Australian Government
Department of Infrastructure and Regional Development
Bureau of Infrastructure, Transport and Regional Economics

# Infrastructure investment macromonitor

This information sheet provides an overview of activity in five key Australian infrastructure industries: transport, energy, communications, water and resources. The purpose of the report is to track investment in infrastructure and explore its impact on infrastructure performance, usage and productivity.

## At a glance

*Construction activity and expenditure*

- Over the last decade, public sector road construction has risen at an average annual rate of 9 per cent; construction of privately-owned roads rose sharply between 2000–01and 2005–06.
- Investment in railways has surged in the last decade. Extensive works on the interstate network have involved comprehensive rehabilitation and enhancement while the resources boom has triggered capacity expansion and line construction, such as new coal lines in Queensland and NSW and eight new private iron-ore railways in WA.
- The growth in harbour construction is dominated by resources-led capacity expansion, such as in Port Hedland, Cape Lambert and Newcastle; by new container terminals in Brisbane and Sydney; and the dredging of the Port Phillip Bay shipping channel.
- Strong growth in pipeline construction has been fuelled by expansion of gas extraction, processing and export.
- Construction in telecommunications has been steady, with some recent public-sector expenditure being driven by the National Broadband Network installation.
- Water storage and supply construction expenditure rose from the second half of the last decade, spurred by work on the South-East Queensland Water Grid and expenditure on three desalination plants.
- Committed resource projects are dominated by energy (LNG, gas, petroleum) expenditure, notably investment in LNG plants in WA and Queensland.

*Infrastructure usage*

- The steady growth in the passenger car task has been subdued since 2003–04 while steady growth in the road freight task has continued, apart from slowing during the Global Financial Crisis.
- Rail passenger travel — anchored by urban train patronage — has risen steadily, by 55 per cent, over the last two decades; recent growth has been underpinned by new railways in Perth and strong employment growth in Melbourne.
- Growth in rail's freight task has been dominated by the growth in bulk movements arising from the resources boom, with rail playing the key role in transporting commodities to the ports, and is so echoed in growth in bulk sea freight.

- Subscribers to broadband internet grew thirteen-fold from 2003–04, to 2011–12, due to organic growth in internet usage and a shift from narrowband. The growing capacity, usage and uptake of broadband has seen a very rapid rise in the volume of data downloads.
- The number of mobile phone subscribers almost doubled from 2003–04 to 2011–12.

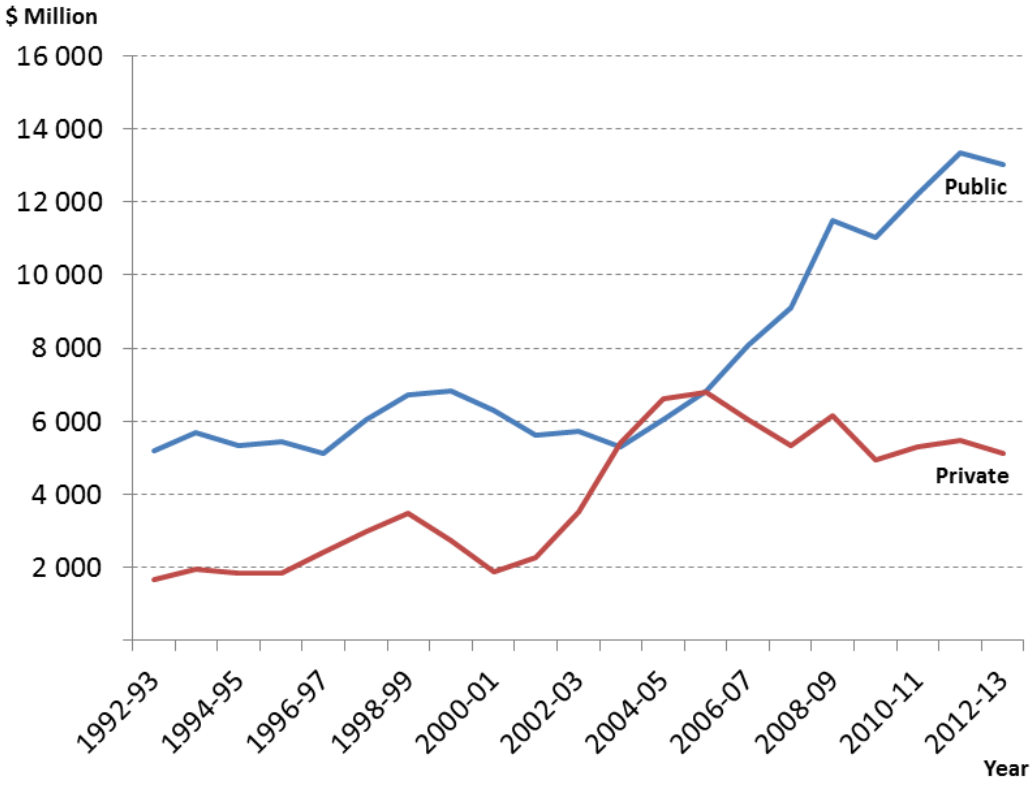
*Infrastructure performance, safety and productivity*

- The road fatality rate in 2012–13 was 64 per cent lower than in 1989–90.
- Australia's capital productivity has been decreasing while labour productivity has been increasing; with the decline in capital productivity consistent with sustained expenditure on infrastructure, where the capital input has not yet been matched by growth in expected output.

## *Section 1 – Construction activity and expenditure*

### Transport

Figure 1: Value of construction done on roads, highways, subdivisions and bridges, by sector of ownership.

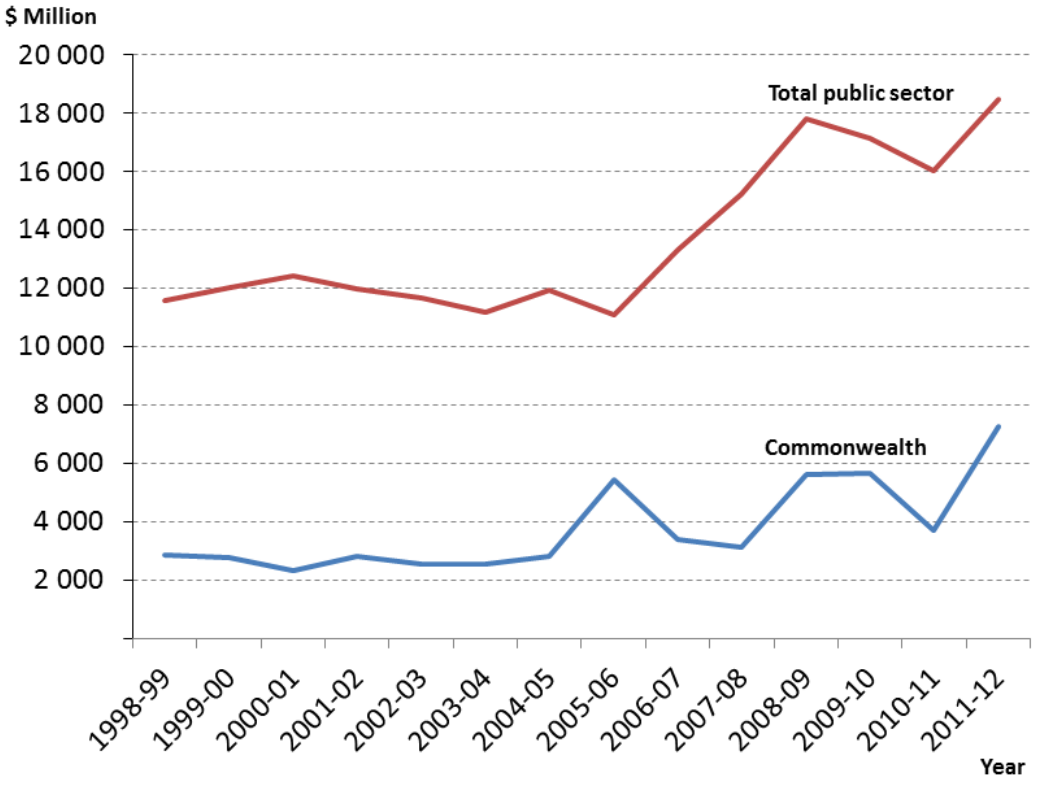



Note Adjusted for price changes, including inflation

Source ABS, Engineering construction activity, Australia (8762)

- The value of public sector road construction increased consistently from 2003–04. In the 10 years to 2012–13, growth in construction of publically owned roads grew at an average annual rate of 9 per cent.
- Construction of privately owned roads grew sharply from 2000–01 to 2005–06. A number of high profile projects were completed, or under construction, during this period of growth, including Sydney's Cross City Tunnel.
- From 2005–06, construction of privately owned roads gradually decreased.

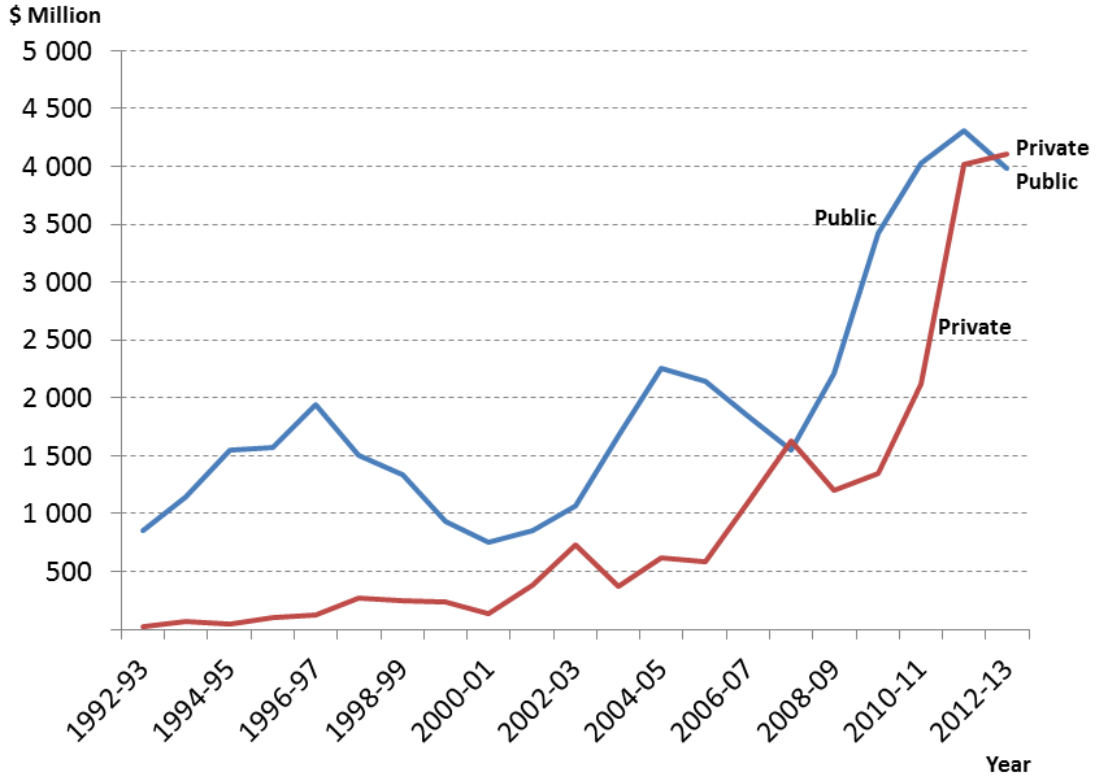
Figure 2: Public road expenditure, construction and maintenance




Source BITRE, Australian infrastructure statistics yearbook 2013, Table T 1.2a-e

- Consistent with the construction activity illustrated in Figure 1, public sector expenditure on road construction and maintenance (Figure 2) increased from 2005–06.
- Commonwealth expenditure as a proportion of total public sector spend peaked at 49 per cent in 2005–06. In 2012–13 Commonwealth expenditure accounted for 39 per cent of total public sector spend.
- In 2012–13 Commonwealth expenditure increased to $7.2 billion. Total public sector expenditure increased to $18.5 billion.

