Infrastructure Australia

Project Business Case Evaluation

Project name	Inland Rail
Rating	Priority Project
Date of IA Board rating	May 2016

Location	National (encompassing Victoria, New South Wales and Queensland)
Proponent	Commonwealth
Project timeframe	A 10-year construction timeframe between 2016 and 2025 is proposed

Evaluation Summary

Demand for freight transport in the Melbourne to Brisbane corridor is expected to grow substantially over the coming decades. The proponent forecasts that the land freight task between these two cities will increase from approximately 4.9 million tonnes in 2016 to around 13 million tonnes, or approximately 1.1 million twenty-foot equivalent units (TEU), by 2050. This increased demand will require additional freight capacity in the corridor.

The proponent proposes to provide increased capacity in the corridor by completing an inland rail connection between Melbourne and Brisbane. The proposed rail solution would provide a service with a transit time within 24 hours, and a high level of reliability, which are identified as industry requirements. Trains operating the service would have capacity to carry 150 TEU from commencement of services, growing to 485 TEU when capacity for longer, double-stacked trains is introduced over time.

The proponent's stated benefit-cost ratio (BCR) is 1.1 using a 7% discount rate and P50 capital costs. When wider economic benefits (WEBs) are included, the stated BCR rises marginally, but is still 1.1 when rounded. Key benefits of the proposed project include improved productivity, improved network efficiency and reliability, safety improvements, sustainability benefits, and reduced lifecycle costs. The P50 capital cost of the proposed solution is $9.9 billion in nominal terms.

Infrastructure Australia's evaluation of the project shows evidence of a long-term stream of benefits to potential users of the project, users of alternative infrastructure, and the broader economy. However, Infrastructure Australia has also identified a number of risks which could impact on the economic viability of the project. Factors such as a decrease in demand for Australia's coal exports, weak oil prices, reduced demand for interstate freight, and upgrades to the Newell Highway, could adversely impact the economic case for Inland Rail.

To address these risks, the proponent undertook further sensitivity testing on a number of key assumptions and parameters in the business case. This sensitivity analysis indicates that the BCR remains above 1 in most scenarios. However, under some scenarios the BCR drops below 1, and under a scenario in which all downside risks are applied simultaneously, the BCR falls to 0.9 using a 7% discount rate and P50 capital costs, or 1.0 including WEBs.

Given the low likelihood of all downside risks occurring simultaneously, Infrastructure Australia is, on balance, confident that the proposed solution would provide net positive benefits to the Australian economy.

Infrastructure Australia also considers that, from a strategic perspective, there is merit in using rail to move substantial volumes of freight over long distances where it is economically viable to do so. This approach is consistent with current strategic planning principles for freight transport.

Context and Problem Description

1. Strategic context

The combined population of Melbourne and Brisbane is projected to increase from around 7 million in 2016 to over 13 million in 2061. This growth in population is expected to generate a substantial increase in demand for interstate freight.

The proponent forecasts that the land freight task between these two cities will increase from approximately 4.9 million tonnes in 2016 to around 13 million tonnes, or approximately 1.1 million twenty-foot equivalent units (TEU), by 2050. This rate of growth is consistent with the rate of growth in the national land freight task projected in the *Australian Infrastructure Audit* – 80% growth over the 20 years 2011-2031.

Given the forecast growth in freight movements and the distances involved, there is strategic merit to a rail solution that provides a viable alternative to road. This is particularly the case as roads along the east coast are expected to become increasingly congested over time, resulting in negative safety, social and environmental impacts.

An initial study into Inland Rail was delivered by the Australian Rail Track Corporation (ARTC) in 2010. This found that the project would be economically viable were it to commence operation between 2030 and 2035. Consequently the 2010 study recommended the project be re-examined between about 2015 and 2020, or when freight demand increases to volumes that would make the project viable.

An alternative alignment for an inland rail connection between Melbourne and Brisbane has been proposed by National Trunk Rail, a private sector proponent which provided a preliminary submission to Infrastructure Australia in 2014. Infrastructure Australia has not received a business case from this proponent.

2. Problem description

The projected increase in the Melbourne-Brisbane land freight task will require additional freight capacity in the corridor.

The current rail connection between Melbourne and Brisbane, via Sydney, cannot offer the transit times and reliability required by industry. This is largely a function of poor rail alignments and capacity constraints, particularly on the section between Sydney and Brisbane, and delays on freight transiting the Sydney metropolitan area.

The current road connection between Melbourne and Brisbane via inland NSW offers faster transit times than rail via Sydney, at lower overall costs. However, much of the road is two-lane single carriageway, with limited passing lanes. Without additional capacity, transit times on this corridor will increase as freight volumes rise.

