TasRail – Delivering value for Tasmania

Data summary report

Prepared for:

TasRail

2015

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Executive summary

pitt&sherry was engaged by TasRail in January 2015 to analyse and report on the value and benefits of freight rail in Tasmania.

The research found that for the financial year 2013–14, the use of rail rather than road to transport freight in Tasmania delivered savings to the community of approximately $26 million through reduced costs related to road accidents, pollution and road maintenance, and through freight cost savings to business and industry.

pitt&sherry projects these savings will continue to increase over the five years to 30 June 2019, reaching an estimated $159 million. This analysis also shows that Tasmania can expect the annual value of rail to steadily increase beyond 2019 as freight volumes continue to grow and the planned investment in rail infrastructure sustains the improvement in the safety and reliability of the rail network.

The statistical data used in the study, which were drawn from a range of official government studies and reports, show that in 2013–14 the use of rail freight in Tasmania rather than road freight saved around $7 million in avoided road accident costs; saved $1 million in environmental costs; avoided $9 million in road maintenance costs; and generated up to a $9 million reduction in the operating costs of commerce and industry.

The data on which these conclusions are based include:

- Tasmanian freight surveys published by the Department of State Growth
- road accident statistics and cost publications
- Austroads data relating to environmental costs of freight transport
- valuations of road maintenance costs by the National Transport Commission
- road and operating costs in the Bureau of Infrastructure, Transport and Regional Economics (BITRE) report on road operating costs.

The essence of the study findings confirms that rail is the most efficient freight mode on major freight corridors such as the Brighton to Burnie route, on which an estimated 68 per cent of contestable freight is now hauled by rail.

The report also confirms that while there is an investment cost in rebuilding the network and capacity of freight rail in Tasmania, as there is with roads and ports, rail freight delivers substantial state-wide benefits that are significantly greater than the investment costs over time.

Freight transport efficiency is maximised when freight can be moved at the lowest possible cost to customers (senders and receivers) and the community at large. A single train can move hundreds of tonnes of freight and the rolling resistance faced by a steel wheel on a steel track is small compared to that of a rubber tyre on a road. These physical and economy-of-scale advantages translate to very low overall costs on a per tonne-kilometre basis (the cost of moving one tonne of freight the distance of one kilometre).

Investment in rail infrastructure allows these fundamental rail efficiency advantages to be captured by the Tasmanian freight system. Track upgrades improve the performance of Tasmania's rail network to a safe and acceptable standard to compete with road for certain freight tasks.

The result is an overall increase in Tasmania's transport system efficiency. This delivers lower costs in two major ways. The most obvious effect is lower costs to freight customers – which in turn reduces the drag of freight costs on the whole economy. For example, when cement can be taken from plant to port at a lower price, the impact ripples throughout the construction sector and then through the entire economy.

At the same time, the negative impacts of moving freight – which are borne by the community as a whole – are lowered by using rail.

Rail freight is a safe freight mode with a lower accident incidence than road, and therefore smaller accident costs. Greenhouse emissions are lower, reducing environmental costs. Using rail rather than road reduces heavy vehicle trips, reducing road damage and therefore road maintenance costs.

It is acknowledged that there are additional economic advantages provided by rail compared to other forms of freight transport. These advantages, which are difficult to quantify, result in substantial value-added benefits for customers and include rail's capacity to provide a seamless integration between rail freight operations and mining and manufacturing facilities. Other advantages include efficient rail connectivity between ports and rail terminals and additional service offerings including bulk commodity handling, storage and ship loading services. This research has not attempted to quantify the economic value of these significant value-added benefits as this was outside the scope set by TasRail. Instead, this report has focused on the quantifiable social and environmental benefits that flow as a direct result of freight rail transport operating in Tasmania.

1. Rail is an important element of Tasmania's freight system

1.1 Rail is a key element of the Tasmanian freight system – and is becoming increasingly important

TasRail has been successful in retaining and growing rail freight volumes since it was established on 1 December 2009. TasRail's freight task has remained firm at 22 per cent of the Tasmanian freight task since 2012–13 (Table 1).

While growth in total freight haulage has remained stable over much of the past five years, it has not been consistent across all freight sectors. Some of this growth has been offset by the contraction in the mining industry, particularly the suspension of a number of West Coast mines that represent a large proportion of TasRail's bulk freight task. The gains in containerised and contestable freight volumes are strong, with a number of commodities returning to rail after long absences, for example logs.