Figure 3: Value of construction done on railways, by sector of ownership

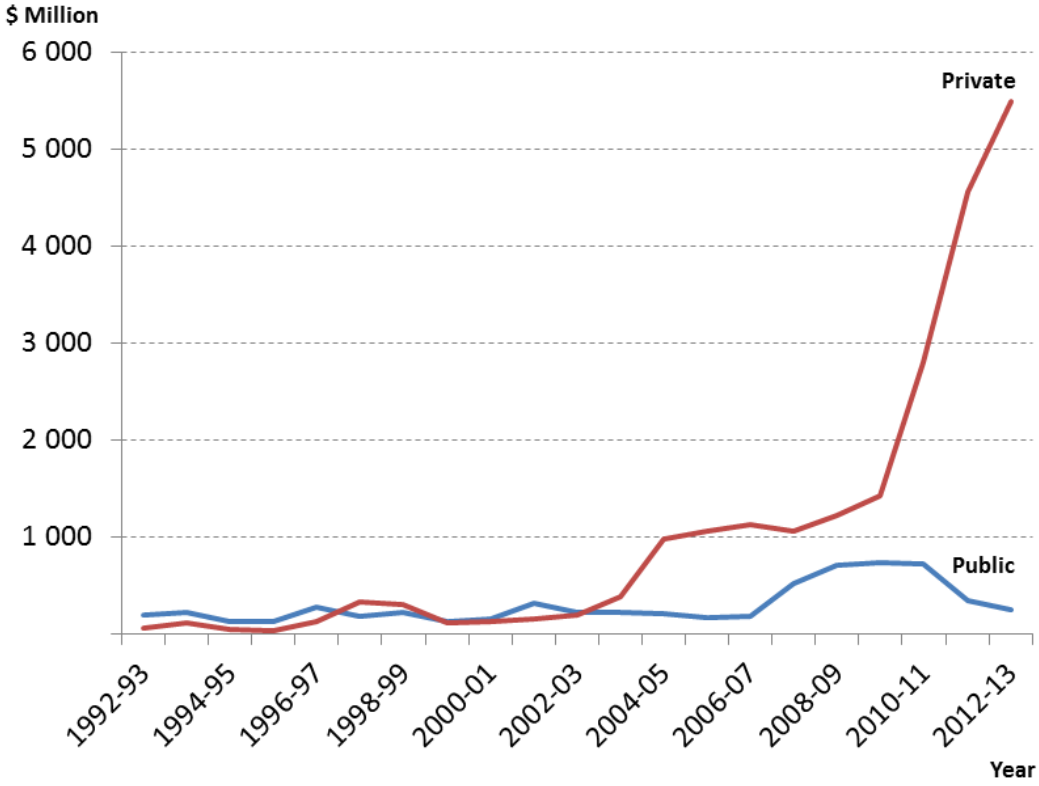



Note Adjusted for price changes, including inflation

Source ABS, Engineering construction activity, Australia (8762)

- Investment in publically owned railways increased significantly from 2007–08.
- The Australian Rail Track Corporation undertook a series of infrastructure works on the interstate rail network and in the Hunter Valley Coal Chain.
- There were also a number of urban passenger and freight projects in this period including Perth's Mandurah railway (2007), Sydney's Chatswood-Epping rail link (2009), the Southern Sydney freight line (2013), various infrastructure upgrades to Adelaide's network (ongoing), the Gold Coast's Robina to Varsity lakes extension (2009), Brisbane's Darra to Richlands railway (2011) and Melbourne's South Morang extension (2012).
- Construction of privately owned railways grew strongly from 2005–06. Works have largely been related to Australia's resources boom, with railways playing a key role in the iron ore and coal logistics chains.
- Capacity expansion can involve double tracking and signalling and the removal of bottlenecks. Considerable investment has been undertaken by Aurizon (Queensland), Fortescue, Rio and BHP Billiton (Pilbara, Western Australia).
- Between 2008 and 2013 there have been a number of new private railways constructed. There have been eight iron ore railways, totalling 726 route kilometres. There have also been 3 coal railways, all constructed by Aurizon, totalling 104 route kilometres.

Figure 4: Value of construction done on harbours, by sector of ownership



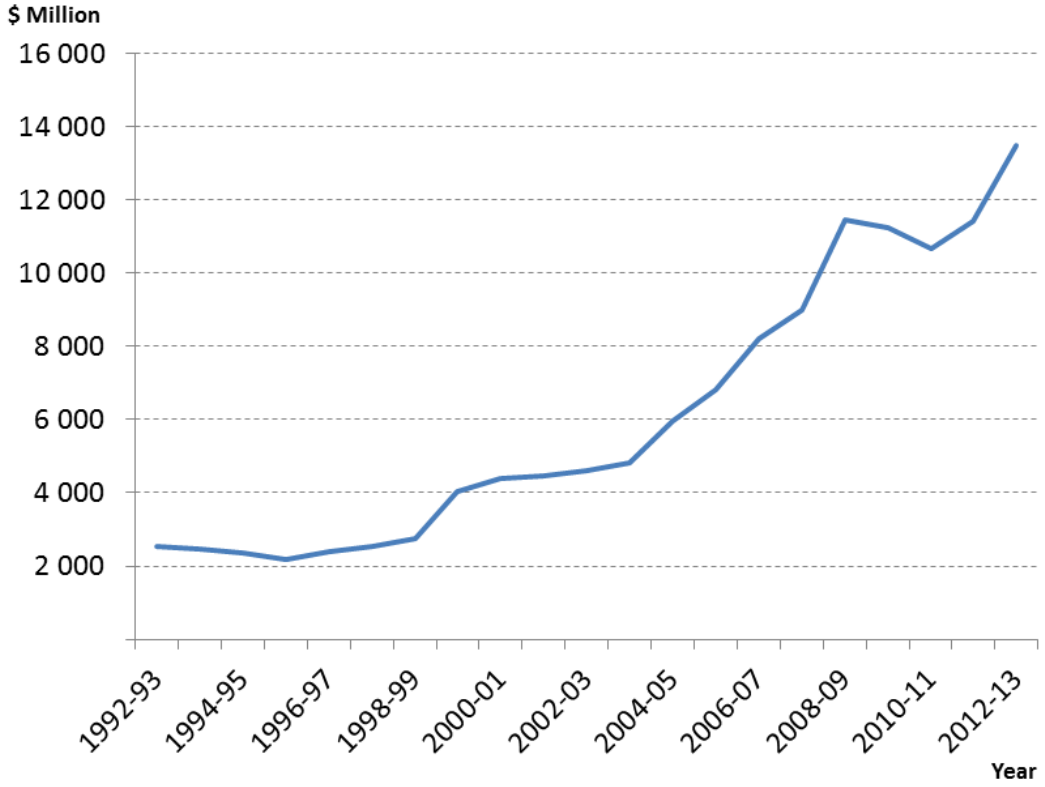

Note Adjusted for price changes, including inflation

Source ABS, Engineering construction activity, Australia (8762)

- Public sector harbour construction increased from 2007–08 to 2011–12. The growth was largely associated with dredging of the shipping channel in Port Phillip Bay.
- From 2009–10 to 2012–13, the value of private sector construction grew by 286 per cent, to reach $5.5 billion.
- The growth is largely associated with the resources sector. Works include new berths at Newcastle; Port B in Cape Lambert and in Port Hedland.
- There has also been construction at container ports. Hutchison opened its container terminal at the Port of Brisbane and developed its new Port Botany terminal at 'the Knuckle' in 2012–13. Also at 'the Knuckle' Patrick has commenced construction of its redeveloped container terminal.

## Energy

Figure 5: Value of construction done on electricity generation, transmission and distribution

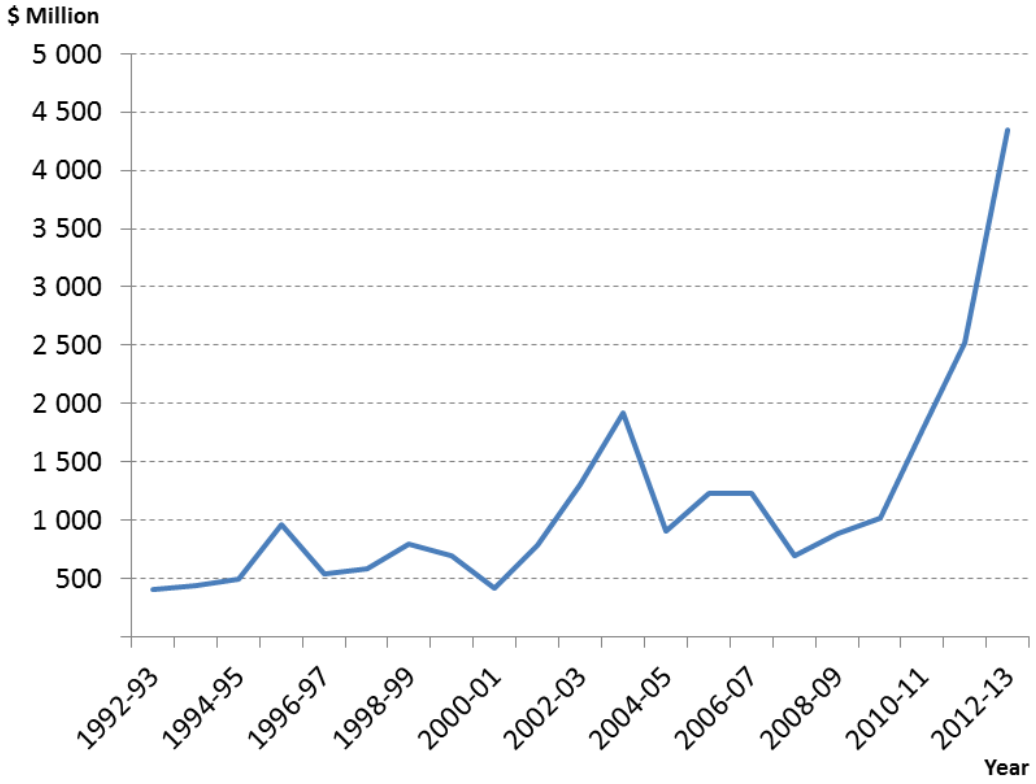



Note Adjusted for price changes, including inflation

Source ABS, Engineering construction activity, Australia (8762)

- Construction work done on electricity infrastructure has grown strongly from 1998–99. Average annual growth in the decade to 2012–13 was almost 12 per cent.
- Construction activity decreased nearly 7 per cent from 2008–09 to 2010–11, consistent with a broader economic slow-down due to the global financial crisis.
- However construction activity has since recovered strongly. In 2012–13 the value of work done increased by 18 per cent to $13.5 billion.

