

An aerial photograph of Melbourne, Australia, showing the city skyline, the Yarra River, and surrounding urban areas. The text is overlaid on the right side of the image.

MELBOURNE BEYOND 5 MILLION

GETTING BETTER
AS WE GET BIGGER

VOLUME THREE

PHYSICAL INFRASTRUCTURE
AND CONNECTIVITY

OCTOBER 2010

This is the third in a series of volumes that define the outcome of the Committee for Melbourne's 2010 Shaping Melbourne Taskforce.

Shaping Melbourne follows previous Committee for Melbourne taskforces on associated topics including Melbourne's Transport, Higher Education and Climate Change challenges. More than 160 members of the Committee have been involved over a 12 month period in the Shaping Melbourne Taskforce's deliberations.



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SECTION

INTRODUCTION

INTRODUCTION

In 2010, Melbourne is a thriving, cosmopolitan city that will only continue to grow. Our ongoing challenge, therefore, is to ensure that we get better as we get bigger.

In volumes one and two of this *Melbourne Beyond 5 Million* series, we have explored the importance of governance and effective decision-making in making our city the very best it can be, and examined the pressing issues of density and the creation of localised economies to help positively shape our city as it heads well beyond five million.

Here in volume three, we turn our attention to the physical infrastructure and connectivity challenges that we must meet and overcome today, tomorrow and well beyond to deliver a world-class city of the future.

There is little doubt that quality infrastructure is the spine of every great, successful and effective city. With this firmly in mind, the primary aim of this volume is to methodically assess the condition of our current infrastructure, make informed and objective observations and, most importantly, provide constructive and considered recommendations for future oversight of, and planning for, Melbourne's growing infrastructure needs.

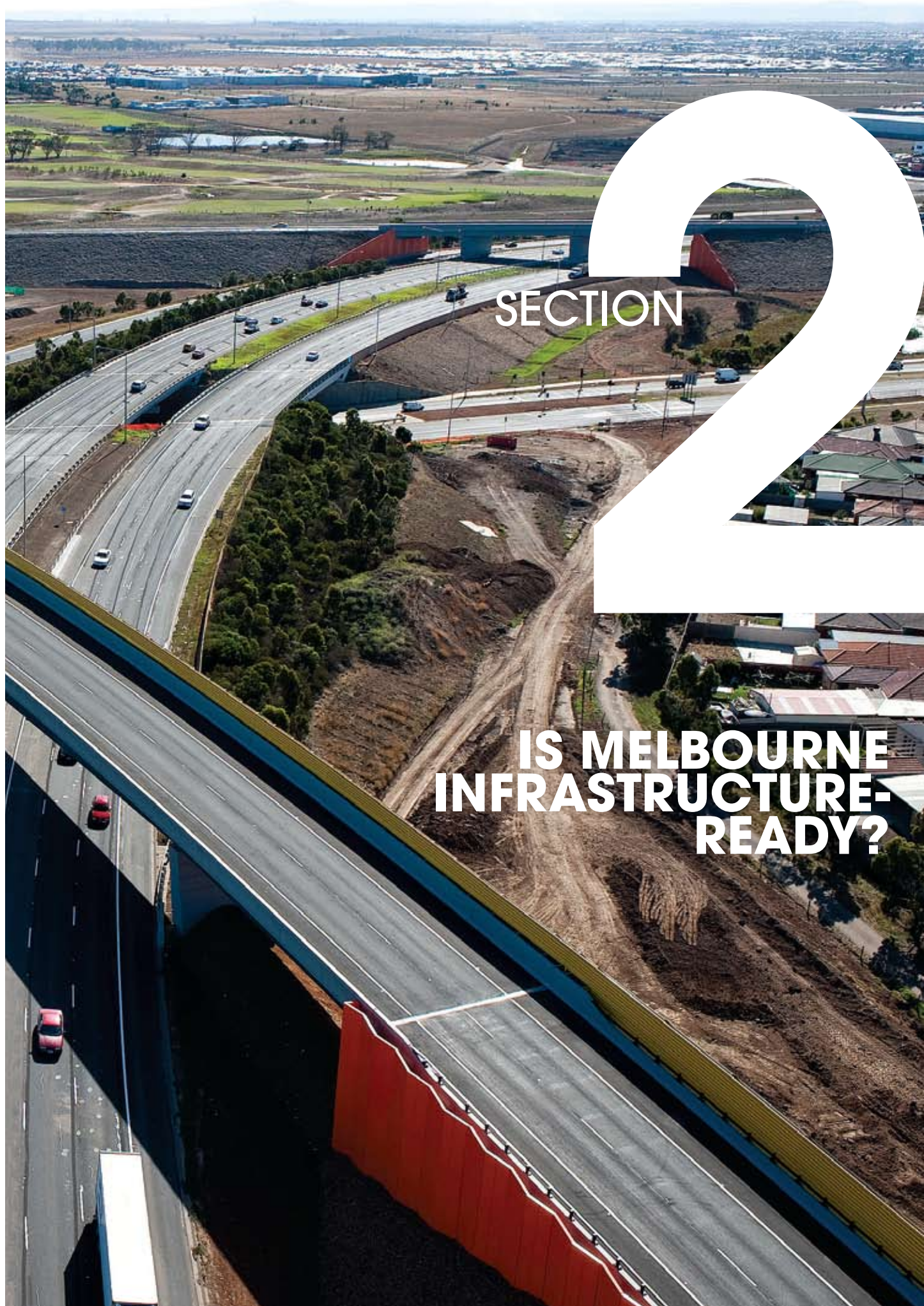
Throughout this volume we examine physical infrastructure, including transport, water, energy and communications, and comment on community infrastructure, such as hospitals, schools and libraries. We recognise that both infrastructure categories have their own valuable role to play and firmly believe that both require more focused consideration and fresh, innovative ideas to adequately support Melbourne beyond a population of five million.