Rail Freight volume for 2015–16 is forecast to show strong growth, with TasRail recently securing a contract to provide freight services for Australian Bauxite Limited, representing some 300,000 tonnes per year. It is expected that a period of market stability will follow, with rail sustaining over a quarter of the State's known total freight task (Table 1).

Using 2013–14 data to analyse the State's total freight task by net tonne-kilometres (ntk)[1], it can be shown that TasRail has captured 22 per cent of the contestable freight market. This is a larger percentage than when compared to measuring rail's share in simple tonnages, which is estimated at 11 per cent. This is a reflection of rail's comparative advantage on relatively long-haul routes such as Hobart to Burnie. Trucks, on the other hand, are perfectly suited to the many local tasks occurring away from the rail network where the distance from origin to destination is short, for instance, first mile/last mile deliveries and quarry to building site.

Table 1 Tasmanian freight task and rail's market share – 2012–13 to 2018–19

Performance measure	2012–13 Actual	2013–14 Actual	2014–15 Forecast	2015–16 Forecast	2016–17 Forecast	2017–18 Forecast	2018–19 Forecast
Total million ntk	1852	1875	1903	1941	1979	2019	2059
TasRail million ntk	415	418	410	521	540	550	552
Percentage of market share captured by TasRail	22	22	22	27	27	27	27

Source: TasRail, Department of Infrastructure, Energy and Resources, *Tasmanian freight survey data summary 2013* (based on the survey of 2011–12) and the 2008–09 Tasmanian freight survey report; Tasmanian Government Treasury, *State accounts, 2013–14;* Tasmanian budget 2014–15 – *Budget paper 1*.

Note: The total freight figures are based on the estimates (in both tonnes and ntk terms) from the Department of State Growth's (previously DIER) Tasmanian freight survey of 2008–09 and 2011–12. From 2011–12 total freight growth is assumed to follow movement in GSP (a reduction of 0.2 per cent from 2011–12 to 2012–13 then an increase of 1.2 per cent, then a return to the long-term average of 2 per cent). Please see the methodology section for further explanation.

[1] A net tonne-kilometre (ntk) is a tonne of freight carried over the distance of one kilometre.

1.2 The contestable freight task is sizeable and TasRail is increasing its share

pitt&sherry projected the contestable land freight task based on detailed data from the *Tasmanian freight demand survey* of 2008–09. The analysis looked at those sections of the Tasmanian freight corridor with both rail and road modes by commodity/sector.

Table 2 shows projections of the total contestable task, along with projections of the road and rail shares of that task. Rail is projected to have held about half of the contestable task over the last few years with a step up to a 60 per cent share expected this year.

Table 2 Projected contestable land freight tasks – 2012–13 to 2018–19

Performance measure	2012–13 Actual	2013–14 Actual	2014–15 Forecast	2015–16 Forecast	2016–17 Forecast	2017–18 Forecast	2018–19 Forecast
Total contestable freight by million ntk	833	843	856	873	891	908	926
Road freight by million ntk	418	424	446	352	351	358	374
Rail freight by million ntk	415	418	410	521	540	550	552
Percentage of market share captured by TasRail	50	50	48	60	61	61	60

Note: Please see the methodology section for further explanation

2. Using rail to carry freight brings benefits to commerce and industry

Rail is the most efficient and productive transport line haul mode on several key Tasmanian freight corridors. This efficiency brings significant benefits to economic sectors with freight tasks that are suited to rail.

This is the case for cement, metal products, wood products and mineral ores – all very large freight tasks and of considerable economic importance to Tasmania. Equally, rail is significantly more productive and efficient for key intermodal (containerised) freight tasks.

Note that the precise financial benefits to individual companies will vary, depending on differences in freight rates which are often commercial-in-confidence. However, the average benefit to industry of using rail can be estimated by comparing the average operating costs of rail with conservative estimates of the average operating costs of road. Estimates of overall benefit, as distributed across TasRail's recent and expected customers, are shown in Table 3, Table 4 and Table 5.

It should be noted that the projected savings to industry include the road maintenance savings reported in Section 4. This is because the charges to freight customers include costs faced by road freight businesses, such as fuel and registration. These include the fuel excise and registration charge adjustments that are designed to reflect road damage costs. The tables below show savings to industry, split by road maintenance related costs and remaining operating costs.