Figure 6: Value of construction done on pipelines



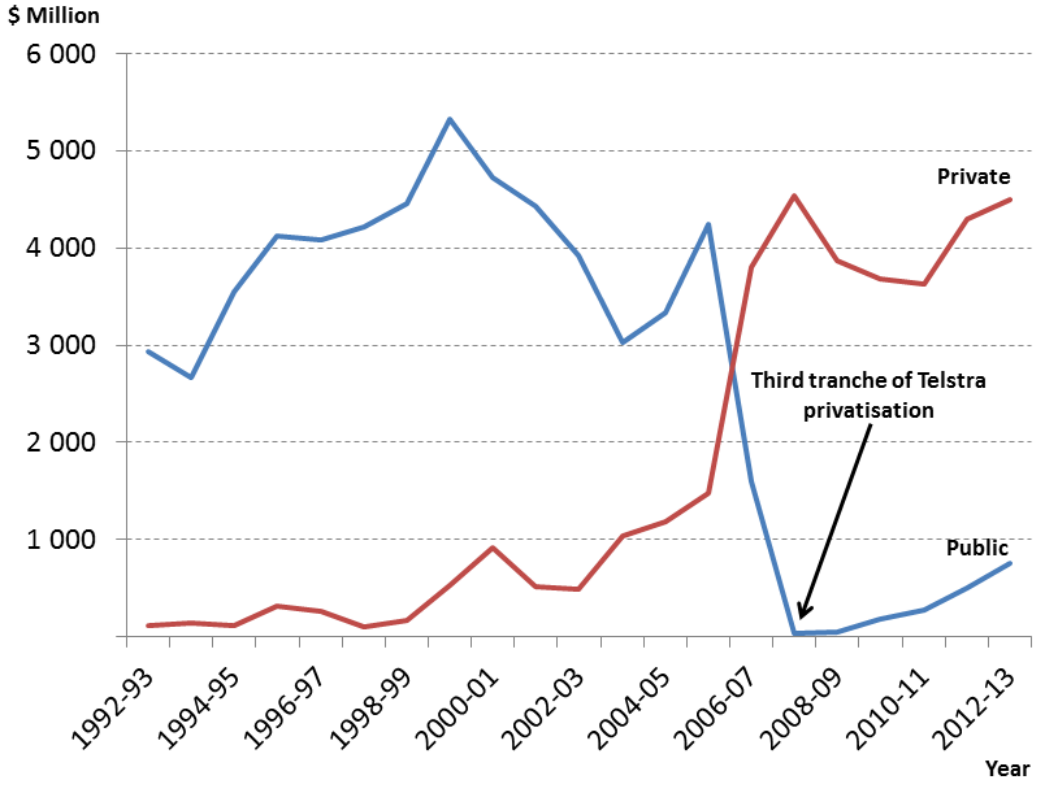

Note Adjusted for price changes, including inflation

Source ABS, Engineering construction activity, Australia (8762)

- The value of construction on pipelines grew by 328 per cent from 2009–10 to 2012–13.
- The value of construction done in 2012–13 was $4.3 billion.
- Many of the projects are associated with strong growth in the gas industry.
- For example, in 2013 QCG completed the longest large-diameter pipeline in Australia. The 540km pipeline is a metre in diameter and will move coal seam gas from the Surat Basin to Curtis Island for processing and export.

## Communications

Figure 7: Value of construction done on telecommunications, by sector of ownership



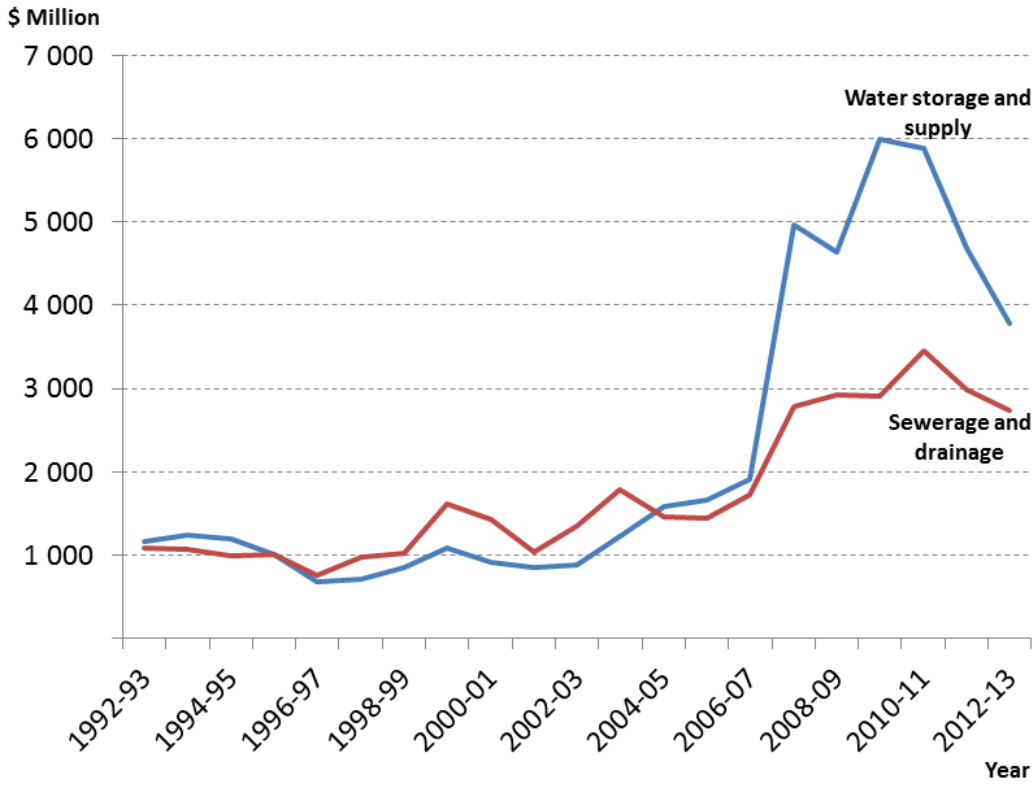

Note Adjusted for price changes, including inflation

Source ABS, Engineering construction activity, Australia (8762)

- Following the third tranche Telstra's privatisation, in 2007–08, the ABS classified work done on Telstra infrastructure as private sector.
- Public sector investment has grown from $57 million in 2008–09 to $762 million in 2012–13. This thirteen-fold increase is largely attributable to the commencement of work on the National Broadband Network.
- Construction work on private infrastructure decreased during the global financial crisis but has since recovered.
- Construction work done on privately owned infrastructure grew by 4.6 per cent to $4.5 billion in 2012–13.

## Water

Figure 8: Value of construction work on water infrastructure



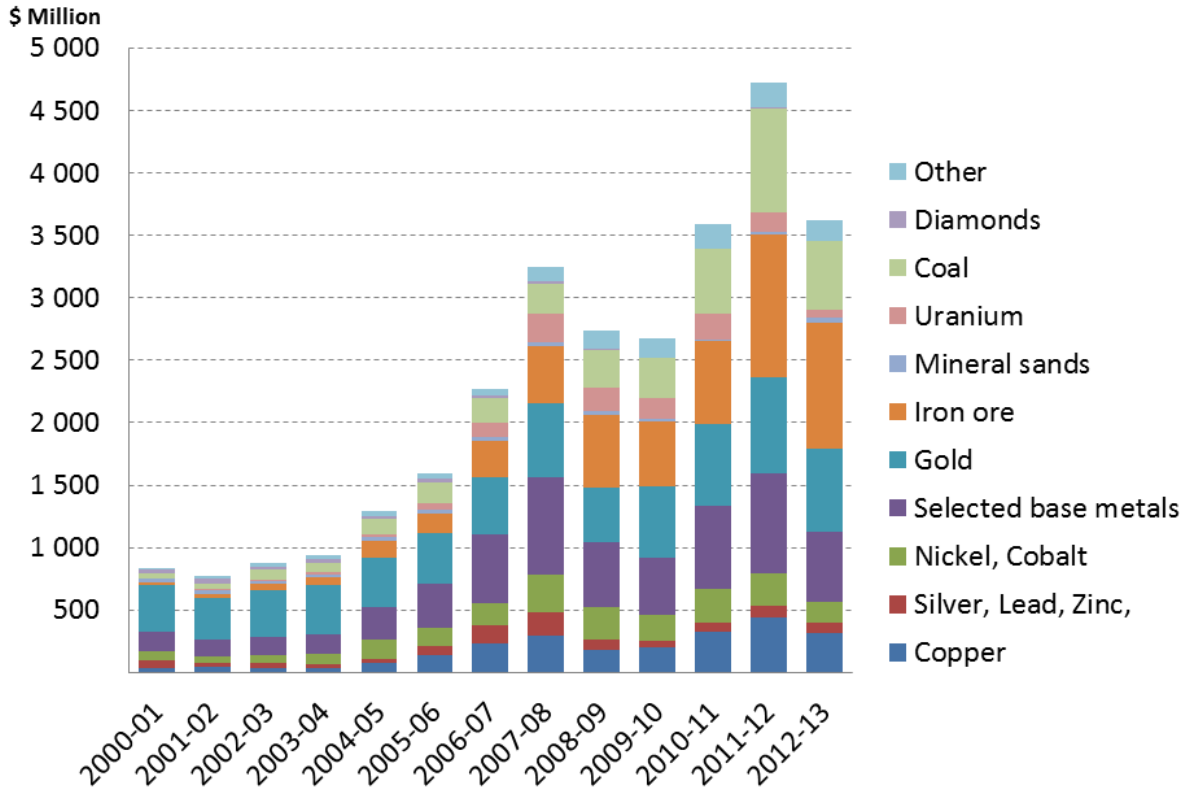

Note Adjusted for price changes, including inflation

Source ABS, Engineering construction activity, Australia (8762)

- Construction work on water storage and supply has historically been similar to work on sewerage and drainage.
- In 2006–07, the value of work on water storage and supply increased significantly. The growth relates to work on the South East Queensland Water Grid and desalination plants in New South Wales, Victoria and South Australia. With the completion of these projects, the two indicators are converging again.
- In 2012–13, construction work on water storage and supply was $3.8 billion. In the same year, construction work on sewerage and drainage was $2.7 billion.

## Resources

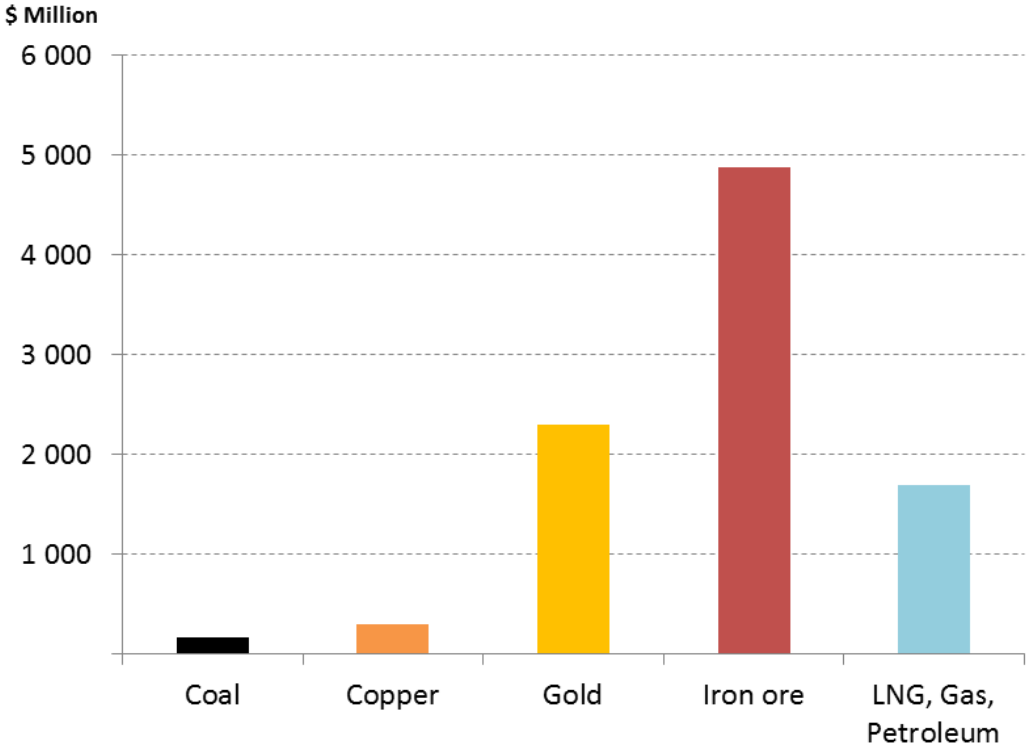
Figure 9: Expenditure on mineral exploration, by mineral sought




Source ABS, Mineral and petroleum exploration, Australia (8412)

- Expenditure on mineral exploration is an indicator of possible mining activity to come. Exploration for iron ore and coal grew strongly from 2003–04 and reached record levels in 2011–12.
- Exploration slowed in 2012–13, although remains at historically high levels.
- In 2012–13, expenditure on iron ore and coal exploration decreased by 12 per cent and 35 per cent, respectively.

