rail networks are radial, with lines running from city CBDs out to the suburbs. As a result, Australian rail networks are stronger in inner-city areas.

Five of Australia’s capital cities; Brisbane, Sydney, Melbourne, Adelaide and Perth have urban passenger rail services of varying sizes. Each of the urban rail networks in these cities report on-time performance higher than 90 per cent.

Transperth and V/Line provide valuable urban and non-urban where timely investment in rail is reaping rewards. Both networks have more than doubled their patronage over the last decade as a result of network expansions and enhancements facilitating improved services and broader coverage. Queensland Rail’s expansion to Springfield in anticipation of population growth is also an example of timely investment in rail to expand existing networks into the outer suburbs.

Electrification

Electrified services commenced in Sydney and Melbourne from the early inter-war period. Today, only one line in Melbourne, the Frankston – Stony Point line is un-electrified.

Around 10 per cent of Queensland’s entire rail network is electrified. Brisbane electrified its passenger rail network in the 1970’s with Perth following in the 1990’s. Through its “Rail Revitalisation Program”, Adelaide is the most recent Australian city to embark on rail electrification.

46% of commuters to Sydney's CBD travel by rail
Sydney
Sydney is home to Australia's busiest urban heavy rail network, with more than 300 million passengers in 2012-13 or an average of 800,000 people each day. In the morning peak, 80,000 people travel by Sydney’s rail service every 30 minutes. During this time, the average wait between trains is 10 minutes or less.

Perth
Perth's rail network has experienced the strongest growth of all Australian capital cities, more than doubling its patronage since 2003-04. The 70 kilometre Mandurah line opening in 2006-07 travelling at speeds of 85km/hr is seen as the catalyst for this growth.

Rather than investing in small changes, Perth has made substantial investments over the last 20 years, including the Mandurah line and 41 kilometres of track out to Joondalup, Currambine and Butler. As a result, Perth’s once small rail network is today almost the same route-kilometre length of Sydney. The recent investment has provided Perth with a modern rail network where longer distances between stations allow for faster trains and substantial park-and-ride facilities, integrated with bus services ensure rail is accessible to many.

Perth predominantly runs ‘all stations’ services all day. During off-peak travel times, the maximum wait for a train is 15 minutes, the lowest wait during off-peak periods of all Australian cities. Services run at 10 minute intervals during the morning and evening peaks.

Melbourne
Melbourne’s heavy rail and light rail networks have also experienced strong growth over the last 10 years. The years 2005-06 to 2008-09 saw the highest increase in Melbourne's rail patronage, a direct result of additional inner city employment.

Stations closer to the city loop receive a higher number of services but across the whole network, during off-peak travel times, Melburnians can expect an average of 20 minute train intervals between each service.

During the peak, Melbourne's South Yarra station averages a service every two minutes. This increases to a train every four minutes outside the morning and evening peak.

Perth’s rail patronage has increased more than 50% since 2003-04
the maximum wait for a train in the off peak is 15 minutes.
Light Rail

Sydney, Adelaide and Brisbane aligned with cities around the globe in the 1950’s and ripped up their tram lines to make road space for cars and buses but today, light rail is experiencing a resurgence.

New projects or extensions are being planned on the Gold Coast, Sunshine Coast, Newcastle, Sydney, Parramatta, Canberra, Adelaide and Perth.

Melbourne
Melbourne was one of the few cities to retain its tram line and today, it is the largest network in the world. In 2012-13 Melbourne trams carried 183 million passengers.8

Considerable investment is underway to transition Melbourne’s tram network into a light rail service which will see the vehicles run along segregated lines, separated from traffic and with traffic light priority to allow faster speeds.

Melbourne’s network averages a distance of 254 metres between each station with 100 metres the shortest distance and 317 metres the longest distance between tram stops.

Gold Coast
Australia’s newest light rail project, the 13 kilometre Gold Coast Light Rail that opened in July 2014, averages 813 metres between each stop, providing higher average travel speeds.

Linking Griffith University with Broadbeach, it is the first light rail service in the world with vehicles designed to carry surf-boards.

Adelaide
Adelaide’s 15 kilometre light rail line runs between the Adelaide Entertainment Centre and Glenelg, via the CBD. The majority of the route is a segregated corridor that uses a former heavy-rail corridor.

and in 2012-13 carried 183 million passengers
Non-Urban Passenger Rail

Non-urban passenger rail services provide inter-city, regional and long-distance rail connections. Darwin, Perth, Adelaide, Melbourne, Canberra, Sydney and Brisbane are all connected by these services. V/Line and NSW Trains provide commuter-style inter-city services and move greater passenger numbers than long-distance tourism providers such as Great Southern Rail’s The Ghan or Indian Pacific which run once or twice a week.

Between 2000 and 2006, the Regional Fast Rail program in Victoria upgraded four lines out to the regional centres: Geelong, Ballarat, Bendigo and Traralgon. With “V/LoCity” trains capable of travelling up to 160km/hr, travel time decreased, service frequency increased and in the last decade, V/Line’s patronage has doubled.

The improvement program has seen population growth along the route as people relocate outside Melbourne. The population of Melton / Bacchus Marsh grew 34 per cent between 2007 and 2012, growth attributed to the Regional Fast Rail project.
2,235 locomotives operate around Australia, the majority of which are standard gauge.