Melbourne has an optimistic future – we're a city on the move and a vibrant, flourishing, envied epicentre. However, to support this future we also need to furnish and complement the city's vision with appropriate and achievable plans.

How we plan the growth, sustainability, nature and make-up of our infrastructure is arguably one of the most important decisions we currently face and we trust that this volume will inspire discussion, generate awareness and motivate action.

We agree that Melbourne must get better as it gets bigger. So, let's plan for it.





SECTION

**IS MELBOURNE
INFRASTRUCTURE-
READY?**



INFRASTRUCTURE-READY

CAPACITY

Melbourne's significant growth during the past 150 plus years has only been made possible through continuous substantial investment in urban infrastructure. Providing, maintaining, upgrading and replacing physical infrastructure – transport, water, energy, telecommunications, sewerage and stormwater – is a major cost in any city. Some of Melbourne's key infrastructure assets are ageing and due for replacement.

Whether new growth is accommodated through urban consolidation or through urban expansion, intelligent long-term planning and investment in urban infrastructure is essential. Irrespective of growth drivers, investment in improved infrastructure also underpins the productivity of metropolitan Melbourne.

Our transport systems were designed largely to service the needs of a mono-centric city. We are now planning for and building a multi-centred city through the development of Central Activities Districts (CADs). Our electricity system was designed on the basis of centralised generation; our water and sewerage systems on the basis of centralised supply and treatment.

Our city is a collection of systems. Effectively managing these requires fresh thinking. For example, how can we make use of waste to generate energy? Also, how can we better harvest stormwater, rather than dispose of it?

We need to fund the transformation of current systems into new, agile and sustainable systems.

As challenges are largely institutional rather than technical, significant changes to the existing patterns of planning, ownership and investment may be necessary to produce essential changes to infrastructure.