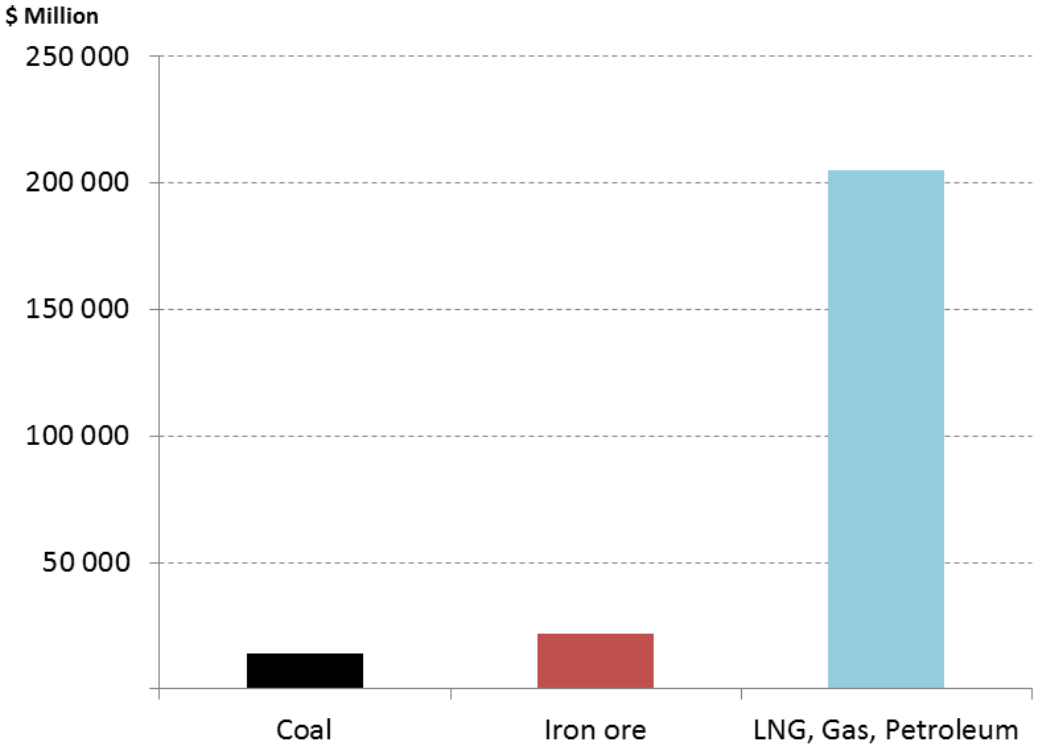
Figure 10: Value of energy and resources projects completed, from October 2012 to April 2013, selected commodities




Source BREE, Resources and energy major projects, April 2013

- The combined value of energy and resources projects completed in the six months to April 2013 is the second highest on record.
- Iron ore was the dominant commodity. Five projects, worth a combined $4.9 billion were completed. The projects added 82 megatonnes of production capacity and were all located in Western Australia.
- There was one gas project completed, worth $1.7 billion. The 'Kipper gas project', 42 km off the Victorian coast, illustrates the often very high value of individual gas projects.

Figure 11: Value of energy and resources projects committed, as of April 2013, selected commodities



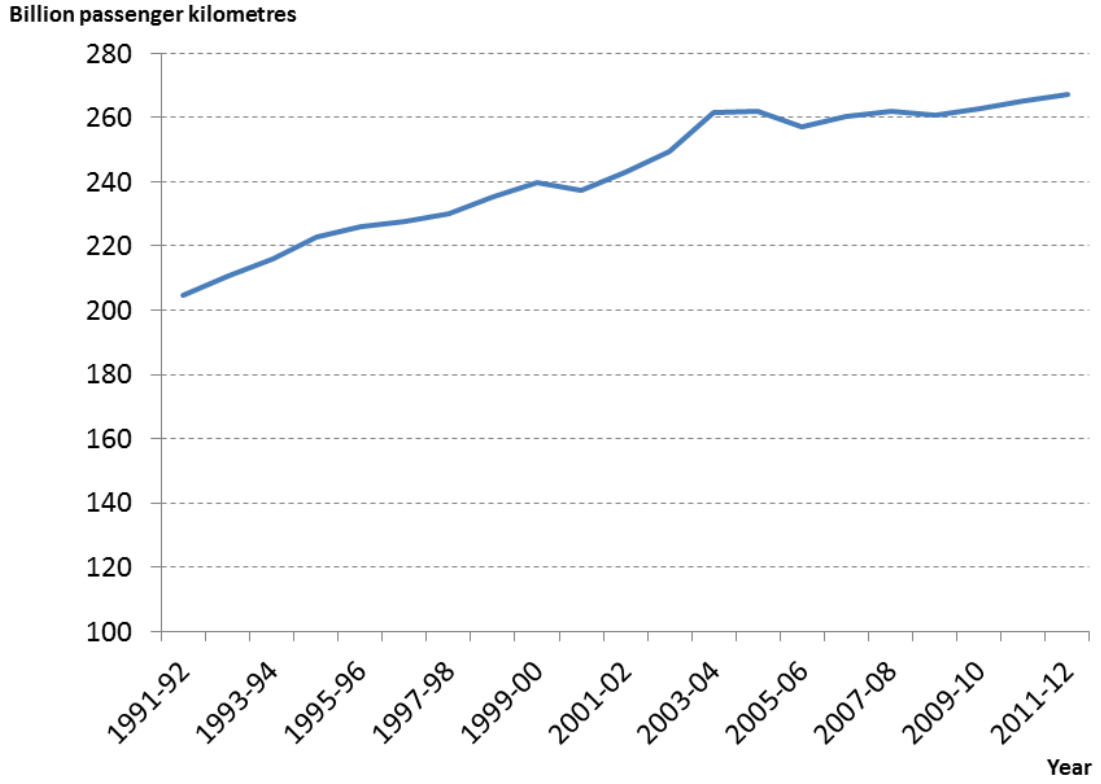

Source BREE, Resources and energy major projects, April 2013

- LNG, gas and petroleum projects account for $205 billion, or 80 per cent of all projects at the 'committed' stage.
- At the beginning of the Australian resources boom, the increase in investment was due to a large number of projects valued at less than $ 1 billion.
- With the growth of LNG projects, the trend is now towards a small number of 'mega projects' valued at over $5 billion each.
- The largest LNG mega projects at the committed stage include: Gorgon LNG (Western Australia, $52 billion), Ichthys LNG (Darwin, $33 billion), Wheatstone LNG (Western Australia, $29 billion), Australian Pacific LNG (Queensland, $25 billion), Queensland Curtis LNG ($20 billion), Gladstone LNG (Queensland, $18 billion), Scarborough FLNG (Western Australia, $14 billion), Prelude floating LNG (Western Australia, $13 billion).

## *Section 2 – Infrastructure usage*

### Transport

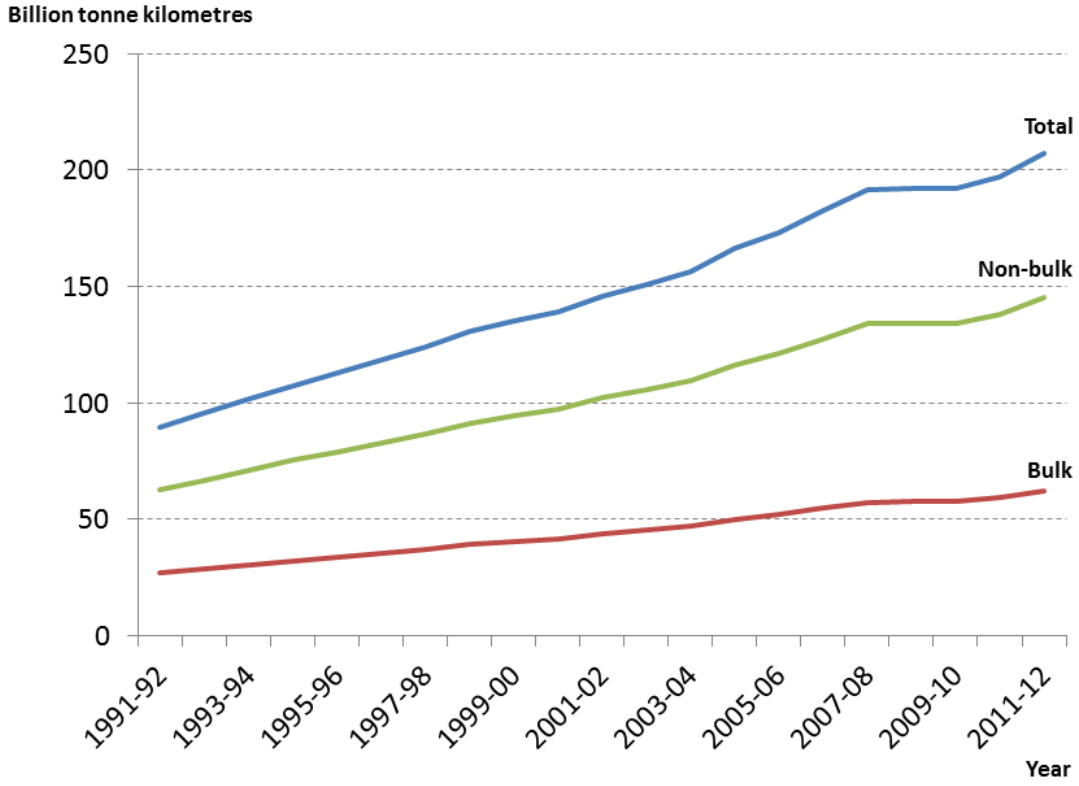
Figure 12: Travel by passenger car, Australia




Source BITRE, Australian infrastructure statistics yearbook 2013, Table T 3.1

- Passenger kilometres steadily increased from the early 1990s to 2003–04, when it reached 261 billion.
- The passenger task plateaued between 2003–04 and 2008–09. Numerous factors will have played a role in this slow down, including fuel prices and the global financial crisis.
- From 2009–10, the passenger task grew steadily.
- In 2012–13, passenger kilometres grew by 0.7 per cent to 267 billion.

