Urban Congestion – The COAG Review

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1 Introduction

At its April 2007 meeting, the Council of Australian Governments (COAG) released, and responded to, the Review of Urban Congestion Trends, Impacts and Solutions, that it had commissioned in February 2006. The Review was a cooperative effort by the three levels of government to improve urban congestion management in Australia in the face of rising congestion pressures. The task was complex on a number of levels, involving difficult economic, technical and policy questions; multiple governments, agencies and viewpoints; as well as a tight timeframe. In response, the Review introduced a number of innovations to economic analysis, policy development and governance of national cross-jurisdictional initiatives. These are addressed in this paper. The paper discusses the:

- background to the Review and its governance;
- methodology and results from the new congestion cost projections undertaken for the Review by the Bureau of Transport and Regional Economics (BTRE);
- key findings and outcomes from the Review;
- subsequent decisions by COAG and the Australian Transport Council of Ministers, and how these are being implemented; and
- conclusion and way forward.

2 The Review and its governance

The Review's main purpose was to assist COAG to meet its commitment, made in February 2006, to reduce current and projected urban transport congestion, building on the considerable efforts made by states and territories over recent years.

It was important for the Review not to let questions about potential funding issues impede rigorous analysis and development of better approaches to manage urban congestion. Accordingly, there was an explicit decision at the outset to undertake the Review and progress any actions emanating from it within the current division of jurisdictional responsibilities. This included joint responsibility for the AusLink network and state responsibility for urban public

transport and the remaining urban network. This decision freed the Review to focus its efforts on the shared interest of governments to improve congestion policy, planning and management measures.

COAG focused the Review on improving the economic performance of national urban corridors (the AusLink urban network) and improving productivity outcomes from urban transport. The focus on the AusLink Network recognised the importance of this network to all levels of government, the economy and the efficient functioning of Australia's capital cities. The interaction of this network with broader transport networks was accommodated within the Review by examining local networks where they interacted with, and impacted on, national corridors.