With reference to the Engineers Australia 2005 and 2010 Infrastructure Report Cards and from its own first-hand knowledge, the Taskforce has assessed Melbourne's infrastructure preparedness generally as in Table 1.

This table demonstrates that although some infrastructure forward planning may be adequate for a population of five million, there are significant challenges and likely shortfalls across all categories for a population well beyond this number.

In addition, Melbourne has no readily available baseline and monitoring information regarding the status of its metropolitan infrastructure, and there is limited coordinated long-term planning across all infrastructure categories.

Table 1

Infrastructure Category	Infrastructure Capability for Melbourne @ 5 Million	Infrastructure Capability for Melbourne @ say 8 Million
Roads	?	X
Heavy Rail – Passenger	?	X
Heavy Rail – Freight	?	X
Light Rail – Passenger	•	?
Ports – Air & Sea	•	?
Electricity – Baseload Supply	•	?
Electricity – Intermittent Supply	?	?
Gas	•	?
Communications	•	?
Potable Water	•	X
Industrial Water	•	X
Recycled Water	?	?
Wastewater	•	?
Stormwater	•	?

• = OK ? = Uncertain X = Not OK

COORDINATING INFRASTRUCTURE WITH THE NEEDS OF THE CITY

In developing an integrated, long-term approach to planning and infrastructure provision several factors should be recognised:

- Assets generally have long service lives and require substantial one-off investments;
- Infrastructure assets, when considered in an holistic sense, generally form an integrated network that suggests ownership by single entities; and
- Communications infrastructure is 'enabling infrastructure' and provides the ability to increase the effective capacity of other infrastructure networks, through innovations such as integrated electronic metering and monitoring systems.

Government should be actively involved in the provision and redevelopment of infrastructure. Without government participation, it is unlikely that private enterprise would have the required incentives to provide most of the infrastructure needs of society by itself.

There is therefore a need for:

- Responsibility to be allocated for coordinated long-term planning;
- Integrated land-use planning and infrastructure provision;
- Land to be set aside where future infrastructure may require dedicated sites or corridors;
- Future infrastructure needs to be identified for perhaps a 50 year horizon, responding to population and economic growth drivers and social aspirations;
- Integrated land-use planning and demand management through pricing and prioritising of infrastructure services.
- Capacity and condition assessments of existing infrastructure and its ability to meet current and future needs;
- Gaps to be overcome at minimum cost, including taking into account sustainability/environmental dimensions; and
- Achieving greater transparency via communication, consultation and engagement with stakeholders, including the community, regarding the approach and commitments of meeting future infrastructure requirements of Melbourne and Victoria, with open and regular reporting on the progress achieved.

Defining how the required infrastructure is best provided presents particular challenges, given both the lengthy timeframes involved and the magnitude of funds required. It involves consideration of:

- The governance arrangements that should apply to investment decisions which account for whole-of-Melbourne/Victoria outcomes;
- How to increase the capacity of the existing infrastructure networks through pricing mechanisms by granting priority/dedicated use or by removing particular bottlenecks;
- How the construction and operational investment is to be funded (public and/or private sector equity and debt) and the source of revenue to repay the investment (taxes and user charges); and
- The mix of Commonwealth, State, Local Government and private funding best suited to the asset concerned.

In particular, the approach to funding new infrastructure in growth areas should be resolved in a manner that balances equitable and affordable outcomes for new residents with those of all Victorians. The application of infrastructure levies, whether on windfall landowners, developers or new residents, will have various positive and negative impacts, which need more explicit analysis and transparent dialogue with the community.

Policies to determine the extent of land required in growth areas, and the mechanisms required to increase dwelling yields in urban consolidation areas, are also important. These matters are at a critical juncture and should be integrated with the funding mechanisms required to resource the infrastructure needs of an extra two to four million people likely to settle in Melbourne in coming decades.

Trends suggest that we will move towards distributed systems of infrastructure, with alternative technologies providing opportunities for locally harnessing energy and water and contributing to a network of linked domestic and local facilities. In many cases these will be integrated into residential and commercial buildings.