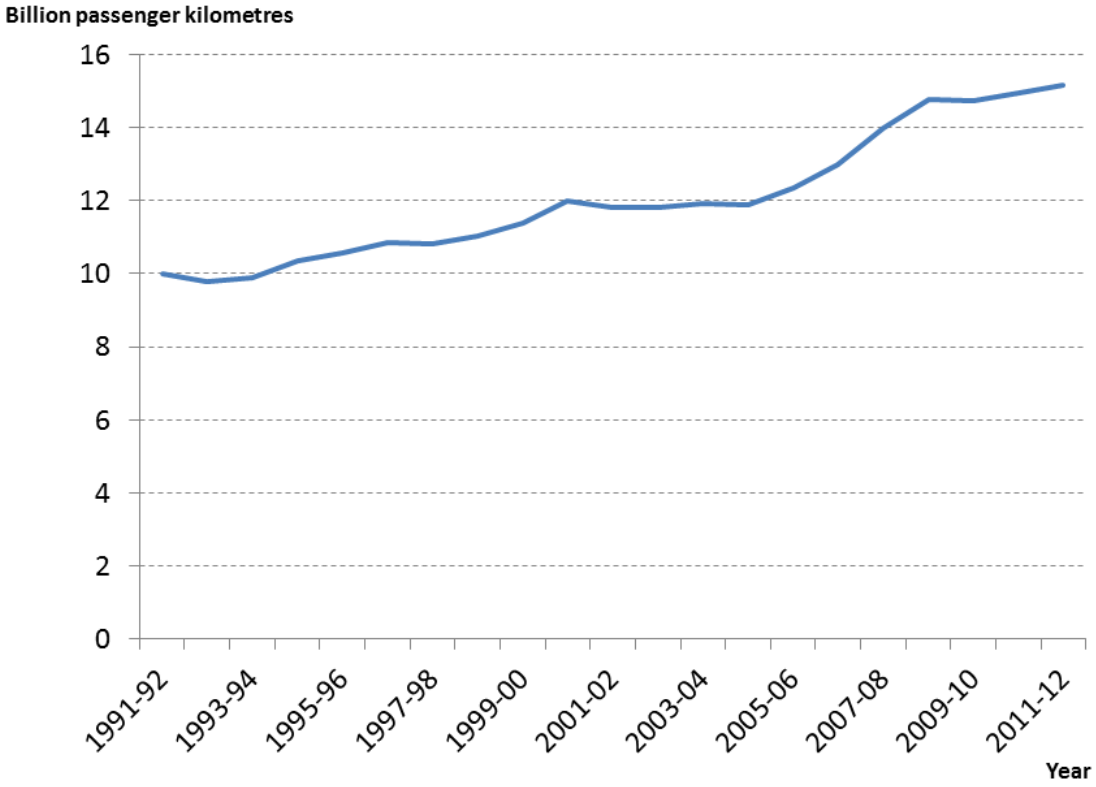
Figure 13: Freight task by road, Australia




Source BITRE, Australian infrastructure statistics yearbook 2013, table T 2.1a-c

- The total road freight task grew steadily from 1991–92 to 2007–08.
- In 2008–09 and 2009–10, growth slowed due to the global financial crisis.
- The freight task has since recovered, growing by 5 per cent from 2010–11 to 2011–12, to a total of 208 billion tonne kilometres.

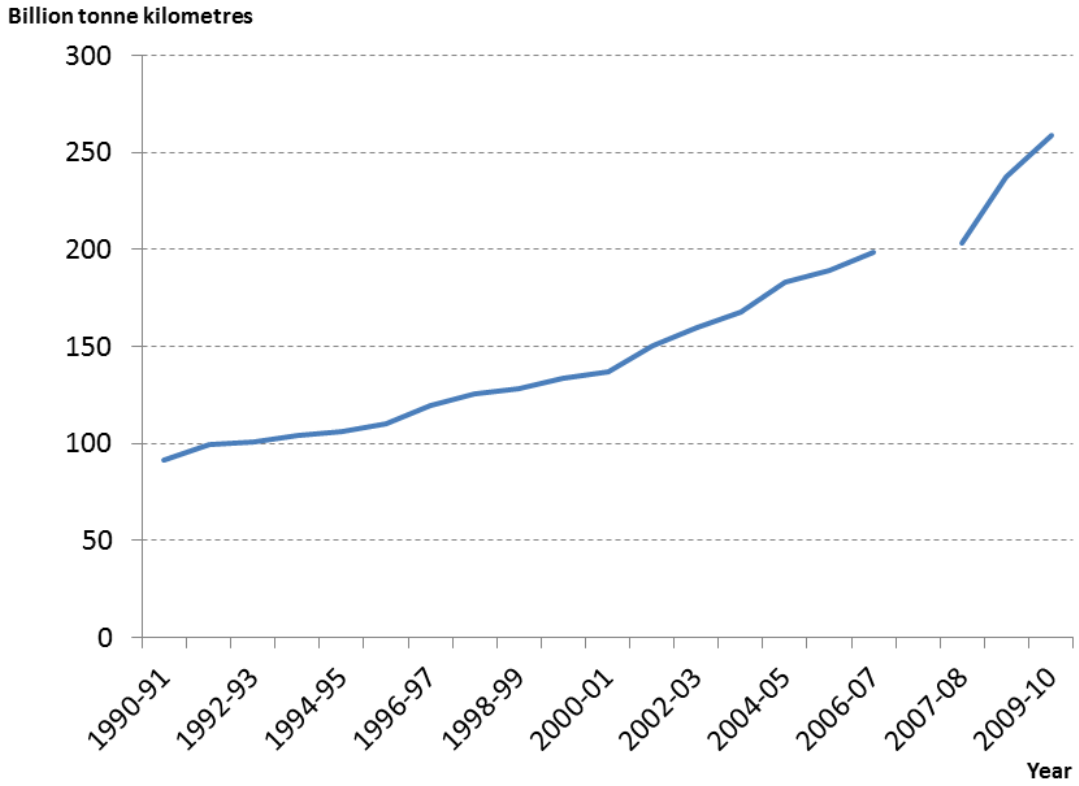
Figure 14: Passenger travel by rail, Australia




Source BITRE, Australian infrastructure statistics yearbook, Table T 3.1

- Passenger kilometres on rail increased by 55 per cent over the last two decades.
- Growth was particularly strong from 2005–06 to 2008–09.
- This recent growth was largely due to increasing urban rail patronage in Melbourne, Brisbane and Perth.
- Melbourne's patronage growth corresponded with rapid increases in employment in and around the CBD. Central Melbourne is well serviced by its radial rail network, meaning employment growth will encourage rail patronage.
- Brisbane's growth was facilitated by extensions to the inter-urban Gold Coast line and the opening of the airport line.
- Perth's patronage growth was largely based on the completion of the Mandurah railway in 2007. In 2010–11, the Mandurah line carried approximately 33 per cent of Perth's urban rail patronage.
- Increasing fuel prices between 2005 and 2008 would have further encouraged patronage growth on rail. This period of growth corresponds with the plateau in passenger kilometres travelled on road (see Figure 12).
- Patronage growth on rail has slowed in recent years. In 2011–12, the total rail passenger task reached 15 billion passenger kilometres.

Figure 15: Freight task by rail, Australia

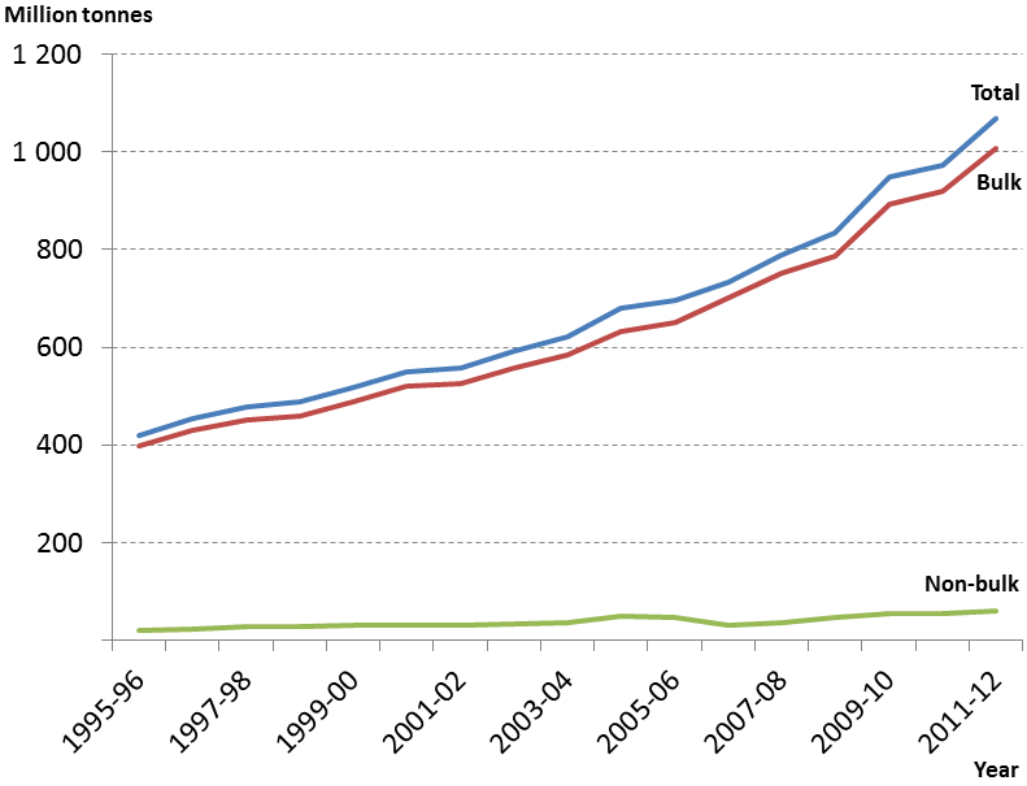



Note Methodology of data collection changed from 2007–08

Source BITRE, Australian infrastructure statistics yearbook 2013, Table T 2.1a-c

- Growth in rail's freight task has been driven by the resources boom, with rail playing a key role in transporting commodities from mines to ports.
- The growth has been facilitated by considerable investments in capacity expansion and construction of new lines by the resources sector (see Figure 3).
- From 2007–08 to 2009–10, the rail freight task increased by 27 per cent to reach 259 billion tonne kilometres.