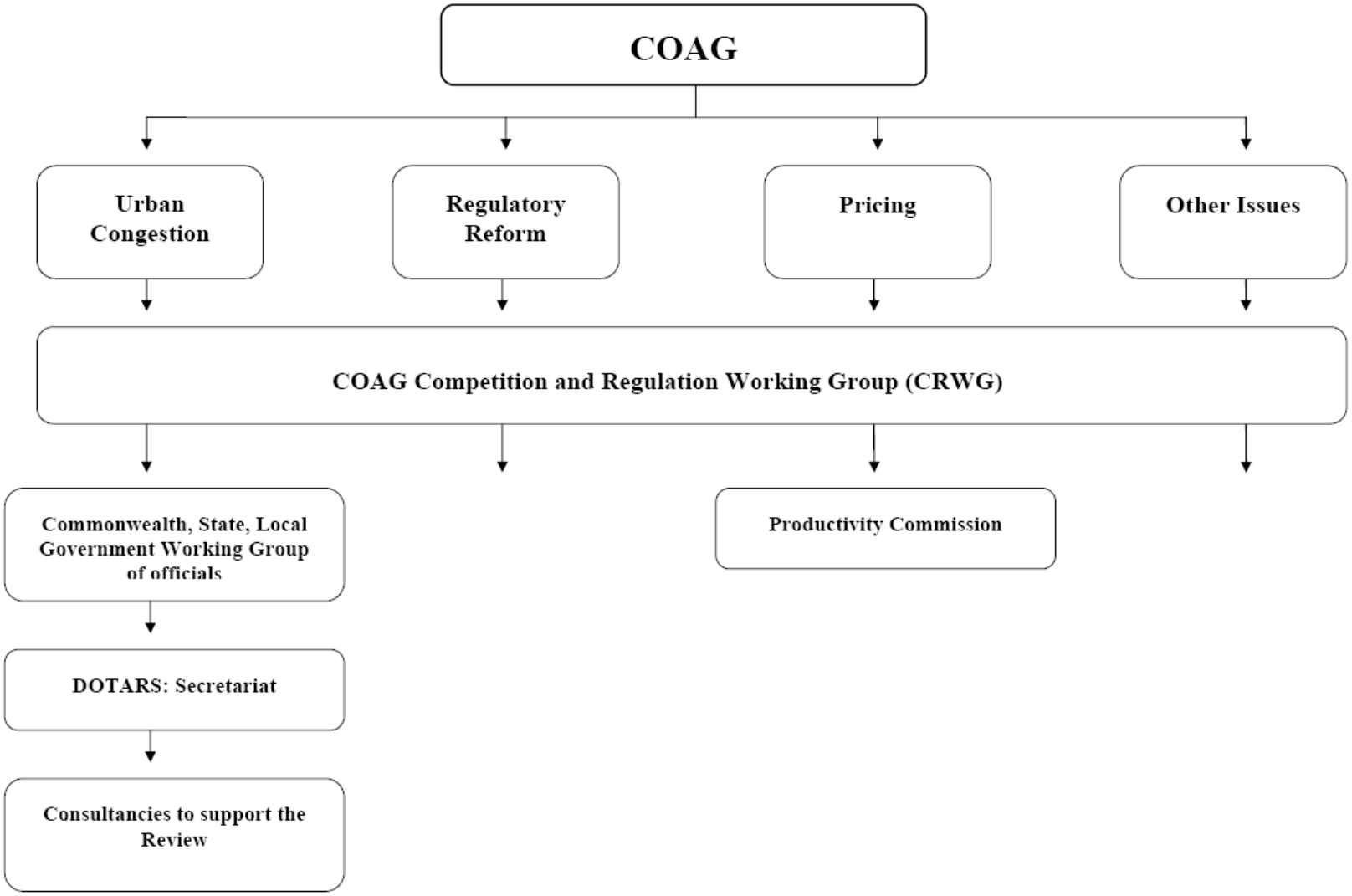
In summary, the Review was tasked with:

- examining the main current and emerging causes, trends and impacts of urban traffic growth and congestion;
- examining and assessing the key characteristics and impact of successful congestion management approaches and initiatives, domestically and overseas; and
- identifying information deficiencies and making recommendations regarding collection and sharing of nationally consistent data.

COAG asked for the Review to be completed by December 2006, providing less than 12 months for it to be undertaken and receive the necessary jurisdictional clearances. That the Review was completed to schedule, including managing a number of consultancies, is testimony to the level of cooperation between participants, and the effectiveness of the governance arrangements.

The Review was overseen by a high-level working group of officials from Commonwealth, state and territory central agencies, and the Australian Local Government Association. This group helped ensure a whole-of-governments approach to the task. The Review was undertaken by a working group of representatives from transport, infrastructure and planning agencies of all levels of government. This working group brought a range of perspectives, experiences and skills to the Review. The working group's membership drew from the pre-existing Standing Committee on Transport's (SCOT) Urban Congestion Management Working Group (UCMWG). This arrangement facilitated the conduct of the Review, in terms of quality inputs and deliberations, management of consultancies, timeliness and liaison between the numerous parties involved. The Australian Government Department of Transport and Regional Services provided the Secretariat to the Review, as well as chairing the SCOT Urban Congestion Management Working Group. The Secretariat also included officers from State agencies (see Figure 1).

FIGURE 1 COAG REVIEW GOVERNANCE ARRANGEMENTS



To assist the Review in examining specialised technical issues, a number of projects and consultancies were undertaken. These covered new projections of urban congestion costs in Australia (2005-2020), traffic management systems, freight transport behaviour change, public transport, land use planning, infrastructure and service pricing in travel demand management, and a high-level assessment of successful congestion management approaches in Australia and overseas. Funding and management of the consultancies were shared between the agencies participating in the Review and coordinated by the Secretariat. The congestion costs project was undertaken by the BTRE and subsequently published as Working Paper 71, *Estimating Urban Traffic and Congestion Cost Trends for Australian Cities*. Most of the other consultancies and the Review report were released publicly by COAG in April 2007 and can be accessed through the BTRE website (www.btre.gov.au). The following section outlines key elements and outcomes of the BTRE congestion costs study undertaken for the Review.