Project description

3. Project overview

The proponent proposes construction of a new freight rail line between Melbourne and Brisbane via inland Victoria, New South Wales and Queensland. The line would be approximately 1,700 kilometres in length. It would connect with the Sydney-Perth rail line at Parkes in central NSW, providing a rail connection between Brisbane and Adelaide/Perth some 500km shorter than the current rail connection via Sydney.

The line would maximise the use of existing rail infrastructure wherever possible, while providing transit times which meet industry requirements. Around 40% of the proposed route would be constructed as new railway, or converted from narrow gauge to dual gauge in Queensland (maintaining the existing narrow gauge connections between Brisbane and regional centres). The remainder of the route would utilise and where necessary upgrade existing standard gauge track in Victoria and NSW.

The line would utilise existing standard/dual gauge connections to the Port of Melbourne and Port of Brisbane. The business case assesses these connections as having sufficient capacity for projected freight flows for at least the first decade of operations.

The project provides for 1,800 metre single-stacked trains from commencement of operation, increasing to double stacked trains within a few years and, ultimately, 3,600 metre double stacked trains as additional capacity is required in the future.

The proponent states the project would allow a maximum train speed of 115 kilometres per hour for intermodal (non-bulk) services, and 80 kilometres per hour for coal or other bulk commodities. This would provide a Melbourne to Brisbane transit time under the 24 hour transit time for intermodal services required by industry. This would realise a time saving of approximately 10 hours from the current average transit time on the coastal rail route via Sydney. The proponent identifies a cost saving of $10 per tonne for non-bulk intermodal freight travelling between Melbourne and Brisbane.

The business case provides for the development and operation of terminals, funded by terminal handling charges. This will allow operators to develop terminal capacity appropriate to their operations.

Business Case and Economic Evaluation

4. Options identification and assessment

The proponent undertook a high-level options assessment to consider a range of reform and investment options. These included:

- Reform options: A number of options were considered that could delay or avoid the need for capital investment including:
    - Undertaking reforms to improve demand management through policy and pricing mechanisms;
    - Productivity improvements through better labour and asset allocation in the freight transport sector; and
    - Deregulation of elements of the freight transport sector, including relaxation of curfews and terminal access restrictions, as well as vehicle productivity restrictions.
- Progressive road upgrades: Investment in the national highway network in the north-south corridor, including duplication of the Newell Highway and improved alignments and gradients throughout the corridor.
- Upgrade of the existing coastal rail alignment via Sydney: Investment in additional tracks and/or passing loops to provide additional capacity on the coastal route.
- Construction of a rail line connecting Melbourne and Brisbane inland from the east coast.

The proponent developed a scoring system to assess the options against a range of quantitative and qualitative criteria. The proponent determined through this process that its preferred option was construction of a rail line connecting Melbourne and Brisbane inland from the east coast.

The preferred option was then assessed against a 'do minimum' baseline scenario which assumed continued government spending for committed and funded investments, including major periodic maintenance requirements. Both scenarios (the baseline case and construction of the preferred option) assumed there would be no change to current policy settings over the life of the proposed project.

Infrastructure Australia notes that the options assessment undertaken by the proponent did not robustly consider the value for money and deliverability of the full range of options. Infrastructure Australia would prefer if the proponent could present a more complete, transparent and objective assessment of the options considered, with greater detail of the relative costs and benefits of alternative options. A full cost-benefit analysis comparing the preferred option with the principal alternative option – increased road capacity between Melbourne and Brisbane – would facilitate greater scrutiny of the relative merits of the two alternative options.

5. Economic evaluation

The proponent undertook a full cost-benefit analysis of the preferred option. The business case was developed using a 4% discount rate consistent with the proponent's terms of reference, with a 7% discount rate used as a sensitivity test. Infrastructure Australia guidelines require that a 7% discount rate be used, to better reflect the long-term opportunity cost of capital. Using the 7% discount rate and P50 capital costs, the proponent's business case (as amended in the proponent's March 2016 addendum) states that the proposed project has a BCR of 1.1.

The March 2016 Addendum also provides further analysis of the WEBs of the proposed project than was provided in the 2015 business case. The WEBs in the updated cost-benefit analysis focus on the agglomeration benefits generated by the preferred option. These include the benefits of industrial clustering around freight hubs, resulting in reduced logistics costs, and ultimately driving increases in economic output. When WEBs are included, the stated BCR using the 7% discount rate and P50 capital costs rises marginally, but is still 1.1 when rounded.

The results of the proponent's cost-benefit analysis are summarised in the table below.