35 per cent of all Australian locomotives are less than 5 years of age while approximately half of Australia’s locomotive fleet is 11 years of age or less. The significant portion of new locomotives is attributed to the resources boom.

### Locomotive ages

<table>
<thead>
<tr>
<th>Age range (years)</th>
<th>Narrow Gauge</th>
<th>Standard Gauge</th>
<th>Broad Gauge</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5</td>
<td>288</td>
<td>504</td>
<td>6</td>
<td>798</td>
</tr>
<tr>
<td>6-10</td>
<td>77</td>
<td>238</td>
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<td>320</td>
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<td>11-15</td>
<td>106</td>
<td>68</td>
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<td>95</td>
<td>298</td>
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<td>21-25</td>
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<td>76</td>
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<td>26-30</td>
<td>47</td>
<td>67</td>
<td>42</td>
<td>156</td>
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<td>31-35</td>
<td>78</td>
<td>49</td>
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<td>127</td>
</tr>
<tr>
<td>36-40</td>
<td>17</td>
<td>10</td>
<td>0</td>
<td>27</td>
</tr>
<tr>
<td>41-45</td>
<td>26</td>
<td>28</td>
<td>9</td>
<td>63</td>
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<td>46-50</td>
<td>36</td>
<td>29</td>
<td>11</td>
<td>76</td>
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<tr>
<td>50+</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>804</td>
<td>1345</td>
<td>86</td>
<td>2235</td>
</tr>
</tbody>
</table>

Melbourne’s light rail network operates 16 different vehicle types, totalling a fleet of 472 vehicles. The newest vehicles, the E Class, have been built in Dandenong, Victoria and are twice the length of some of the older vehicles, the Z and A class introduced between 1975 and 1984. Light rail vehicles introduced in the last decade are commonly more than 30 metres long.

### Manufacturing, Contractors and Suppliers

Rail manufacturing and supporting infrastructure generate annual revenue exceeding $4.2 billion.

Across Australia, there are approximately 330 manufacturing firms with more than 150 years of rail design and manufacturing capability. Rail suppliers are mostly small to medium enterprises (SMEs), 85 per cent of which are Australian owned.

There are significant opportunities for growth in Australian rail manufacturing and maintenance. The replacement demand plus growth requirements for passenger rolling stock alone will create demand for 200 to 300 cars per annum to be procured over the next 20 years. The forecast demand coupled with whole of life passenger rolling stock maintenance requirements will see Government invest around $1.7 billion per annum.

International opportunities are ample. In Asia alone, more than $200 billion is being invested in rail. Australia’s expertise and capabilities in heavy haul, transport design, planning and systems, rolling stock manufacturing, civil engineering, railway components, specialised equipment and construction are highly regarded worldwide. Our heavy haul system is considered the best in the world in terms of innovation. It is important that Australia continues to leverage this competitive advantage and become a leader in the global market.
Safety performance

One of the most important elements of railway performance and operations is safety. The collision and derailment occurrence rate for rail is extremely low when compared to other modes of land transport.

In a recent report by Deloitte Access Economics, it was identified that road transport generates almost eight times more accident costs than rail and every additional rail journey reduces accident costs by between $1.25 and $1.46. If 1000 commuters were to travel by rail instead of road, this would reduce costs from road accidents by between $650,000 and $760,000 a year depending on the city.

Rail track

Indicative of Australia’s settlement, different rail track gauges still exist today but Australian cities are connected by a standard gauge which allows interstate trains to run smoothly between cities.

Australia’s current railway network is around 33,000 route-kilometres, with an additional 452 route-kilometres under construction.

Melbourne has Australia’s largest heavy and light urban passenger rail networks, totalling 712 route-kilometres or, 462 route-kilometres of heavy rail and 250 route-kilometres of light rail.

Since 2009, 554 route-kilometres of freight track and 69 route-kilometres of heavy and light rail track have been opened around Australia. The majority; 408 route-kilometres are heavy-haul freight track opened to haul iron ore.
Carbon dioxide equivalent emissions of the rail industry have increased by 29% per cent in the last decade from 4330.3 gigagrams to 5581.4 gigagrams. The increase is a direct result of the commodities boom and the rise of the passenger rail task in many cities especially Perth and Melbourne.

Environmental Performance

Compared to road freight vehicles and cars, rail emission intensity is low.

Emissions intensity of passenger and freight modes, 2007, carbon dioxide equivalent.
Federal Government Investment in Rail

Compared to the year 2013-14, the current 2014-15 budget showed a 43 per cent decrease in Federal funding for rail transport. Although this is set to remain relatively unchanged in 2015-16, the current Government has forecast another two significant drops in rail funding; a 41 per cent decrease between 2015-16 and 2016-17 and then another 44 percent drop to the year 2017-18.

As a result, compared to the previous Government’s allocation of $1,648 million in 2013-14, the current Federal Government will deliver an 80 per cent decrease in rail funding, projecting to invest just $319 million for rail transport by 2017-18. This position of the Australian Government is in contrast with other Governments around the world who are investing in their public transport systems to solve the challenges they face in cities and regional centres.

Australia’s Federal Government has a key role to play in both setting policies and providing funding for public transport and rail infrastructure. Relying on State Governments to pick up the pieces will not stand the test of time.
Acknowledgements

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Special acknowledgement to Jeremy Dornan and Peter Kain (BITRE).

For the full report or more information about the Australian rail industry, visit www.ara.net.au.