DETERMINING PRIORITIES FOR INFRASTRUCTURE

The Commonwealth Government's advisory body, Infrastructure Australia, is responsible for assessing the relevant importance of national scale infrastructure in terms of eligibility for funding support.

Infrastructure Australia has identified a useful methodology for determining priorities for the many infrastructure needs of cities such as Melbourne, and also of Victoria more broadly. This is explained in a June 2010 report, and includes the following observations:

1. Recognition that long-term infrastructure planning and better use of our existing infrastructure networks are essential if Australia's infrastructure competitiveness is to be maintained.
2. Addressing transport congestion and poor network coverage, notably for freight and public transport, presents the greatest opportunity to improve national productivity.
3. Challenges include the need to encourage better planning and governance; reduce the multiplicity of rules and regulations; enhance export capacity; and reduce the loss of productivity in our cities caused by ageing transport networks.
4. Acknowledging the strategic development priorities announced in the May 2009 National Infrastructure Priorities Report, including a National Ports Strategy; a National Freight Network Strategy; Energy Strategy – actions for a true national energy grid; Water Strategy – actions for water security and regional towns water quality; and a National Framework for Public Transport Network Planning.
5. While there are competing views about the merits of the lease or sale of government assets, the proceeds from such asset sales could in turn be directed to investment in new infrastructure. Greater involvement of private sector capital may also represent an opportunity to better allocate risks between the Government and Private Sector.
6. Delivering future infrastructure requires the (prior) acquisition of land, or corridors, to minimise disruption caused to communities when infrastructure is installed. Co-location of infrastructure in the same corridor can reduce land costs and urban dislocation.
7. Key steps in responding to (the population growth) challenges include developing long-term integrated land-use and infrastructure plans for urban areas; significantly improving public transport networks; improving governance of urban planning, with better coordination and participation across government, industry and the community; and integrating long-term strategies to manage land-use planning, density, population and urban congestion.
8. A national cities strategy is needed to address population and urban development, sustainability, liveability and governance.

Infrastructure Australia estimates that Australia has an infrastructure backlog (for current needs) of the order of \$800 billion, from which it could be deduced that the Victorian component is of the order of at least \$100 billion. While some of this backlog needs to be resolved, it is necessary that Melbourne makes better and smarter use of its existing infrastructure, finding more efficient solutions and influencing demand and supply scenarios.

Typically Infrastructure Australia's infrastructure priority assessments are published at the end of each financial year. It is therefore considered that a similar and matching reporting approach should be adopted in Victoria and particularly for Melbourne.





A photograph of a high-speed train, likely a Shinkansen, stopped at a station platform. The train is silver with green and blue accents. The platform has a large, arched roof structure. A large white number '3' is overlaid on the right side of the image. The text 'SECTION' is written in white capital letters across the middle of the number '3'.

SECTION

**BETTER MANAGEMENT
OF INFRASTRUCTURE**

INFRASTRUCTURE MANAGEMENT

BETTER MANAGEMENT OF INFRASTRUCTURE

One possible approach to improved coordination and management is to establish a permanent statutory body reporting to Parliament – a Victorian Infrastructure Commission – with the aim of providing assurance on the condition and performance of Victoria’s infrastructure and long-term planning for future infrastructure needs, in line with defined economic, environmental and social objectives.

The interrelationship of this Commission, with the governance arrangements for metropolitan Melbourne as outlined in volume one of *Melbourne Beyond 5 Million*, require further examination. Several existing models may be worthy of consideration, including the Western Australian model of a planning commission, supported by statutory committees, including an infrastructure coordinating committee.

The respective roles of the public and private sectors in infrastructure delivery, with particular regard to finance and risk, require further examination. This could include consideration of alternative delivery models for infrastructure projects.