3 BTRE traffic and congestion growth trends

3.1 Traffic growth trends

Cars form the largest component of traffic in our cities.

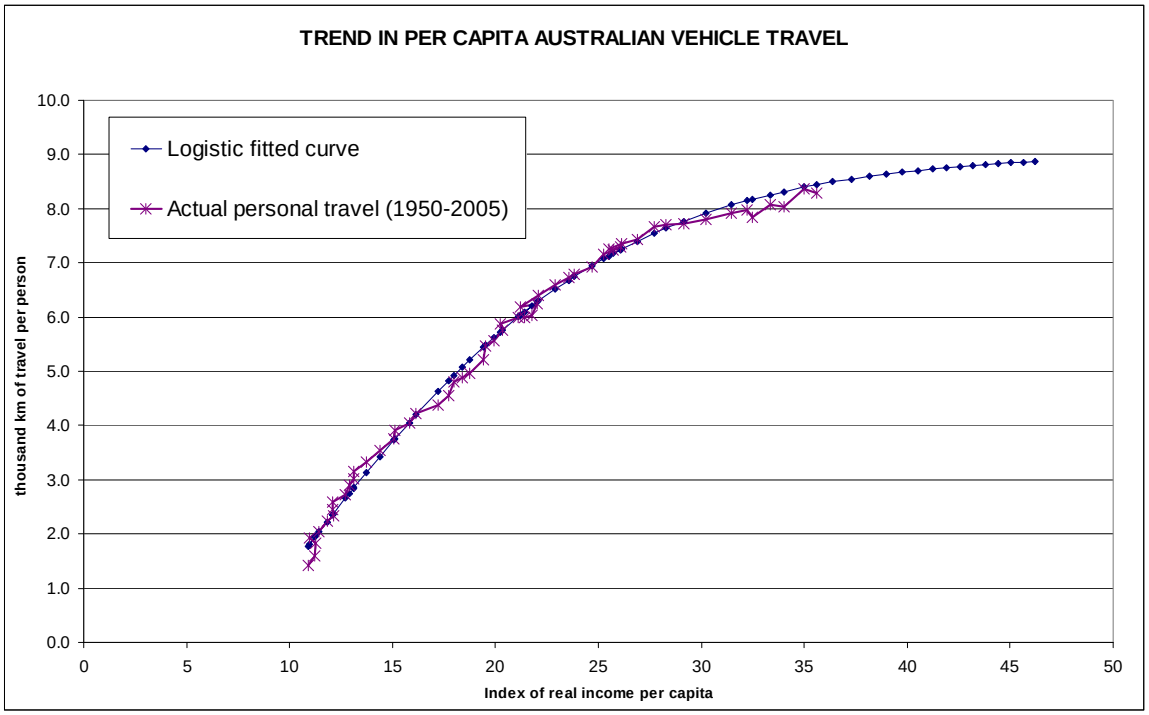
Given the comparative constancy of the expected UPT mode share in each city (including Perth after the addition of the southern railway), essentially it is possible to forecast car traffic growth relatively independently.

A simplifying framework for explaining car traffic (vehicle kilometres travelled or VKT) is the following:

Car traffic = Car travel per person × Population

The advantage of this formulation is that, for Australia, it turns out that car travel per person has a simple relationship to economic activity levels. The trend in per capita car travel (kilometres per person) in Australia has in general been following a logistic (saturating) curve against real per capita income – measured here by real Gross Domestic Product (GDP) per person (see Figure 2).

FIGURE 2 HISTORICAL TREND IN ANNUAL PER CAPITA PASSENGER VEHICLE TRAVEL VERSUS REAL AUSTRALIAN INCOME PER CAPITA



Source: BTRE (2002, 2003a), BTRE Estimates.