Table 3 Actual savings in operating costs for commerce and industry – 2013–14

	$ million
Actual savings in operating costs for commerce and industry – road maintenance	9
Actual savings in operating costs for commerce and industry – other vehicle running and labour costs	9
Total actual savings in operating costs for commerce and industry	18

Table 4 Projected savings in operating costs for commerce and industry – 2014–15 to 2018–19

	$ million
Projected savings in operating costs for commerce and industry – road maintenance	58
Projected savings in operating costs for commerce and industry – other vehicle running and labour costs	55
Total projected savings in operating costs for commerce and industry	113

Table 5 Total projected savings in operating costs for commerce and industry –2013–14 to 2050

	$ million
Projected savings in operating costs for commerce and industry – road maintenance (discounted at 4 per cent)	297
Projected savings in operating costs for commerce and industry – other vehicle running and labour costs (discounted at 4 per cent)	252
Total projected savings in operating costs for commerce and industry (discounted at 4 per cent)	549

Certain industries are heavy users of rail services. Projections of operating cost savings (the cost of moving freight from A to B) for major rail users are shown in Table 6 and Table 7. Note that total savings to these industries (and the overall benefits reported above) are likely to be much higher – as the efficiency benefits and related cost savings to manufacturers and logistics service providers of loading on to a single rail service instead of multiple trucks has not been estimated.

Table 6 Projected freight service savings by commerce and industry – 2013–14

	$ million
Wood products	4.2
Metal products	4.5
Cement	1.1
Mineral ores	1.4
Intermodal container customers	4.8

Table 7 Projected freight service savings by commerce and industry – 2014–15 to 2018–19

	$ million
Wood products	21.6
Metal products	23.3
Cement	5.7
Mineral ores	7.0
Intermodal container customers	26.8

2.1 Freight service savings may be significantly higher than projected

pitt&sherry has produced operating cost estimates on a net tonne-kilometre basis using data from TasRail, BITRE, Austroads and TransEco.

TasRail's costs are known precisely, while road costs have been estimated conservatively. Therefore the tables above are based upon a conservative estimate of operating cost difference.

An alternative and recent estimate of road freight costs, produced as part of BITRE's review of the Tasmanian Freight Equalisation Scheme, illustrates the conservative nature of our estimates. This review produced estimates of about 13 cents per ntk for B-doubles and 18 cents per ntk for semi-trailers. This translates into an estimate that is roughly twice our conservative estimate of road operating costs. This means the savings could be close to double those reported above.

References

Bureau of Infrastructure, Transport and Regional Economics 2011, *Truck productivity: sources, trends and future prospects,* Report 123, Canberra, ACT.

TransEco 2011, *Road freight cost outlook*, May 2011.

SKM 2013, *BITRE freight rates update 2012–13: Bass Strait Shipping and Tasmanian Freight Equalisation Scheme – Final Report*.

3. Rail is the safest way to move freight – reducing the cost of accidents to the community

3.1 The community is safer when contestable freight is carried by rail rather than road

The accident costs of carrying freight on rail in Tasmania are less than half of the cost of carrying the same amount of freight on heavy, articulated trucks. Based on the average accident rate over a period of five years, the annual accident cost of rail freight in 2013–14 was 1.2 cents for every tonne carried over a kilometre. The equivalent road cost was 2.8 cents. See the methodology section for further detail.

This difference in accident costs can be attributed to rail having a lower incidence of fatalities and serious injuries.

Table 8 quantifies actual achieved savings (actual rail safety savings) for the financial year 2013–14. Table 9 shows the projected savings (projected rail safety savings) based on TasRail's projected rail freight task for the next five years. Table 10 shows the total projected savings through the total avoided road accident costs (total projected rail safety savings) from 2013–14 to 2050.

Table 8 Actual rail safety savings – 2013–14

	$ million
Accident costs on rail	5.0
Avoided road accident costs	11.5
Net savings	6.5

Table 9 Projected rail safety savings – 2014–15 to 2018–19

	$ million
Accident costs on rail	30.4
Avoided road accident costs	70.8
Net savings	40.4

Table 10 Total projected rail safety savings – 2013–14 to 2050

	$ million
Accident costs on rail – undiscounted	313
Avoided road accident costs – undiscounted	729
Total projected net savings – undiscounted	415
Total projected net savings – discounted at 4 per cent*	196

* The Australian Government's Department of Infrastructure and Regional Development project appraisal guide recommends discount rates of 4 and 7 per cent to be used in the appraisal of projects with long-term benefits. For further discussion see section 9.