Further dialogue is required on infrastructure provision and funding issues, bringing together key players from the commercial sector and government to identify cultural and institutional barriers to achieving desired outcomes.

Further investigation is required into the availability, use and development of alternative energy and water technologies as they could apply to Melbourne.

A long-term, integrated approach to land-use planning and infrastructure provision which assesses the future needs of Melbourne for periods of at least 50 years would result in:

1. Land requirements and corridors to enable the future provision of infrastructure and/or the efficient operation of existing infrastructure;
2. Infrastructure that is more adaptable to changes over time; and
3. The assessment and integration of potential land uses such as industrial, residential, open spaces and nature reserves with the land required to provide the infrastructure needed to support or access those uses.

There is a need for a coordinated whole-of-government approach to the planning of Melbourne’s long term infrastructure needs for the next 50 plus years, including:

- The need for orbital transport routes, particularly for public transport, to be reviewed;
- Establishment of additional transport and infrastructure corridors where required;
- Better integration between modes of transport with a focus on thinking of transport outside of the ‘silos’ of ‘trains, buses and trams’ towards viewing services as either mass transit transport modes (trains, light rail, bus rapid transit) or ‘on street’ modes (trams and buses) ;
- Options for major water supply upgrades to western metropolitan Melbourne;
- Alternatives to supply substantial baseload electricity generation as a contingency plan in the event of coal-fired generation being phased out;
- Analysis and consideration of the capacity and wisest use of our local natural gas reserves (and the need or otherwise to import gas from elsewhere in Australia);
- Confirmation of future port and airport capacity and demand required for a 50 plus year timeframe;
- Further consideration of generation, transmission and distribution of energy to the significantly growing western metropolitan Melbourne customer base;
- Securing of our infrastructure in light of potential impacts from climate trends, including vulnerability to possible long-term changes in sea levels; and
- Achievement of the equitable allocation of funding on a prioritised basis among the various infrastructure categories.



4

SECTION

TRANSPORT

TRANSPORT

A STRATEGIC APPROACH

Smarter management and operational systems are needed to maintain the safety and efficiency of the transport system. Critical gaps remain in Melbourne's road and public transport networks. There will be a continuing need for new transport infrastructure as outer Melbourne grows. A strategy focused solely on gaining capacity through building new roads will soon reach limits of affordability, practicality and political acceptability.

The Taskforce supports the approach of developing a stable strategic framework for making decisions about the management of the road network, through network operating plans, which VicRoads has developed under the name 'SmartRoads'.

These plans will guide the implementation of various traffic treatments, such as public transport priority measures, by allocating priority to individual modes across different times of day. Importantly, they provide both decision-makers and road users with consistent application of priority measures.

In consultation with local government and key stakeholder groups, the development and application of network operating plans demonstrates commitment to combine key network improvements with a comprehensive strategy for sustainable operation of Melbourne's road and public transport network.

The Taskforce commends the State Government for passing the Transport Integration Act (2010). The intention of this legislation is to require transport agencies and other areas of government to "have regard to broader social, economic and environmental considerations – a clear triple bottom line framework – when making decisions about transport systems". It also requires agencies to "work together towards the common goal of an integrated and sustainable transport system. It requires land use agencies to take into account the new Act when making decisions which impact upon the transport system".

While this report identifies the infrastructure needs for transport in Melbourne as the population grows beyond five million, the current actions already identified by the State Government should be acknowledged. The Taskforce is aware that there are several steps underway to secure transport corridors or funding for several major pieces of transport infrastructure such as the WestLink Project, Melbourne Metro, Regional Rail Link and the Outer Metropolitan Ring Road Corridor. These projects, along with the increasing investment in the bus system (initiatives such as SmartBus and the Orbital bus program), are constructive steps forward in closing the many infrastructure gaps.

A MULTI-MODAL NETWORK

Melbourne has recently experienced significant growth in heavy rail use by commuters. The inability of the metropolitan rail network to accommodate such steadily increasing passenger numbers is one of the most crucial urban management issues for Melbourne. This situation will be compounded by further increases in population and a move towards urban consolidation.

