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**Canberra Capital Metro Full Business Case**

**Review by Professor Roger Vickerman**

1. This Independent Review was commissioned by CMA in order to assess the soundness of the methodology used to develop the Business Case for the Capital Metro project. The Review focuses on the broad approach to the Business Case, rather than an audit of the detailed data or values used.
2. The Capital Metro project is a project to construct an initially self-contained tramway or light rail line (LRT) along a 12km corridor between Canberra City Centre and Gungahlin, a northern suburb. The project has four stated key benefits: transport benefits arising from reduced congestion and time savings; sustainable urban redevelopment arising from changing densities of urban development; contributions to economic growth; enhancement of the urban landscape. It is envisaged that the project will be created through a PPP vehicle and indicative parameters and costs are given.
3. The overall conclusion of this Review is that the methodology used is a sound one and provides a reasonable estimate of the likely impact of the project on the transportation system and economy of the proposed corridor and the Canberra region more widely. It raises a number of issues, which might be helpful in refining the case, but does not question the overall soundness of the business case for the project. It could be argued to be more likely that the case as presented underestimates the final impact due to unquantified factors or changes in behaviour occasioned by the project.
4. Traditional business cases for transport projects focus solely on the transport benefits arising to users of the new facility, plus benefits to users of competing facilities resulting from the transfer of users from one mode or facility to the new one.
  - a. These benefits are usually estimated separately for the gains from existing travellers and those from new travellers (generated traffic) for whom the cost of a journey was previously too high. This improved accessibility may particularly be of benefit to lower income users. The key value in

these estimates is the value of time-savings. The business case for Capital Metro uses standard Australian values of time-savings for public transport and automobile users. What it does not do is differentiate values of time-savings by journey purpose, but since most journeys by the LRT are likely to be for commuting or various non work purposes rather than in course of business this is not likely to introduce any significant bias.

- b. Additional transport benefits to users arise from the increased reliability of the service compared with the existing levels of congestion, and more particularly with forecast future levels of congestion as population on the corridor is forecast to increase. The business case correctly identifies the do-nothing base case as the situation that would obtain in the future in the absence of the new LRT line.
- c. Transport benefits also accrue to both users and non-users from the increased sustainability of the LRT line compared with automobile use. The reduction in emissions contribute both to meeting national targets for the reduction in greenhouse gases and improvements to public health. The former are measured, but the latter are not measured explicitly. The reduction in particulate emissions would be an additional source of public health benefits and this could be one source of additional unidentified benefits. Further public health benefits may arise from lower accident rates and reduced stress. But there needs to be care taken here as these benefits may already be taken into account in the direct willingness to pay of users; identifying any additional public benefit is largely an assumption.
- d. The implied mode shift is seen as a direct benefit in making the overall transport situation in the city more sustainable. These benefits are however largely captured in the direct benefits. The LRT is assumed to replace buses along the corridor meaning that journeys starting off the corridor may have imposed an additional penalty of requiring passengers to change from bus to LRT. Similarly car journeys using park-and-ride which replace direct journeys may incur a similar additional penalty. We know that users generally value waiting and transfer times more highly than in-vehicle times. Networks which have imposed such a need to transfer have faced difficulties, e.g. the Tyne and Wear metro in the UK and TransSantiago in Chile.
- e. Perhaps more problematic is the largely unknown question as how far introducing a completely new transport option will change people's behaviour. Generally transport models use parameters from existing revealed behaviour supplemented by evidence from stated preference models. These are quite good at predicting behaviour from marginal changes to network performance, but less good where the changes are non-marginal. There is significant evidence of the underperformance of rail systems against forecast from systems around the world, but also evidence that tram and LRT systems outperform guided busways with similar characteristics. It can reasonably safely be argued that the proposed single line system is not such a major change as to expect a wholesale change in behaviour, but there might be an argument that taking a line by line approach to what is intended to be ultimately a larger system may distort the overall evaluation.

5. Urban development benefits arise from the assumption that LRT will facilitate urban densification. This has two major effects, one is the reduction in the costs of providing urban services to higher density communities, the other is the increase in productivity arising from the agglomeration effects from higher density employment.
  - a. Densification is a difficult argument because it is not always clear that the causality is from transport provision to densification. Transport facilities such as LRT are typically associated with denser developments since these are usually necessary to ensure the levels of ridership needed for economic operation of infrastructure intensive modes such as LRT. Reference to similar projects elsewhere needs some clarification, as there is typically a need for complementary policies to achieve the higher levels of population density. In fact relevant accompanying planning and land use policies are usually essential to maximise the benefits from new transport projects.
  - b. There is a secondary argument relating to making more developable land available and thus preventing upward pressure on land values or rentals. This, sometimes known as the 'unlocking effect', could have a value in keeping locations in Canberra competitive.
  - c. There is an argument that the agglomeration effects might more properly be handled under the economic impacts associated with growth since they are associated with labour market impacts leading to high effective employment densities. It might be useful to clarify the spatial distribution of jobs associated with the LRT line.
  - d. The wider economic impacts calculated here follow the guidance used in the UK, which is probably the most sophisticated currently used. This involves estimating the productivity gain associated with increased agglomeration, as measured by effective employment density. Employment density depends on the distribution of the labour force relative to each location and the elasticity of this with respect to changes in accessibility costs. The estimated productivity gains depend on the elasticity of output with respect to effective density. This varies sector by sector with business and financial services often shown to have the greatest elasticities, much larger than those for manufacturing. Employment structure by sector is thus important. The problem is knowing the value of these elasticities which have also been shown to be highly variable through both time and space.
  - e. As well as the agglomeration effects through increased density, lowering the generalised costs of transport may also have an effect on price-cost margins in imperfectly competitive markets. The business case follows the UK guidance in making an arbitrary allowance of a 10% uplift to allow for this in the absence of detailed information on such margins (and hence the degree of imperfect competition) sector by sector in particular locations. It is not immediately clear that this is appropriate in this case given the size of the public administration sector, which offers less scope for such gains from reducing the transport cost barrier to competition. This has a relatively small impact, but might be worth some further consideration.