Source: **pitt&sherry** estimates, based on accident incidence data and accident cost data:

- Australian Transport Safety Bureau, *Australian rail safety occurrence data 2002 to 2012*.
- Bureau of Infrastructure, Transport and Regional Economics 2014, *Impact of road trauma and measures to improve outcomes,* Report 140, December, Canberra.
- Bureau of Infrastructure, Transport and Regional Economics, Australian road deaths database.
- https://www.bitre.gov.au/statistics/safety/fatal_road_crash_database.aspx.
- Tasmanian crash statistics: fatalities 2014.
- http://www.transport.tas.gov.au/roadsafety/crash_statistics.

4. Use of rail reduces the need for road maintenance and upgrades

4.1 Road maintenance

Using the rail system to move freight reduces truck movements, which in turn reduces the cost of ongoing road infrastructure maintenance.

The cost of maintaining roads would therefore rise significantly if rail's freight task was moved on to road. The estimated savings in road maintenance costs, under TasRail's actual and projected freight tasks, are shown in Tables 11 to 13.

Table 11 Actual road maintenance savings – 2013–14

	$ million
Actual road maintenance savings – avoided road maintenance costs	9

The Tasmanian 2015 budget papers show the 'below rail maintenance contribution' to TasRail reduces over the next four years, from $12 million in 2015–16 to $8.1 million in 2018–19. Analysis by **pitt&sherry** projects that, by contrast, the annual savings achieved by rail from avoided road maintenance costs will continue to increase year-on-year, generating annual savings of $12.5 million per year by 2018–19.

Table 12 Projected road maintenance savings – 2014–15 to 2018–19

	$ million
Projected road maintenance savings – avoided road maintenance costs	58

Table 13 Total projected road maintenance savings – 2013–14 to 2050

	$ million
Total projected road maintenance savings – avoided road maintenance costs (undiscounted)	643
Total projected road maintenance savings – avoided road maintenance costs (discounted at 4 per cent)	297

Note on estimation of road maintenance costs

The estimates above are based on the National Transport Commission (NTC) method of estimating the cost impact on road infrastructure of heavy vehicle movements on a per net tonne-kilometre basis.

There is quite some debate about whether the NTC system, which applies fuel and registration charges on the basis of heavy vehicle type, does fairly allocate the real road infrastructure costs of individual freight and passenger vehicles. All road users do pay for some share of the road – but the costs are averaged across vehicle types – and under the current charging system cannot reflect the real impact of each individual vehicle.

Both Australian Treasury and the Productivity Commission have recommended changes to the system.

A related issue is whether maintenance costs of heavy truck movements on secondary and tertiary roads are accurately reflected. Key freight roads, that carry large numbers of heavy vehicles with high axle loads, are designed and built to a higher standard than roads of lesser freight importance. Heavy trucks travelling on these lower standard roads can do significant damage and it is debatable whether the resultant costs are fully met by heavy vehicle charges.

References

NTC website: http://www.ntc.gov.au/heavy-vehicles/charges/.

Productivity Commission 2014, *Public infrastructure*, Inquiry Report No. 71, Canberra.

Treasury, 2010, Australia's future Tax System, Commonwealth of Australia, Canberra http://taxreview.treasury.gov.au/content/Content.aspx?doc=html/pubs_reports.htm.

4.2 Road upgrades

The 'off network' TasRail lines provide a high standard freight corridor that is not matched by an equivalent high standard road freight route. These off network lines include the Derwent Valley Line between Boyer and Brighton, the Fingal Line and the Melba Line.

The existence of these off network rail lines avoids the need to substantially upgrade or construct roads in these corridors. Without rail, the roads in these corridors would require substantial capital investment to take them to the standard necessary to carry rail's freight task. Significant pavement strengthening and possible bridge strengthening would also be required. Additionally, realignment work would be very desirable. The alignment on some sections of these roads is inappropriate for the dual purpose of a high volume freight route and tourist road. An engineering assessment of necessary upgrade works has not been performed, but the cost of such work would be multiple millions of dollars.

5. Rail has a smaller impact on the environment than road

5.1 The negative environmental impact of freight transport is smaller on rail than road

The most significant environmental impact of freight transport in Tasmania is greenhouse gas emissions. Austroads has recently updated its estimates of the dollars per net tonne-kilometre cost of greenhouse emissions for road and rail. These costs are the basis of the estimates shown in Table 14, Table 15 and Table 16.

Other environmental costs of freight transport include air, noise and water pollution. However, these impacts are quite low for both road and rail modes given that large sections of the Tasmanian freight corridors operate through rural and remote areas.