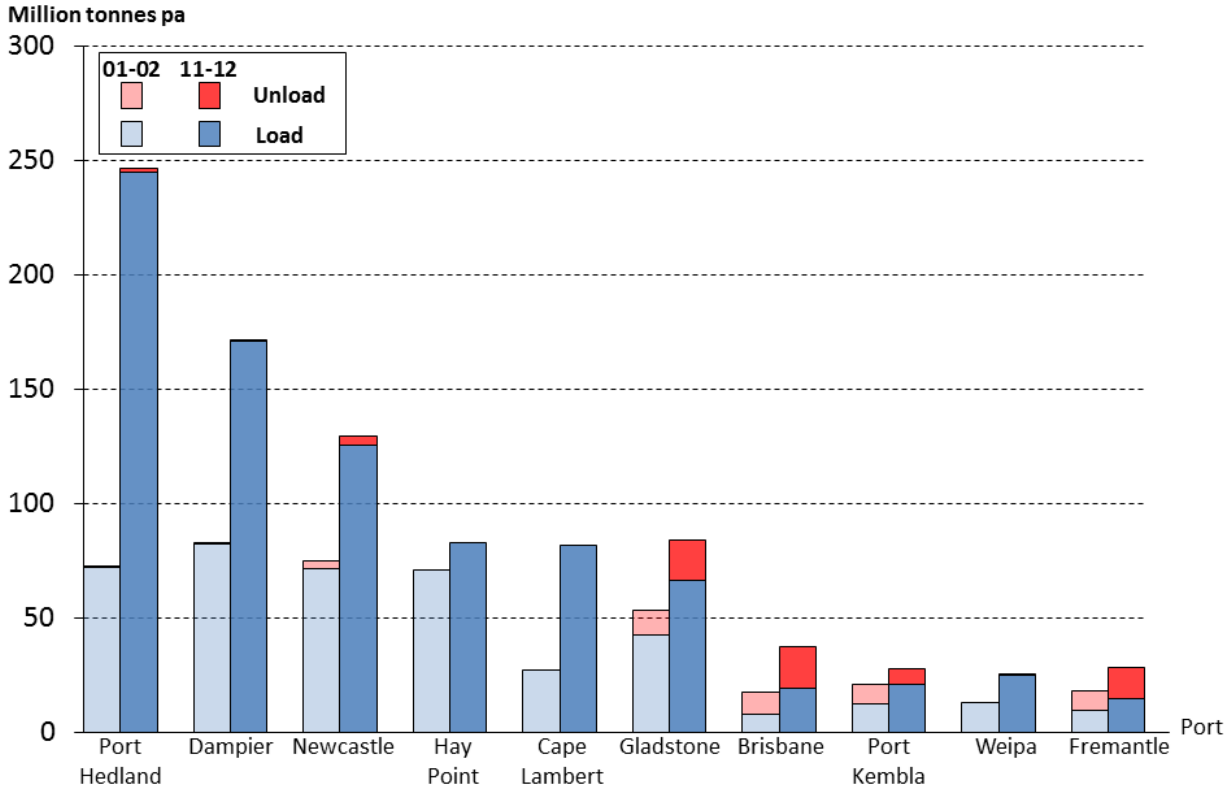
Figure 16: International sea freight to and from Australia




Source BITRE, Australian infrastructure statistics yearbook 2013, Table T 7.4

- The growth in sea freight has been driven by increasing bulk freight.
- From 2008–09, growth in the volume of sea freight increased due to bulk exports caused by the resources boom.
- In 2011–12, total sea freight increased by 10 per cent to over 1 billion tonnes

Figure 17: Bulk port throughput, loading and unloading, 2001–02 and 2011–12, selected ports

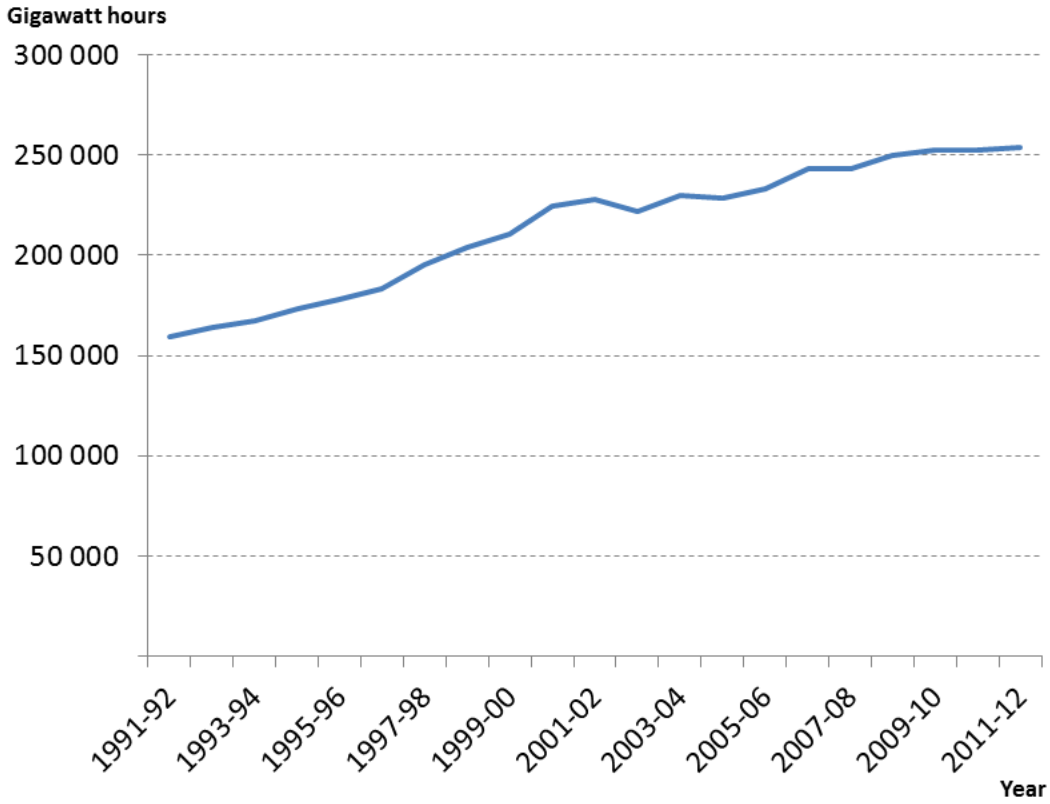



Source BITRE, Australia's bulk ports, Report 135; and updates

- The resources boom has caused significant growth in export (load) volumes from bulk ports.
- The dominant commodities exported are iron ore and coal. Port Hedland, Dampier and Cape Lambert are iron ore dominated ports. Newcastle, Hay Point and Gladstone are coal-dominated ports.
- Port Hedland is the world's largest bulk export port and Newcastle is the world's largest coal export port.
- Growth from 2001–02 to 2011–12 was particularly strong in the iron ports. Growth in throughput for Port Hedland, Dampier and Cape Lambert was 241 per cent, 108 per cent and 203 per cent, respectively.

## Energy

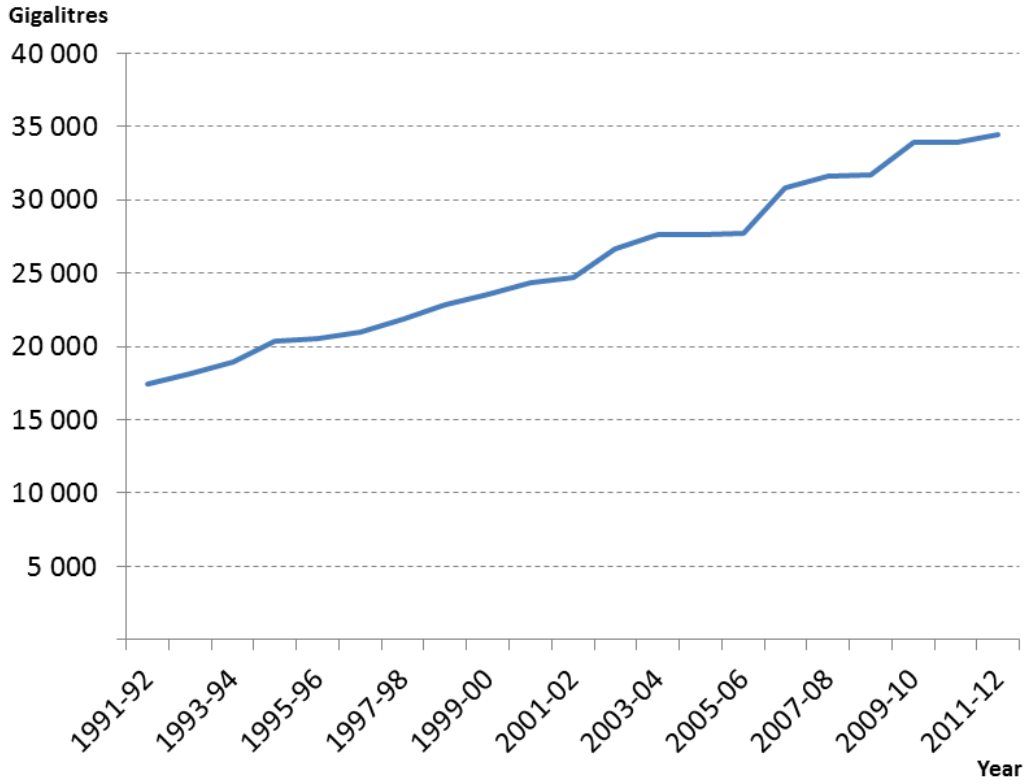
Figure 18: Consumption of electricity, Australia




Source BREE, Australian energy statistics, Table I

- Electricity consumption in Australia grew steadily from the early 1990s to 2009–10, but the rate of growth has since slowed.
- In the two decades to 2011–12, the average annual growth rate of electricity consumption was 2.4 per cent.
- Growth in 2011–12 was significantly lower than the average, at 0.5 per cent.

Figure 19: Consumption of gas, Australia

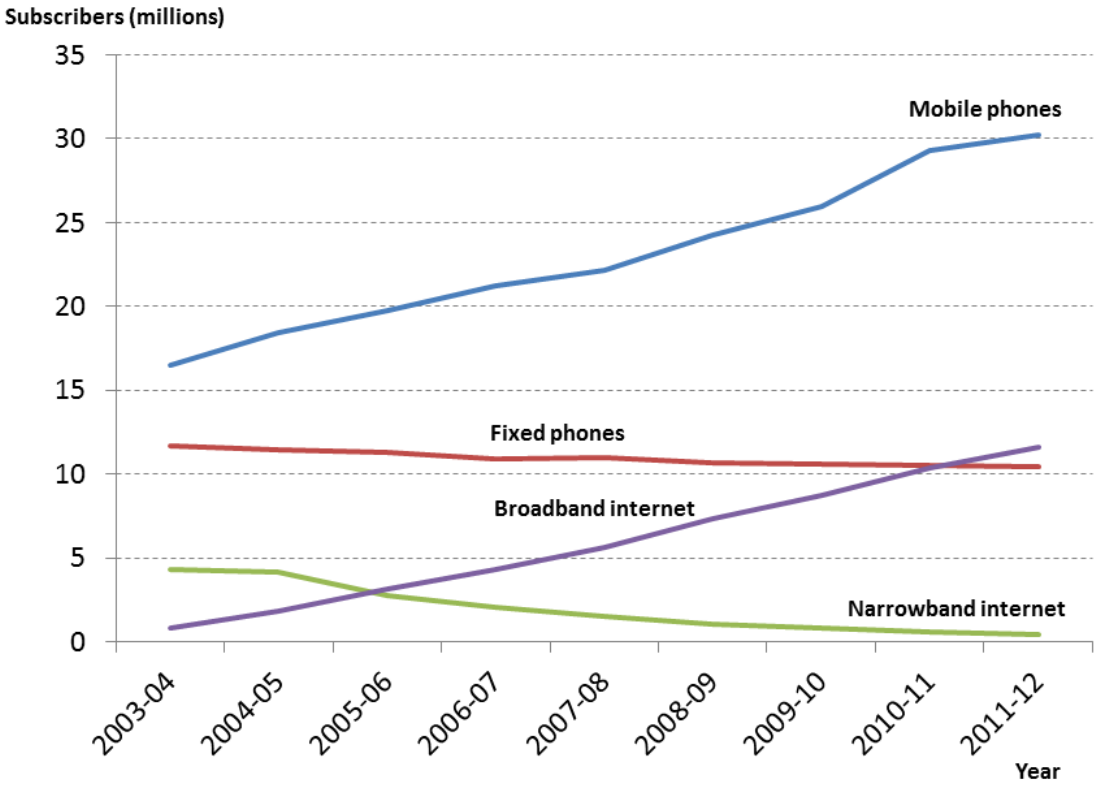



Source BREE, Australian energy statistics, Table E

- In the two decades to 2011–12, Australian gas consumption grew by an average annual rate of 3.5 per cent. Gas consumption trends have been driven largely by the manufacturing, mining and electricity generation industries.
- From 2002–03 gas consumption by the mining industry grew substantially because of the resources boom.
- Gas consumption by the manufacturing industry, traditionally the largest consumer of gas, began to decline in 2004–05, after 30 years of strong growth.
- The significant increase in gas consumption from 2006–07 was largely caused by growing consumption by the electricity generation industry in Western Australia and New South Wales.