6. The main economic gains are seen to be the benefit from enhanced business opportunities and growth in employment. Part of this is about construction, which clearly has a non-negligible impact in the short to medium term. But part is argued to be the growth and diversification in employment that arises from the ability to develop areas along the corridor.
  - a. The standard argument about employment effects has two dimensions. One is that participation rates may rise as a result of lower commuting costs. The other is that more competition for jobs across a wider area leads to better sorting, matching jobs to skills more efficiently.
  - b. However, here there is a further argument made about the creation of additional floor space along the corridor. Care needs to be taken in presenting these arguments that it is made clear that no double counting is taking place as the changes in land and rental values are simply another way of looking at the direct transport benefits to users. These changes may, however, be useful indicators of the way the new line might promote new developments. There may be an additional factor above and beyond these direct benefits due to imperfect competition in the market for land/floorspace, but this may be hard to identify.
  - c. The better sorting argument is linked here to a push for diversification of the Canberra economy leading to more private investment. This could be regarded as a rather tenuous argument to link this directly to the provision of the LRT line. It may be better argued that the LRT line as part of a package of measures will contribute to achieving this goal.
  - d. Implicit in the labour market and land value argument is the tax wedge argument. As a result of changes in both labour and land markets leading to higher values arising from the improved transport government tax revenues may rise. It has been argued that rising land values in proximity to LRT stations should be taxed as part of a land value capture exercise which may prevent the wider economic benefits from agglomeration simply being appropriated by land owners when they could be used to lever the wider benefits. This argument seems to be well covered in the business case.
  
7. One interesting additional source of benefits explored in the business case is the value ascribed to enhancing the corridor as an entrance to Canberra. This is partly a further element of the land values argument and is a further area where double-counting needs to be avoided. There may be some confusion in the use of the term benefits, which appears to be used here to refer to a more general concept than the precise valuation of monetary benefits in the cost-benefit analysis. I wonder if the more neutral term wider impacts might be better to avoid the impression that these are quantified benefits equal in value to those in the transport and quantified agglomeration benefits. But it does raise interesting questions about visual perception and the measurement and monetary valuation of this remains an area of some speculation. It raises two questions: first is the appropriate physical measure of visual attraction and secondly the value which can be ascribed to this. On the first element UK practice simply ascribes an indicator based on largely subjective judgment as to whether this is a small or large effect, and avoids any monetary valuation. Clearly the argument here is not so much about the visual impact itself, and often this has been argued to be

negative because of the possible cluttering of the streetscape by overhead line equipment, but about attracting new investment. I have some doubts about the ability to identify a separate impact of this, and about the linking of this directly to the LRT development as one of its benefits.

8. Cost benchmarking has generally proved difficult in projects such as these as despite the number of LRT systems, and the intent to buy tested technology, each system is essentially unique. This is one of the reasons for ensuring that adequate allowance has been made for optimism bias as well as other identifiable sources of risk. Appropriate sensitivity testing with quite wide variation seems to have been carried out. The real discount rate of 7% is clearly a standard public sector value, although it does seem to be on the high side in comparison with the discount rates used in other developed countries, e.g. in Europe in recent years. The effect of this is demonstrated when the UK value of 3.5% is used together with a more optimistic assumption for rising values of time through time; the BCR increases from 1.2 to 1.7.
9. There is an ambiguity in the presentation of the calculation of the BCRs (Table 29). Excluding the WEIs of A\$198m, transport and land use benefits sum to A\$786, compared with project costs of A\$823, implying a BCR of 0.955 (i.e. <1.0, but =1.0 when rounded to 1 decimal place). With the WEIs the BCR is as stated 1.2. The latter figure may be the more relevant, albeit still fairly marginal, but I think a reference to the rounding may be desirable.
10. The delivery model proposed raises a number of issues. These relate principally to the effect of a move to a PPP type of provision rather than as a public sector procurement project. This affects both costs and risks. A whole chapter is devoted to this although it is not strictly part of the business case for the project, but failure in the delivery could affect the ultimate outturn of the project so it is reasonable to include some discussion of it. Failure in delivery can result in a private sector partner seeking to review the contract in the light of unforeseen risks outside the partner's control or the public agency wishes to terminate due to non compliance by the private partner. This may be more problematic in a situation as envisaged here where the public agency sets fares and there is no revenue risk to the private sector. Clearly there is a need for careful negotiation of the contractual terms as the public sector might be exposed.
11. The overall conclusion of this Review is that a careful and robust appraisal of the project has been undertaken suggesting that reasonable confidence can be held in the Business Case as presented. The core analysis of the Business Case follows best practice in the assessment of the core transport benefits and goes further in incorporating an assessment of potential wider economic benefits of the project. The Report also identifies a number of relevant impacts which go beyond the strict Business Case, but which it is reasonable to raise. Care needs to be taken that these are clearly identified as additional impacts, which may give rise to potential benefits, but not quantified benefits as in the substantive Business Case.