Table 14 Actual environmental costs and savings – 2013–14

	$ million
Cost of emissions on rail	0.2
Cost of emissions on road	1.1
Actual net savings	0.9

Table 15 Projected environmental costs and savings – 2014–15 to 2018–19

	$ million
Cost of emissions on rail	1.2
Cost of emissions on road	6.7
Projected net savings	5.5

Table 16 Total projected environmental savings – 2013–14 to 2050

	$ million
Total projected environmental savings - avoided emissions by performing TasRail's projected task on rail (undiscounted)	56
Total projected environmental savings - avoided emissions by performing TasRail's projected task on rail (discounted at 4 per cent)	26

Source: Austroads 2014, *Valuing environmental and other externalities*.

6. The expected net value of rail freight to Tasmania

The benefits of rail that have been estimated in this report include:

- the benefit gained by rail freight customers in the form of lower costs
- the benefit to the community of lower accident costs
- the benefit to the community of lower environmental costs because of reduced greenhouse gas emissions
- the benefit to the community of avoided road maintenance costs.

The current and future investments and costs that have contributed to these benefits include:

- the annual cost of the 'below rail infrastructure maintenance contribution' by the Tasmanian Government
- the announced first tranche of Infrastructure Investment (IIP) funding for TasRail by the Australian and Tasmanian governments of $120 million for the Tasmanian Freight Rail Revitalisation Program over the next four years to 30 June 2019.

Note that when considering net benefit, the benefit of avoided road maintenance costs is included within the benefit gained by customers through lower freight service costs. This is because the maintenance impact of trucks is captured (at least approximately) in the fuel and registration charges that are included in road operating costs.

The net impact of the costs and benefits considered in this report, of providing rail services in Tasmania, is positive and substantial.

Table 17 shows the total net benefit of TasRail for the period 2015–16 to 2050.

Table 17 Quantified projected net savings of rail to Tasmania – 2015–16 to 2050

	$ million
Total undiscounted	1,174
Total discounted at 4 per cent	514

Table 18 shows the costs and benefits of running TasRail over the next four years.

Note that there are additional benefits that have not been quantified, but these would add very substantially to those tabled below. The negative cash flow balances in 2016 and 2017 reflect the fact that the major investments occur in those years and pay back as a flow of benefits over time.

Table 18 Investments and savings summary – 2015–16 to 2018–19

Financial year ending June	2016 ($m)	2017 ($m)	2018 ($m)	2019 ($m)
Benefits				
Operating costs for commerce and industry – road maintenance only	11.6	12.1	12.4	12.5
Operating costs for commerce and industry excluding road maintenance savings	11.3	11.6	11.8	11.8
Safety savings	8.2	8.5	8.6	8.7
Environmental savings	1.1	1.1	1.2	1.2
Sub-total benefits	**32.2**	**33.4**	**34**	**34.1**
Government investments				
IIP capital investment by Australian and Tasmanian Governments	46.4	44.9	14.3	14
State Government operating grant	12	12	8.1	8.1
Sub-total Investments	**58.4**	**56.9**	**22.4**	**22.1**
Net impacts				
Annual net impacts – undiscounted	–26.2	–23.5	11.6	12

6.1 Unquantified benefits

Benefits that are not included in the above valuation of net benefit include:

- seamless interconnectivity between freight rail and mining and manufacturing facilities;
- state-wide connectivity between rail terminals, major ports and major industrial hubs;
- avoided road upgrade costs – the capital investment that would be required to enable 'off network' elements of the road system to carry the rail freight task;
- logistical savings achieved by freight customers and freight service providers due to rail's economy of scale (e.g. loading a single train at a single time rather than multiple trucks over time);
- decongestion at key points in the Tasmanian freight system, for instance ports and major intersections of freight and passenger corridors.

7. Strategic benefits of rail

7.1 The rail network provides spare transport capacity: necessary for industry expansion at low cost and with community acceptance

Rail is well utilised, but has considerable capacity to perform much larger freight tasks at only marginal additional cost.

In other words, rail has the capacity and the capability to support economic growth. Prospective manufacturers and mines can plan in the knowledge that their production can be transported at reasonable cost – and that the community will accept the movement of this freight given the widespread understanding of rail's strong safety and environmental credentials.

In economic terms, this enabling characteristic of rail is termed *Option value*. This Option value recognises the potential benefit of opportunities that are unlocked through the provision of infrastructure such as rail lines, roads and ports. This is more fully explained below in section 7.2.