Improvements to the passenger rail network should be a cornerstone of government action to prepare Melbourne for a population of more than five million people.

A key shift in thinking is needed, resulting in the integration of the entire public transport system: trains, trams, buses, and potentially ferries, into one integrated network. There is a need for a coordinated approach to vehicle and facility provision, ticketing, timetabling (or on-call response times), connectivity at activity centres and other nodes of inter-modal intersection.

In acknowledging that not all locations will have access to trains and trams, a more efficient and integrated, high frequency approach to the bus network is needed to connect with trains and trams. Concentric connections delivered by bus services should complement and intersect with radial connections. A grid like network of high quality routes across all of Melbourne would ensure that dispersed trips in most directions can be made on public transport.

PUBLIC TRANSPORT

TRAINS

Melbourne's rail network is a radial network from the CBD extending to the outer suburbs. This network is effective in transporting people to and from the city, but is far less effective for people wishing to travel between outer-lying suburbs.

Only around nine per cent of home-to-work trips involve the central city as a destination (ABS Census, 2006). The home-to-work journey involves myriad origins and destinations and the fragmented nature of this demand is a challenge for any public transport system. The emerging land-use strategy, involving the creation of a number of CADs requires reorganisation of the networks to capture a greater proportion of home to CAD trips.

Transit Oriented Development (TOD) at activity centres on the rail network should be actively facilitated to promote an urban form that maximises accessibility offered by the rail network, and assists in promoting viable concentric (orbital) connections such as those outlined in Figure 1.

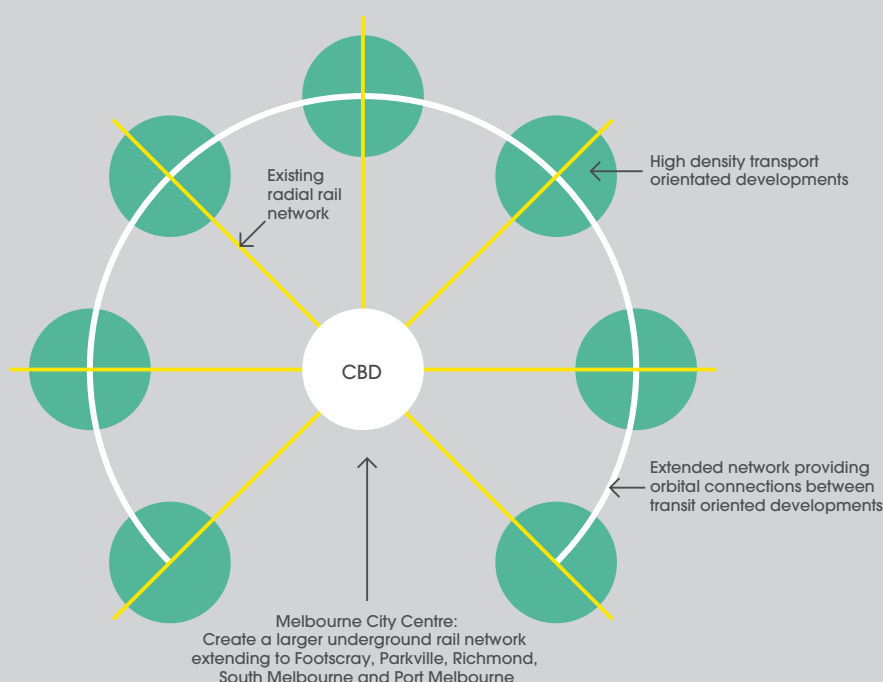
Additions to the underground passenger rail network will provide opportunities for greater capacity with new lines and railway stations, promoting increased accessibility and urban densities at strategic stations and surrounding precincts in the inner city.