## Communications

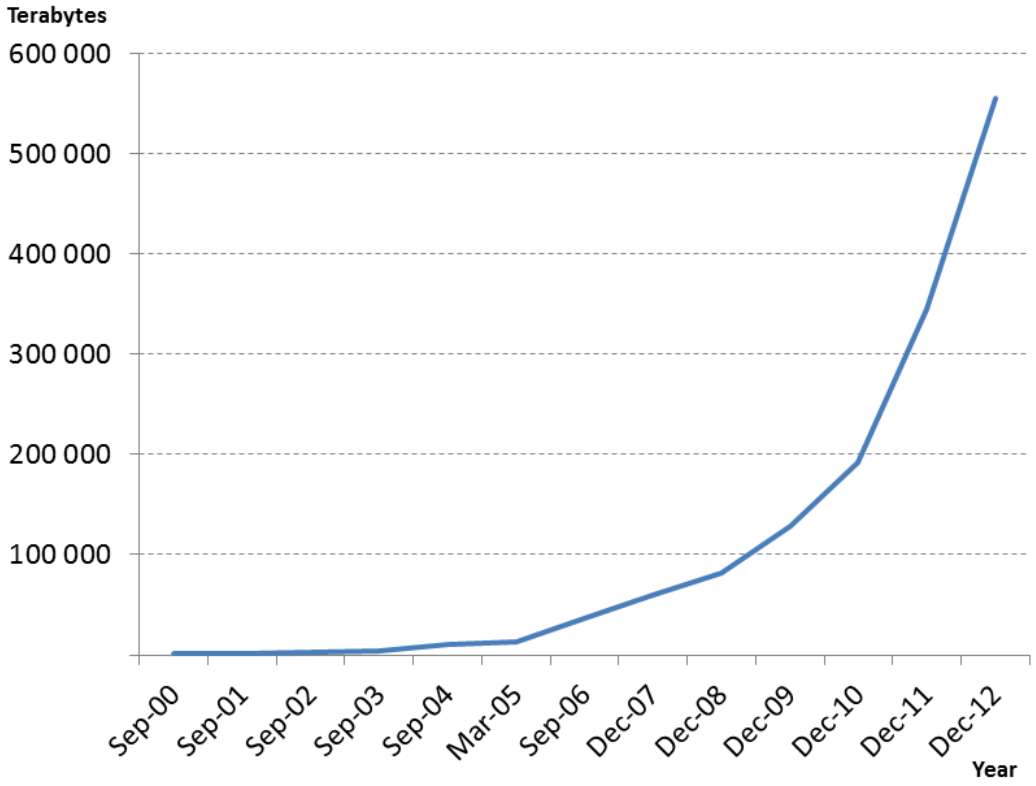
Figure 20: Number of communications subscribers, by medium




Source BITRE, Australian infrastructure statistics yearbook 2013, Figure C 2

- Figure 20 illustrates the strong growth of newer communications technologies.
- From 2003–04 to 2011–12, subscribers to broadband internet grew thirteen-fold. In 2011–12, there were 11.6 million broadband subscribers.
- The growth in broadband has been accompanied by a decrease in subscribers to narrowband internet, as the technology becomes increasingly redundant. In 2011–12, there were less than 500 000 subscribers to narrowband internet.
- The number of mobile phone subscribers almost doubled from 2003–04 to 2011–12. There are now more mobile phone subscribers than people in Australia, illustrating the growing number of people with dedicated mobile phones for work.
- The number of subscribers to fixed phones is slowly declining as people move towards mobiles. In 2011–12 there were 10.4 million fixed phone subscribers.

Figure 21: Volume of data downloaded, for ISPs with more than 1000 active subscribers

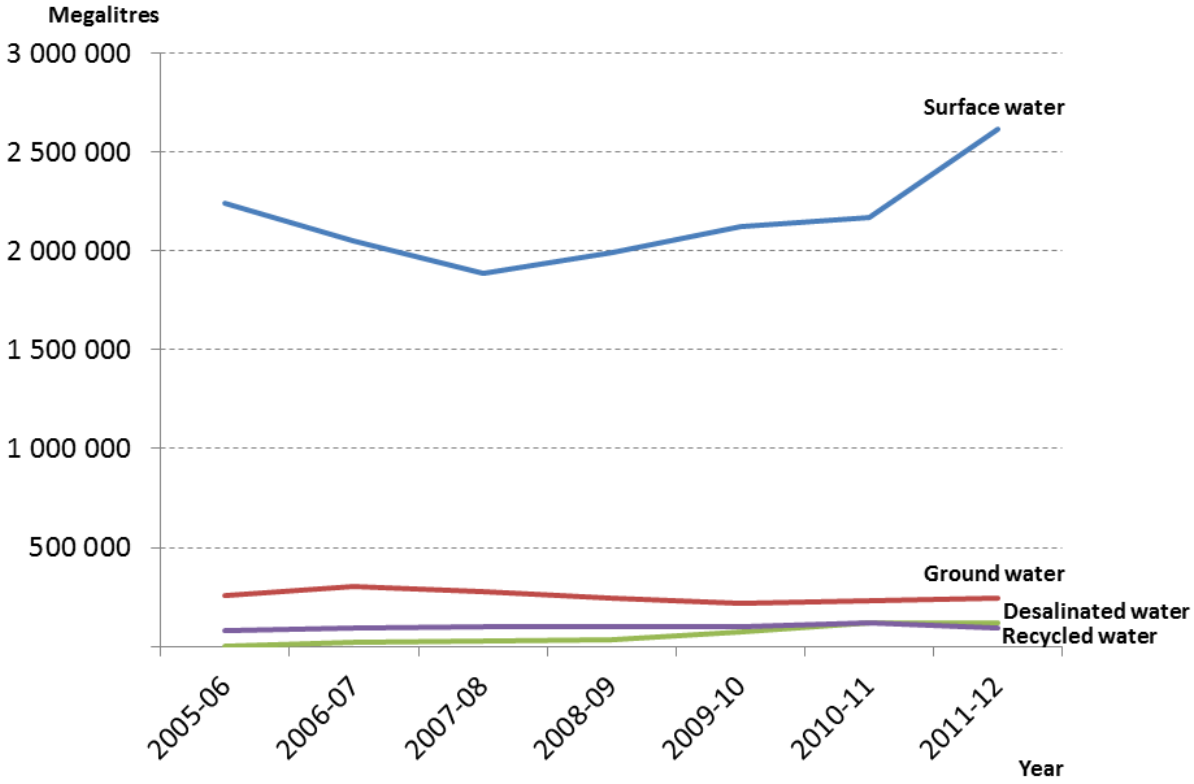



Source BITRE, Australian infrastructure statistics yearbook 2013, Table C 4.5

- Between 2000 and 2012, the volume of data downloaded increased at an approximate average annual rate of 75 per cent.
- The volume of data downloads was restricted in the early 2000s, partially because internet subscriptions were largely low capacity dial-up (see Figure 20).
- The rapidly growing capacity, uptake and usage of broadband internet have meant a significant increase in the total volume of data downloads.

## Water

Figure 22: Inputs into urban water supply




Note Data excludes Tasmania

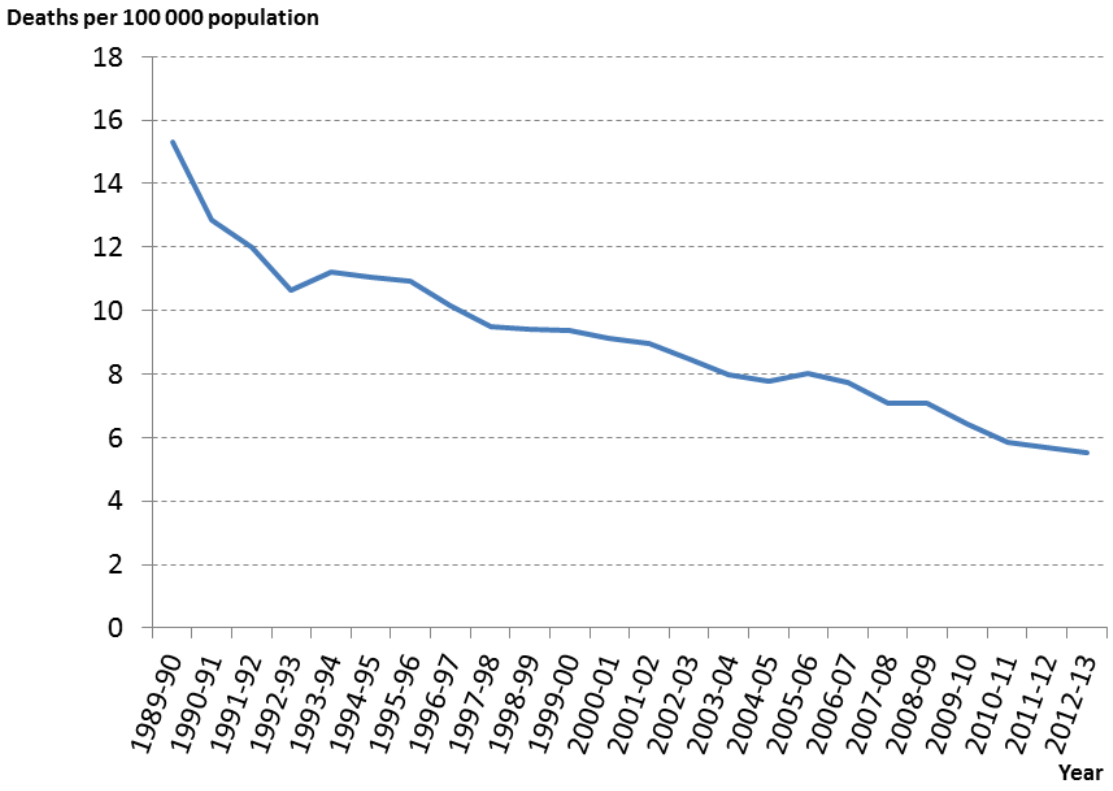
Source BITRE, Australian infrastructure statistics yearbook 2013, Tables W 2.2 – W 2.5

- The recent construction of desalination plants in New South Wales, South Australia, Queensland and Victoria (see Figure 8), has increased the volume of desalinated water supplied to cities from almost nothing in 2005–06 to 123 000 megalitres in 2011–12.
- Surface water, however, remains the dominant source of water for cities and towns. In 2011–12, the volume of surface water supplied increased by 21 per cent to 2.6 million megalitres.