Here, then, we have the basis for understanding the relationship between car traffic and economic development. As incomes per person increase, personal car travel per person has also tended to increase, but at a slowing rate over time. In other words, more car travel is attractive as incomes rise, but there reaches a point where further increases in per capita income elicit no further demand for car travel per capita. The assumed base case rate of GDP growth of around 2.7 per cent per annum over the 15 years from 2005 to 2020, implies that Australia-wide per capita car travel should level out at around 8900 kilometres per person by 2020 – about a 6 per cent increase on 2005 (and about 10-12 per cent over the somewhat *below trend* 2001 to 2003 levels). After 2020, growth attributable to car travel per person will probably effectively cease. Thus by 2020, the growth rate of car travel should have fallen to the rate of population growth – expected to be less than one per cent per year in our capitals by that date. Overall, the growth in car traffic in our capital cities is expected to be on the order of 24 per cent over the 15 years to 2020.

Even though personal passenger travel exhibits a saturating trend over time, there is, as yet, no sign of approaching saturation in per capita freight movement in Australia. The 15-year growth of 90 per cent is expected for both articulated trucks and light commercial vehicles (LCVs). However, articulated trucks form a very small part of the traffic stream. Thus, except in localised areas, it will be articulated trucks that

will be affected by growing congestion, rather than the other way around.

The same cannot be said for LCVs, which form a significant part of the current traffic stream. Their assumed fast growth is the major factor responsible for lifting the expected 15-year growth in total traffic to 34 per cent from the 24 per cent coming from cars alone.

The combination of slowing absolute growth from cars combined with continued exponential growth (mainly) from LCVs, results in expected growth in total traffic that is approximately *linear* over the full period from 1990 to 2020.

These projected growth rates mean that *the same absolute volume of traffic will likely be added to our capital city roads in the next 15 years as was added in the past 15.*

3.2 Congestion growth trends

The growth in traffic in the past 15 years has resulted in additional congestion, but the increase has been moderated by three main factors:

1. Significant additions to capacity (in the form of motorways, freeways, tunnels, new roads at the fringes, etc.) for many cities;
2. Increasing intelligence built into the road network (e.g. loops in the road controlling intersection lights); and
3. Peak spreading.

BTRE modelling of congestion cost trends for COAG assumed that the first two of these factors would continue to operate over the 15 years to 2020. Specifically, the modelling assumed that the effective capacity of the city networks would increase by about 1 per cent per year (16 per cent over the 15 years) due to the operation of the first two factors. In addition, the models automatically generated further degrees of peak spreading.

The models themselves were aggregate models, as opposed to the detailed road-by-road network models used by several of the cities. Nevertheless, they were disaggregated in the following ways:

- by weighted type of road
- by time of day
- by business vs private travel
- by type of vehicle.

Congestion imposes significant social costs – with interruptions to traffic flow lengthening average journey times, making trip travel times more variable and making vehicle engine operation less efficient. The BTRE modelling was designed to include four main cost of congestion elements:

- extra travel time (e.g. above that for a vehicle travelling under less congested conditions),
- extra travel time variability (where congestion can result in trip times becoming more uncertain - leading to travellers having to allow for an even greater amount of travel time than the average journey time, in order to avoid being late at their destination),
- increased vehicle operating costs (primarily higher rates of fuel consumption), and
- poorer air quality (with vehicles under congested conditions emitting higher rates of noxious pollutants than under more freely flowing conditions, leading to even higher health costs).

The extra travel time component was calculated by reference, not to free flow speeds, but to an optimal travel time. Free flow speeds are the speeds one could typically average travelling across the city in the middle of the night. Such quick travel times are not realisable in actual day-time flows and so calculating 'delay' as the difference between congested travel times and these unrealisable (in daytime) travel times results in inflated estimates of the 'cost of congestion'. A better reference speed to use in calculating the delay due to congested conditions is the 'optimal travel time', which is the travel time that would result if appropriate traffic management or pricing schemes were introduced and optimal traffic levels were obtained. The delay obtained from comparing actual congested travel times to this more realistic base level is about half that obtained using 'free flow' travel times as the base.