In this regard, the State Government is to be commended for its Melbourne Metro initiative, commencing with the planning of Stage One from Dynon to Domain. This will link significant precincts, including redevelopment areas, health and education precincts, major tourism destinations and office precincts.

However there is a question as to why this project should be broken into two stages. The first stage will create a termination point in an area where the bulk of St Kilda Road businesses are not located. This will mean that passengers heading for businesses further up St Kilda Road would need to disembark at the termination point and then catch a tram for the remainder of the journey.

By bringing stage one and stage two of the project together it would be possible to create a second stop on St Kilda Road that would serve a larger number of businesses. It is considered that there are therefore significant productivity benefits from delivering stages one and two of this project together.

Figure 1
Melbourne's rail network requirements



Localised responses to network weaknesses are also required. One of the greatest restrictions on the efficiency of the network is the number of level crossings. More trains on the network will result in longer waiting times at level crossings, causing increases in vehicle congestion. The cost of grade separation is significant, and imaginative solutions to funding models, air banking and joint development rights will need to be examined if we are to reduce the impact of Melbourne's nearly 200 level crossings.

TRAMS

Trams play an important role in Melbourne's public transport network and are an iconic feature of Melbourne. Approximately 75 per cent of the Melbourne tram network is an on-road network where trams are required to share the road space with other modes. As congestion along Melbourne's road network has increased, the delays imposed on trams have also lengthened, impacting on their ability to operate to schedule.

A number of improvements to the tram network will be required to meet the needs of a population beyond five million, which include:

- Granting trams a higher level of priority;
- Establishing extended or all-day clearways on selected tram routes, leading ultimately to the separation of the tram network from other road users before the city grows beyond five million;
- Increasing the frequency of tram services to five or 10 minute headways and also the span of operational hours;
- Upgrading rolling stock to provide a more efficient and modern form of transport;
- Switching more sections of the tram network to light rail operation with station-like facilities at stops and grade separations at major intersecting roads;

The above improvements will assist to promote the increased urban density along key transport corridors which is discussed in volume two of this report series.

BUSES

The bus network is an integral element of the public transport network as it services the majority of the outer suburbs and allows for inter-suburb connections. The bus network is poorly integrated with the train and tram components of the public transport system.

A number of improvements to the bus network will be required to meet the needs of a population of beyond five million, including:

- Higher frequency services with less than 10 minute headways on all significant routes;
- Extended service operations to be at a minimum between five am and midnight;
- Bus Rapid Transit (BRT) for areas that are not serviced by rail. BRT systems, setup with sufficient infrastructure and priority, can provide reliable high quality public transport links. These BRT systems should provide:
 - Priority at intersections (grade separated if possible)
 - Dedicated corridors with physical separation from traffic
 - Modern, clean and attractive bus stations
 - Multi-door buses that allow rapid boarding and alighting
 - High-capacity, low-emission buses
 - Express services and
 - Disabled Access.
- Significantly increasing geographic coverage, especially in outer areas – creating bus routes that connect local suburbs and high speed radial routes connecting larger trip attractors;
- Ensuring the network of bus routes and timetabling integrates with trains and trams, and that buses are operated as part of one identifiable public transport network.





AIRPORTS

Melbourne Airport operates with one north-south and one east-west runway and has undergone notable land-side and air-side capacity expansion in recent years. The airport's master plan provides for modest extensions to these runways plus their full eventual duplication elsewhere in the airport precinct.

It would therefore appear that there is adequate passenger and freight-related capacity for some time to come, subject to the availability and retention of adequate (noise) buffer zones around the airport.

Airports can also be seen to function as activity centres, where large amounts of people and car parking converge for obvious functional purposes. Around the world, a number of innovative airport precincts have made considerable progress in becoming employment and retail centres.

Well-planned airport precincts can incorporate specialised office, conference and shopping facilities along with short- to medium-term accommodation. Rather than evolving into a land-hungry, road-dominated pattern, airport precincts can become sustainable pedestrian environments that combine major concentrations of activity.

