

Tunnelling for rail: What it really costs

The backlog of much-needed rail projects in NSW stretches back decades, along with numerous broken rail infrastructure promises including the North-West Rail Link.

Over the last ten years, cost has emerged as the most important excuse for not proceeding with rail projects.

This fact sheet debunks the cost argument. Based on comparable, and indeed more difficult, projects, it highlights the way Treasury cost estimates for rail projects in NSW have been inflated above market rates.

NSW Treasury's current cost estimate for the full North-West Rail Link (Stages 1 and 2) is a staggering \$7.7 billion or about \$366m per kilometre. By any comparison with recent overseas and Australian experience this is at least four times what the project should really cost. Strangely, when a go-ahead for Stage 1 of the project (9 km, three stations) was announced in 2007, the cost estimate was \$700m. This argues that a realistic cost of the full 21 km project would then have been around \$1.6 billion.

Treasury's current estimate follows the position of NSW Treasurer, Eric Roozendaal. In a 2009 advertisement (co-signed

by peak NSW business groups) the Treasurer put pressure on the Commonwealth Grants Commission to give a greater cut of federal revenue to NSW on the basis that the state had special infrastructure needs and "tunnelling through Sydney sandstone costs \$400 million a kilometre" (Advertisement, Sydney Morning Herald, 29 September 2009).

This is worse than misleading. Tunnelled rail projects, whether in the ideal medium of Sydney sandstone or the more challenging soft rock, or even sand, typically come in for \$100m per kilometre or less. Here are some compelling examples ...

Case 1

Gotthard Base Tunnel

\$90m per km

With tunnelling completed and fit-out for high-speed rail underway, the Gotthard Base Tunnel is, at 57 km, the longest in the world. It runs under the Swiss Alps between Berne and Valais. It's actually twin 9.5m diameter tunnels, so the total length of rail tunnel is about 114 km, but there's also 38 km of access tunnels, plus crossover chambers and two large emergency evacuation stations. Because the twin tunnels will be used by high-speed trains travelling at 250 km/h they can each carry only one track, but being around the same diameter as Sydney's Airport Line tunnel they could easily accommodate two conventional standard gauge suburban rail tracks.

The Gotthard Base Tunnel is a vastly more challenging undertaking than the North-West Rail Link. Final cost after complete fitout is expected to be \$10.2 billion. This means an equivalent per km single tunnel cost of \$90m per km. In other words, if the Swiss were building the North-West Rail Link it would come in for much less than \$1.9 billion.

Case 2

Airport Rail Line

\$100m per km

Completed just in time for the 2000 Sydney Olympics the ARL tunnel is eight km long and the world's fourth-largest diameter bored tunnel. Because much of the route is below the water table – six km of the job was through saturated sand – it was mostly constructed using a giant tunnel-boring machine (TBM) and involved state-of-the-art techniques. There are five stations and construction of four of them was an unusual and difficult engineering task. Most accounts put the total cost at \$800m.

Case 3

Caracas Metro

\$90.2m per km

A new 12.3 km section of the Caracas, Venezuela, metro system, was completed in 2004 at a cost of \$1.1 billion. If the Venezuelans were building the North-West Rail Link it would come in for \$1.9 billion.

Case 4

Estimate for Melbourne-Brisbane Inland Rail Alignment tunnels

\$55m per kilometre plus fitout

A detailed 2008 cost-assessment for a proposed inland rail line from Melbourne to Brisbane, developed by consultants Parsons Brinkerhoff, Connell Wagner and Halcroft for the Australian Rail Track Corporation settled on a standard estimate of \$55m per km for 9.3m diameter tunnel construction*. The estimate was based on recent Australian experience. Conservatively, the consultants assumed that tunnels would have to be lined because of poor geological conditions. The estimate did not include fitout – track laying, signalling and power supply. It is clear that tracklaying would add not more than \$5m (and more likely \$1-3m) per track kilometre to the basic tunnel price. Of course this estimate does not include the construction of stations which would be a feature of an underground suburban railway but it makes clear that a robust rule-of-thumb for a fitted-out two-track rail tunnel is \$100m per kilometre or less.

* Melbourne-Brisbane Inland Rail Alignment Study, Working Paper No. 3, Stage 1 Capital Works Costings. Available on the web at: <http://www.artc.com.au/library/IRAS%20WP3%20Stage%201%20Capital%20Works%20Costings%20090505.pdf>

Inquiries: 0417 674 080

EcoTransit Sydney, February 2011