The net cost of actual urban traffic levels above the optimal amount of travel (after converting hours lost to delays into dollar terms) is given by what is called the deadweight loss (DWL). Avoiding this loss due to congestion would produce a net social benefit – leading to the common descriptions of such DWL values as a measure of the '*cost of doing nothing about congestion*', or the '*avoidable cost of traffic congestion*'. This is the measure used to generate the estimates of congestion costs that follow.

BTRE *aggregate* congestion estimates for this study give a total of about 9.39 billion dollars for the 2005 social costs of congestion[1] (on the basis of *potentially avoidable costs*, calculated from the deadweight losses associated with current congestion levels across the Australian capitals). This total is comprised of approximately $3.5 billion in private time costs (losses from trip delay and travel time variability), $3.6 billion in

[1] In estimated costs to Australian economic welfare, and not in terms of measured economic activity or gross domestic product (and therefore not directly referable to as a proportion of GDP).

business time costs (trip delay plus variability), $1.2 billion in extra vehicle operating costs, and $1.1 billion in extra air pollution damage costs. The national total is spread over the capital cities, with Sydney the highest (at about $3.5 billion), followed by Melbourne (with about $3.0 billion), Brisbane ($1.2 billion), Perth ($0.9 billion), Adelaide ($0.6 billion), Canberra ($0.11 billion), Hobart ($50 million) and Darwin ($18 million).

BTRE aggregate projections (using the base case scenario for future traffic volumes) have the avoidable social costs of congestion more than doubling over the 15 years between 2005 and 2020, to an estimated $20.4 billion. Of this $20.4 billion total, private travel is forecast to incur time costs of approximately $7.4 billion (DWL of trip delay plus trip time variability), and business vehicle use $9.0 billion (DWL of trip delay plus variability). Extra vehicle operating costs contribute a further $2.4 billion and extra air pollution damages a further $1.5 billion. The city specific levels rise to approximately $7.8 billion for Sydney, $6.1 billion for Melbourne, $3.0 billion for Brisbane, $1.1 billion for Adelaide, $2.1 billion for Perth, $0.07 billion for Hobart, $35 million for Darwin, and $0.2 billion for Canberra.

4 Key findings and outcomes from the Review

The Review report made a number of findings and proposed a way forward. These are discussed in this section.

4.1 Key findings

- Each city has a unique set of circumstances. Consequently, congestion responses need to be tailored to each city. However, there are also issues of cross-jurisdictional impact and importance where joint action by governments would deliver more effective outcomes than separate actions by individual governments.

- Improvement in Australia's response to managing growth in urban congestion costs, including on national urban corridors, is warranted and achievable; economically, socially and environmentally.

- There is no easy 'silver bullet' solution to the forecast growth in Australia's urban congestion, including on national urban corridors. The most effective responses will entail the packaging of measures for specific urban corridors and networks. Packages should incorporate complementary supply and demand-side measures (including both 'carrots' and 'sticks'); and short, medium and long-term elements, with the flexibility for elements' timing to be adjusted in response to changes in need over time.

- A consequence of supply-side measures, including new infrastructure, is the 'induced demand' effect, where improved travel conditions generate additional traffic, eroding the size and longevity of the original benefits for existing travellers. Consequently, measures to manage the 'induced demand' effect should be included in any package.

- While congestion is manifested on particular sections of road or rail, it has a range of causes not related solely to the adequacy of congested links of the transport network. A broader approach, which addresses demand drivers as well as the capacity of transport infrastructure, is needed to ensure that congestion is not simply shifted from one location or time of day to another.

- People and industry do voluntarily adjust their behaviour to avoid congestion or adapt to it, eg by adjusting travel times, and accordingly accrue benefits by avoiding the most congested periods. However, there are limitations to the extent of 'natural adjustments' and behavioural changes need to be reinforced and supported.