7.2 The strategic benefit of rail – Option value

Strategic consideration of TasRail and its contribution to the economy should recognise the future benefits that might flow from the availability of this infrastructure. Economics has long recognised 'Option value' as an attribute of key assets. It addresses the uncertainty of future costs and returns, and the set of opportunities that can be unlocked or denied through infrastructure support or disinvestment.

New Zealand consultant, Motu Economics and Public Policy Research notes:

> The potential importance of options created by particular infrastructure investments means that a standard 'needs analysis' may be an insufficient basis from which to begin an ex-ante evaluation of a potential investment. In the cases discussed above, an 'opportunities analysis' also needs to be included prospectively. Furthermore, it is important not to restrict opportunities to those that may be exercised (or even internalised) just by the infrastructure provider or by existing agents. Future agents (e.g. new migrants, start-up firms or international firms not yet present in the country) may be the agents that take advantage of opportunities that are created.
>
> A corollary of this approach is that disinvestment decisions need to take account of future opportunities that are potentially lost through a decision to scrap existing infrastructure. The opportunity (or option) approach may be particularly important where discontinuities are possible. For instance, a decision to close (large parts of) the rail network owing to its inability to pass a conventional CBA may turn out to have a large negative outcome if fuel prices were to surge massively, in which case the option to increase rail traffic would no longer be available. Of course, this option value must be weighed against the costs of ongoing operational deficits in determining the closure decision.
>
> Grimes, A 2010, *The economics of infrastructure investment: beyond simple cost-benefit analysis*, Motu Working Paper 10-05, August 2010, p.37.

For Tasmania, like other jurisdictions, future economic opportunities can be uncertain. However, mineral development, manufacturing, primary industries and the associated need to haul heavy freight in a safe, timely and efficient manner in harmony with population and environmental goals look to be a strong part of the state's future.

The value of these options, and the importance of an operational rail system in achieving them, clearly reinforces the case for maintaining a Tasmanian freight rail network.

8. Fast facts

8.1 Freight rail delivers value for Tasmania

In 2013–14, savings achieved by moving freight on rail rather than road included around:

- $7 million in avoided road accident costs
- $1 million in avoided environmental costs
- $9 million in avoided road maintenance costs
- $9 million in operating cost savings to Tasmanian commerce and industry.

Total projected savings for the five years from 2014–15 to 2018–19 are estimated at approximately:

- $40 million in avoided road accident costs
- $6 million in avoided environmental costs
- $58 million in avoided road maintenance costs
- $55 million in operating cost savings to Tasmanian commerce and industry.

8.2 TasRail is a major freight service provider

The freight hauled by TasRail:

- represents about a quarter of Tasmania's land freight task;
- represents around 50 per cent of contestable freight on all freight corridors covered by the rail system; and
- represents 68 per cent of contestable freight on the major corridor between Brighton and Burnie.

8.3 Rail is a safe freight mode

Rail use results in significantly fewer freight related deaths and injuries. Based on the average of accident rates over the five years up to 2013–14, there was:

- an average of 1 less articulated truck related fatality each year = 24 per cent fewer articulated truck related deaths in Tasmania and a 4 per cent reduction in total road fatalities
- 9 fewer serious injuries = 5 per cent fewer serious injuries for Tasmania
- 9 fewer serious injuries = 29 per cent fewer serious injuries related to articulated truck accidents.

9. Methodology

The analysis in this report is based on comparing the cost of moving freight by rail with the cost of moving freight by road. As explained above, we looked at costs in several areas: environmental, safety and operating and maintenance costs.

Use of the rail system to carry freight results in a saving when the cost of performing the freight task is smaller using rail rather than road. The size of the saving depends on the rail versus road cost differential (measured in cents per net tonne-kilometre) and the size of the freight task – again measured in net tonne-kilometres (moving 1 tonne of freight over a distance of 1 kilometre).

Further detail on the methodologies used to make the estimates in the report appears below.