## *Section 3 – Infrastructure performance, safety and productivity*

### Transport

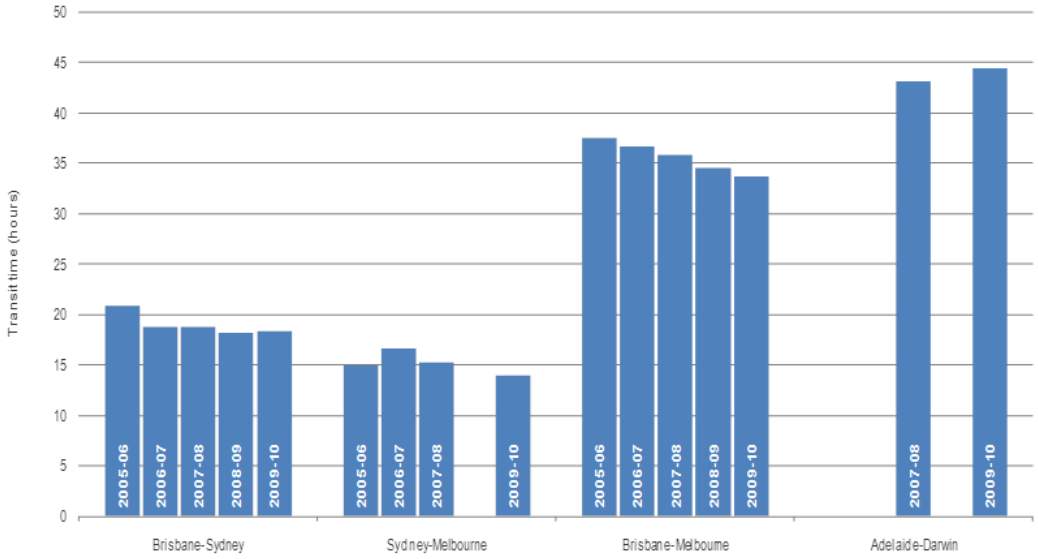
Figure 23: Road Safety – fatality rate, deaths per 100 000 population




Source BITRE, Australian road deaths database; and ABS, Australian demographic statistics (3101)

- The rate of road deaths has been trending downwards since the late 1980s.
- The fatality rate in 2012–13 was 64 per cent lower than in 1989–90.
- The rate of deaths per 100 000 people in 2012–13 was 5.5.

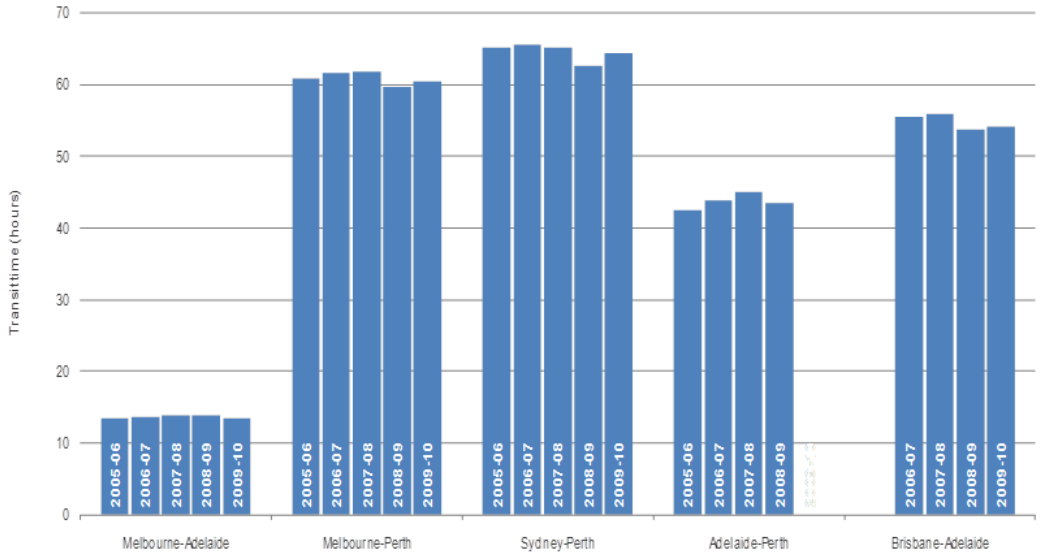
Figure 24: Railways – average scheduled transit times, North-South and Central corridors, 2005–06 to 2009–10




Source BITRE, TrainLine 1

- The scheduled transit times of Brisbane-Sydney, Brisbane-Melbourne and Sydney-Melbourne fell between 2005–06 and 2009–10.
- This is likely to be a result, in part, because of improvements in signalling and construction of passing loops and passing lanes on the North-South corridors.
- Transit times on the central corridor increased slightly between 2007–08 and 2009–10.

Figure 25: Railways – average scheduled transit times, East-West corridors, 2005–06 to 2009–10

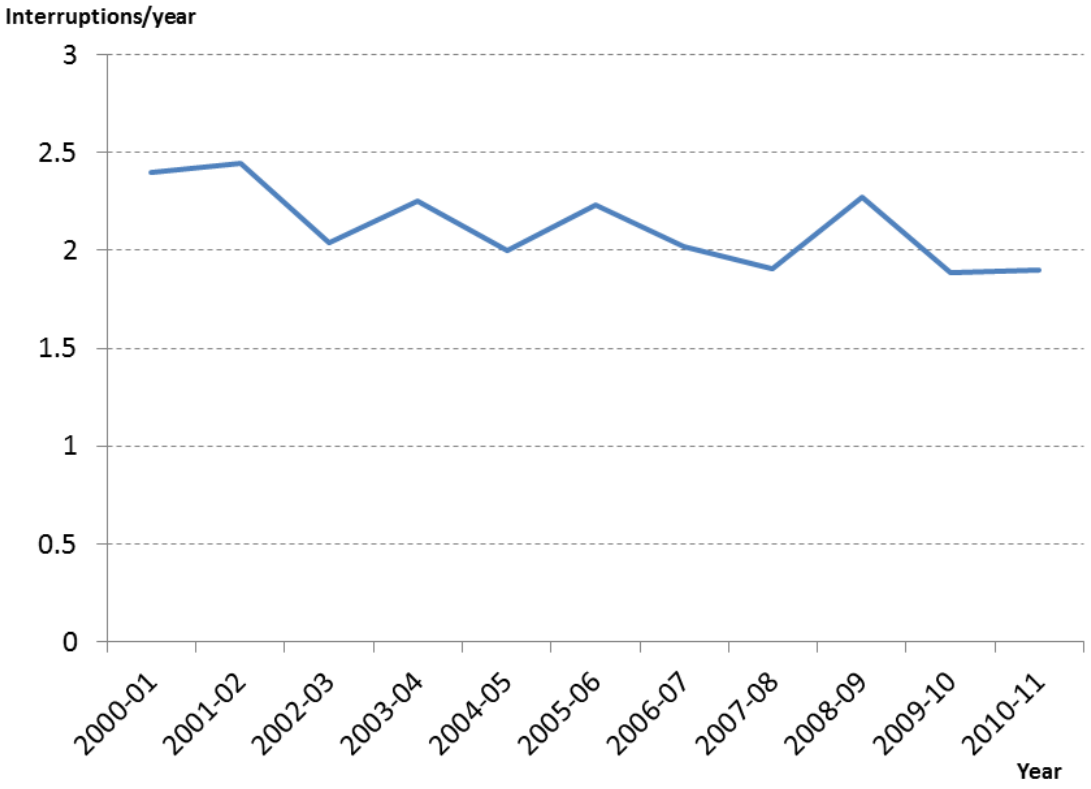



Source BITRE, TrainLine 1

- There was no discernible trend in transit times on the East-West corridors from 2005–06 to 2009–10.
- Changes are influenced by a range of factors including: the line speed; the number of stops on route; the number and type of other trains on the line; and operator dependant factors, such as time spent in intermediate cities.

## Energy

Figure 26: Average interruption frequency index – number of times a customer's electricity supply is interrupted per year



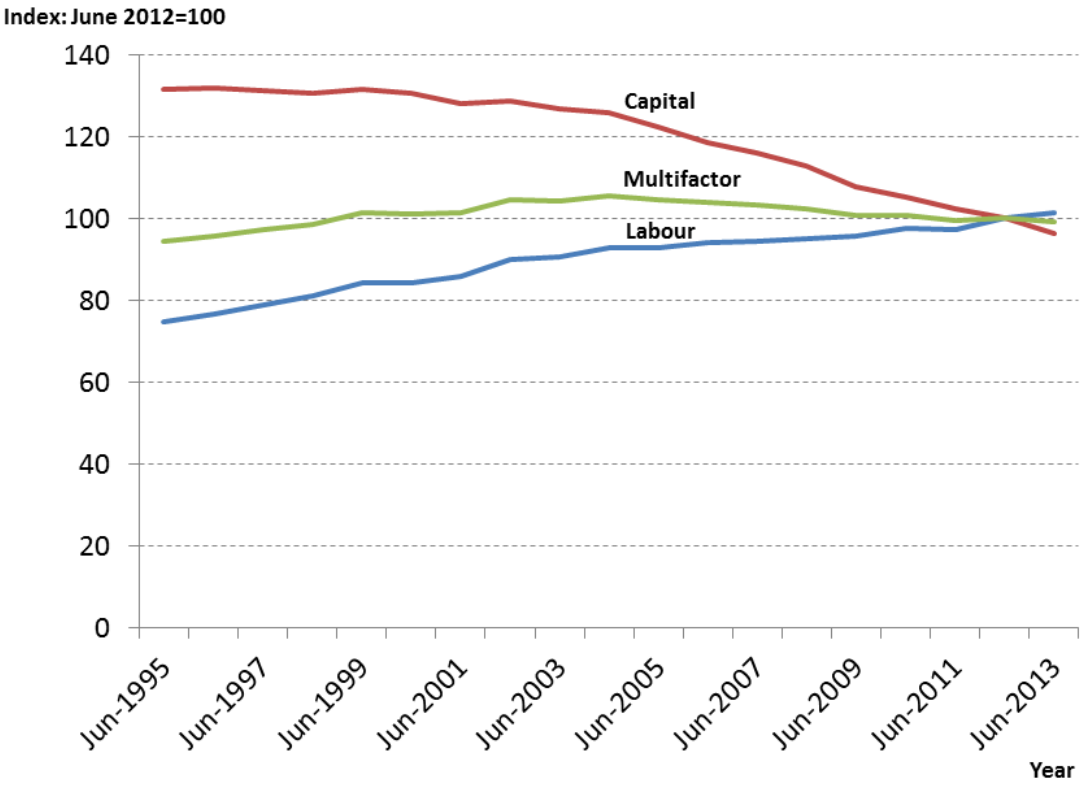

Note Data represents the national electricity market weighted average

Source Australian Energy Regulator, State of the energy market 2012

- The average number of electricity supply interruptions per year decreased from 2000–01 to 2010–11.
- Changes in this index are caused by planned interruptions (due to maintenance works) and unplanned outages (due to equipment failure, overload, extreme weather etc.).
- The capital intensive nature of electricity distribution makes high levels of in-built spare capacity unfeasible. The aim, therefore, is not to eliminate interruptions entirely, but base the predicted level of interruptions (and therefore maintenance) on the assessed value of reliability to the community.

## Productivity

Figure 27: Index of Australian productivity in the market sector – capital, labour and multifactor




Note Adjusted for quality hours worked

Source ABS, Australian system of national accounts (5204)

- Australia's capital productivity has been decreasing while labour productivity has been increasing.
- Multifactor productivity estimates provide measures of productivity per combined unit of input from labour and capital. This measure increased gradually until 2004 but has since declined.
- The decline in capital productivity is consistent with a sustained period of expenditure on infrastructure, particularly in the mining sector. This expenditure constitutes input into capital which has not yet been matched by expected growth in output.

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