- An incremental and sustained approach to ramping up Australia's approach to managing congestion is likely to be the most effective way forward. This will be dynamic and will evolve as challenges change on each urban corridor. It will involve careful monitoring so that new measures are introduced or modified as required in line with changes in demand, build on the tangible achievements and lessons of earlier measures, and constitute a sustained congestion management strategy implemented over an extended timeframe.

- There is a dearth of sound Australian *ex-ante* and *ex-post* evaluations of individual congestion management measures. There are also serious gaps in congestion-related data and performance information. These weaknesses need to be resolved in order to understand objectively how individual measures and broader policies are progressing, and the improvements they are achieving. This is essential to underpin successful congestion management efforts.

4.2 Way forward

The Review drew on both the expertise of the agencies involved in the Review and the consultancies to identify 25 action strategies for the consideration of jurisdictions. These cover: traffic management; freight, commercial and service vehicle management; passenger travel demand management; public transport; integrated transport and land use planning; road demand management; and data and monitoring. The action strategies were designed to add value to current

measures being used in Australia, or to reinforce cutting edge approaches, rather than replicate existing practice. For example:

- with traffic management the emphasis is on building intelligence into major infrastructure, and using it in an integrated fashion to manage whole corridors and networks to meet agreed network and corridor objectives;

- with service vehicle traffic (eg public utilities, residential and commercial repairs, and couriers etc), represented by the high growth of light commercial vehicle traffic reflecting the growing service orientation of the economy, the focus is first on finding out a lot more about the drivers of these movements, before examining options to reduce their congestion impact;

- with land use, the Review proposed joint strategic transport/land use objectives be formulated to guide developments along major corridors, and that developments be subsequently monitored to identify where productivity and efficiency objectives are being compromised by these developments so relevant remedial action can be taken;

- the Review also proposed some options for taking forward the pricing debate in a practical way, eg by developing principles for variable tolling regimes and undertaking pilot projects.

The Review concluded by proposing two streams of activity to improve congestion management, drawing on the action strategies it had proposed: jurisdiction-specific action and joint progression of issues of cross-jurisdictional impact and importance.

5 COAG and ATC decisions

COAG considered the Review report at their meeting in April 2007, and agreed *inter alia*:

- Jurisdictions will develop and implement their own specific responses to urban congestion, drawing on the action strategies as appropriate and adhering to the principles set out in the Review, both on and off the AusLink National Network; and

- ATC will establish arrangements to improve urban congestion data, modelling and performance information for decision-making and report to COAG on progress by June 2008.

At their May 2007 meeting, ATC tasked the SCOT UCMWG with bringing forward for consideration at the November 2007 ATC meeting:

- measures to improve urban congestion data, modelling and performance information for decision-making; and

- additional high value issues of cross-jurisdictional importance which could be progressed jointly by ATC through a small number of trials and case studies, eg; modifying urban supply chain behaviour to avoid periods of peak congestion and improving efficiency of service vehicle movements.

6 Conclusion

The COAG Urban Congestion Review has been a successful initiative in inter-jurisdictional cooperation and policy in an area of increasing economic, environmental and social challenge to Australia. It rigorously built the case that urban congestion is a national issue and the costs of urban congestion are likely to rise substantially unless Australia's approach to congestion management is improved. It argued that the costs of congestion affect all levels of government and require all levels of government to cooperate more effectively than in the past in order to meet the challenges. It also proposed a range of initiatives that could be adopted by jurisdictions to improve congestion management.

Both COAG and the Australian Transport Council of Ministers have responded positively to the Congestion Review and initiated valuable work to improve policy, planning and practice in congestion management.

The inter-jurisdictional work on congestion management complements other initiatives such as the National Guidelines for Transport System Management in Australia and development of AusLink corridor strategies, which together are helping improve transport infrastructure planning and management at the national level.

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