9.1 Estimating total freight

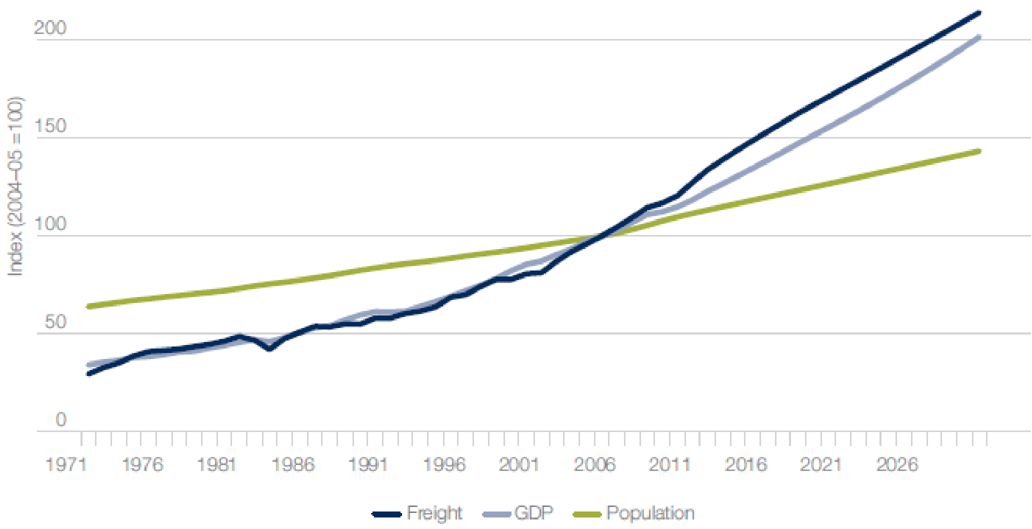
The chief basis of the total state freight task estimates that were shown in Table 1 are the Tasmanian freight surveys conducted by the Department of State Growth (then DIER) every three years. The most recently published freight survey was conducted in 2011–12. In order to make estimates of the total freight task beyond 2011–12 **pitt&sherry** applied freight growth rates in line with actual GSP changes and then from Treasury's projected GSP growth rates for Tasmania. These are shown below in Table 19.

Table 19 Projections of annual Tasmanian freight growth

	2012–13	2013–14	2014–15	2015–16	2016–17	2017–18
Percentage annual growth rate	–0.2	1.2	1.5	2.0	2.0	2.0

On a year-to-year basis, the freight task may not change at exactly the same rate as GSP. This is seen in the period from 2008–09 to 2011–12 where Tasmanian freight volumes dropped substantially, due to particular sectoral disruptions, while GSP remained fairly steady. However, over a longer time scale there is a very good correlation between freight growth and overall economic growth. This is illustrated in Figure 1, produced by BITRE and used in the *National land freight strategy.* The figure shows national historical GDP and freight growth together with projections of freight to 2030.

Some methods of projecting freight take a more fine-grained approach and forecast freight on a sector-by-sector basis. This can be useful in certain applications, but for the purposes of forecasting total freight tasks, the method of tracking credible estimates of GSP/GDP movement is widely accepted. Note that the Tasmanian Treasury estimates of GSP growth are based on long-term trends and are lower (more conservative) than the national GDP growth forecast of 2.8 per cent recently published in the Australian Treasurer's *2015 Intergenerational report – Australia in 2055.*



Source: Standing Council on Transport and Infrastructure, 2012, *National Land Freight Strategy*, Canberra (Figure 5).

Figure 1

National freight task relative to GDP and population growth and forecasts 1971–2030

9.2 Estimating contestable freight

Contestable freight is a freight task that could reasonably be performed by road or rail. Therefore the task must (a) include carriage along the corridors that match the rail network, and (b) consist of suitable goods. Highly perishable goods for instance are assumed not to be contestable by rail.

pitt&sherry's estimates of contestable freight (Table 2) are based on data from the 2008–09 *Tasmanian freight survey*. We used aggregated origin-destination data to construct a detailed analysis of the 2009 freight task performed by road and rail by segment/corridor, where the corridors map to TasRail's network. This analysis provided a detailed 'snapshot' of the contestable freight task by mode, in tonnes and net tonne-kilometres, and by corridor, including modal shares.

9.3 Estimating savings

The estimates of savings are based on multiplying the rail freight task by the difference in the road and rail costs on a per net tonne-kilometre basis. We based these costs on parameters drawn from a variety of sources as summarised in Table 20.