	7% discount rate and P50 capital costs	**4% discount rate and P50 capital costs**
BCR excluding WEBs	1.1	2.8
BCR including WEBs	1.1	2.9

Infrastructure Australia identified a number of risks to the economic viability of the preferred option. These relate to the assumptions, demand and broader economic methodology applied in the cost-benefit analysis. The proponent conducted a number of sensitivity tests of these risks:

- Length of the future benefits stream and treatment of residual values: The business case uses a future stream of benefits approach to capturing benefits at the end of the appraisal period, consistent with relevant guidelines. Straight line depreciation was used to test the effect of not receiving an ongoing stream of benefits after 50 years of operation. This test showed a reduction in the stated BCR.
- Assumed rate of mode switching (price elasticity): The business case projected how freight switches from road to rail (price elasticity) through a stated preference survey methodology for interstate traffic between Melbourne and Brisbane. The earlier 2010 study for Inland Rail used a lower rate of mode switching based on price. Use of the lower rate showed a reduction in the stated BCR.
- Reliability characteristics for Inland Rail: The business case assumes an operational service reliability rate of 98%, with a sensitivity test at 95%. This test showed minimal impact on the stated BCR.
- Future oil prices: The assumed oil price of US$120 is in excess of current and recent forecast prices. A sensitivity test was applied to examine the impact of oil prices at US$90 based on long-run forecasts, with a corresponding decrease in exchange rate assumptions. This test showed minimal impact on the stated BCR.

- Future of the coal market: Australian coal exports are an important driver of demand for Inland Rail. A sensitivity test for the impact of changes in energy use and a decline in coal demand was applied, to test a scenario in which no coal is transported 30 years after project completion. This test showed minimal impact on the stated BCR.
- Duplication of the Newell Highway: The baseline scenario used by the proponent assumes no duplication of the Newell Highway. As the principal competing freight route, it is possible that the Newell Highway could be duplicated during the life of the proposed Inland Rail project, leading to reduced transit times for road freight vehicles. A sensitivity test was applied to assess the impact of duplication of the Newell Highway, funded through Depreciated Optimised Replacement Costs road pricing. This test showed minimal change to the stated BCR as reduced road transit times were offset by higher road prices.

While the sensitivity tests completed by the proponent have provided some assurance that the project's BCR will remain higher than 1 in most circumstances, scenarios more severe than those tested would likely result in a lower BCR.

Under a scenario in which all sensitivity factors were applied at once, the BCR was 0.9 using the 7% discount rate and P50 capital costs without WEBs, and 1.0 including WEBs. The sensitivity parameters that had the largest impact were straight line depreciation and the price elasticity assumption. Overall, Infrastructure Australia considers the assumptions, demand and broader economic methodology applied in the cost-benefit analysis to be robust. Given the low likelihood of all downside risks occurring simultaneously, Infrastructure Australia has, on balance, a reasonable level of confidence that the proposed solution would provide net positive benefits to the Australian economy.

However, given the potential impact of key risks to the economic viability of the project, Infrastructure Australia considers that the proponent should undertake further assessment and management of these risks to ensure that the project, if constructed, is able to deliver a BCR higher than 1.

Major cost items:

The major cost elements are:

- Capital costs associated with delivering Inland Rail infrastructure within the proposed 10-year construction timeframe; and
- Operating costs which have been developed based on assumed demand, comprised of costs associated with below rail operation and maintenance costs.

Total capital cost (nominal, undiscounted)	• $9.89 billion (P50) • $10.66 billion (P90)
Proponent's proposed Australian Government funding contribution (nominal, undiscounted)	The proponent is currently undertaking an assessment of funding and financing options for the project
Other funding (source / amount / cash flow) (nominal, undiscounted)	As above

Major sources of benefit

The major sources of benefit identified by the proponent include:

- Improved productivity and economic efficiency as a result of operating cost savings, shorter transit times, improved reliability, improved availability, avoided incidents on the coastal route and an additional north–south rail option to avoid incidents (80% of total benefits);

- Sustainability benefits for the community from increasing rail's share of the long-distance freight task, reducing vehicle emissions, congestion and noise (10.5% of total benefits);
- Reduced lifecycle costs for infrastructure owners and operators on the road network as a result of lower freight volumes, with reduced maintenance costs and capital investments able to be deferred (7.5% of total benefits); and
- Safety benefits for the community as a result of reducing the number of heavy vehicles on the road network (2% of total benefits).

Deliverability

The proponent has provided sufficient technical information on the project design to demonstrate that there has been adequate planning for project delivery at this stage of the process. The proponent is separately considering taxation, financing, ownership and procurement aspects of the program, including possible funding options.

A range of risks have been identified in delivering Inland Rail:

- Changes in demand, leading to a reduction in freight flows in the Melbourne-Brisbane corridor.
- Increases in project cost beyond the estimates included in the business case. Given the marginal nature of the BCR, an increase in project cost could have a significant impact on the final BCR.
- Lack of integration between operators and planning authorities in the development of appropriate terminal capacity.
- Changes to stakeholder priorities impacting on construction staging.