Table 20 Road and rail costs and sources

Cost type	Rail	Road	Sources
Safety	$0.012/ntk	$0.0275/ntk	These valuations are based firstly on a 5-year average of accidents to 2013–14 as recorded in Tasmanian crash statistics and Australian rail safety occurrence data. The cost per fatality and serious injuries per accident is taken from BITRE's Report 140 *Impact of road trauma and measures to improve outcomes* (2014). The net tonne-kilometres for road are based on the *Tasmanian freight survey* for road and TasRail data on rail.
Environmental	$.00048/ntk	$0.0026/ntk	Austroads 2014, *Valuing Environmental and other externalities*.
Operating – including vehicle and road maintenance	$0.044/ntk	$0.09/ntk	Rail costs include labour, fuel, rolling stock maintenance and consumables and track access charges as reported by TasRail. Road costs include labour, tyres and vehicle maintenance, and fuel and road access charges incorporated through registration and fuel excise adjustment as reported by BITRE, TransEco and the National Transport Commission.

9.4 Discount rates

Future benefits and costs are often discounted, and allow the calculation of the present value of benefit and cost streams over a future period, for instance of 30 years. Discounting to produce a present value is based on the concept that a dollar in the future is worth less than a dollar today. However the size of the discount rate that should be used is a debatable point.

The Department of Infrastructure and Regional Development requires the use of two discount rates – 4 and 7 percent – when assessing potential projects. Infrastructure Australia asks for net present values to be reported using 4, 7 and 10 per cent discount rates. The UK uses 3.5 per cent for public sector projects. BTRE (2005) has suggested that long-term government bond rates provide a good guide to selecting discount rates. The 10-year Australian Government bond rate averaged close to 7 per cent over the period from 1969 to 2015. However bond rates were much higher at the beginning rather than the end of that period, reaching a high of 16.4 per cent in 1982 and a low of 2.27 in February 2015.

Figure 2, sourced from the Reserve Bank of Australia, indicates that the rates over the last 10 years have been below 7 per cent without exception, with rates in recent years of 4 per cent or lower. All the above information suggests that the 4 per cent rate, as used in this report, is a sensible choice of discount rate. The impact of the choice of discount rate on the net present value of TasRail's revitalisation, where benefits extend over many years, is further demonstrated in Table 21.

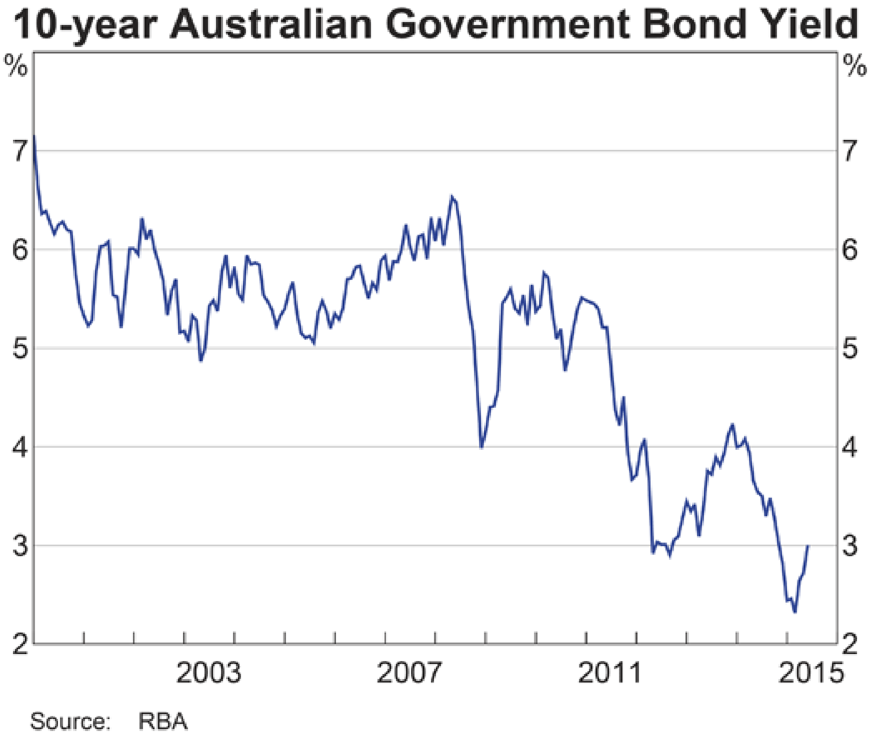


Figure 2

Movement in bond rates

Table 21 **Rail freight use – quantified net savings to Tasmania from 2015–16 to 2050 at multiple discount rates**

Net savings – projections	$ million
Total undiscounted	1,174
Net Present Value discounted at 4 per cent	514
Net Present Value discounted at 7 per cent	300
Net Present Value discounted at 10 per cent	185

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