Melbourne Airport, with its large land bank and entrepreneurial management, has great potential for such development.

The long-term future role of Avalon Airport requires further review in the context of metropolitan Melbourne's overall air transport needs. If the population of Melbourne's west significantly increases, Avalon offers a ready-made second major airport to serve and energise this growth.

It is likely that Essendon Airport will be phased out and an optional outcome for the site is to transform it into fully functioning mixed use activity centre.

Moorabbin Airport, although smaller than Melbourne and Avalon, has a useful role for lighter aircraft and helicopter services.

AIRPORT RAIL LINKS

Many major international airports have integrated their terminal facilities into nearby passenger rail networks using express rail link connections – e.g London Heathrow.

There have been regular calls to follow this model in Australia and particularly in Melbourne.

Such an initiative has been adopted in Sydney and Brisbane although to date patronage in both cases has not justified the expenditure involved. One reason is that most trips originate from home and are challenged by the radial pattern of rail networks.

Despite numerous inquiries in recent years into the feasibility of a rail link to Melbourne Airport, it has not been financially justifiable.

As part of long-term infrastructure planning it would be prudent to examine whether such links to Melbourne and possibly Avalon airports might one day be feasible and therefore consider whether transport corridors should be earmarked now so that future provision is not rendered impossible. Two models occur internationally – connection to the metropolitan rail system, as in Sydney, or a dedicated direct service to the central city, as in Hong Kong and Brisbane. Southern Cross Station contains some provision for an airport link, but there is no corridor yet set aside for either model.

The importance of airports as local employment hubs, in addition to the number of people that drive and park at airports, means that it is important to not only consider airport rail links but consider other forms of mass rapid transit services including tram and bus networks.

BAY FERRIES

The feasibility of passenger ferries linking bayside communities to Melbourne has been considered by various bodies in recent years. This, for example, includes a recently completed State Government survey of demand for a potential commuter ferry service from Portarlington to Port Melbourne.

Proposals for such services need to overcome barriers such as travel time, energy consumption, inclement weather impacts and affordable cost. While they have not yet been proven feasible, viability should be regularly reviewed as Melbourne grows further around Port Phillip Bay and Geelong grows around Corio Bay.

There is also the potential to consider the possibility of establishing ferry links at Victoria Harbour as a way of linking Docklands to Williamstown, with potential tourism benefits as well as enhanced connectivity for employers.

PRIVATE TRANSPORT

ROAD NETWORK

As Melbourne grows, the proportion of kilometres travelled on roads by private motorists, compared to that on public transport, will need to be substantially reduced. While it is likely that in the future there will be more vehicles on our roads, one substantial difference may be that the distance travelled on each trip will have reduced substantially, as a result of improved integrated transport and land use planning.

A complete orbital network of urban motorways would provide for cross-town journeys and more accessible CADs. New vehicle systems could result in travel at consistent speeds and roads could be equipped with an extensive array of traffic safety management tools, including freeway management systems such as lane-use signs, variable message signs, variable speed signs, incident detection equipment to identify slow moving or stationary vehicles and closed circuit TV coverage of the entire motorway network.

Congestion will be further managed by road pricing, introduced following an extensive review. While some transport charges on motor vehicles may be abolished, all vehicles could be charged on a per kilometre base, dependent upon the vehicle mass, engine size and possibly carbon emissions.

Additional transport charges could be dedicated to the city in which they are raised, to be spent entirely on transport, with priority to maintenance of existing transport infrastructure and enhancing the capacity of the light and heavy rail networks and the ability to provide public transport services.

ACTIVE TRANSPORT

Cycling and walking are modes of transport that support a healthy population, as well as sustainability outcomes. The Victorian Government's effort at developing the Victorian Cycling Strategy, including an investment of \$115 million as part of the Victorian transport plan, is to be commended.

The potential to further integrate cycling and public transport has the potential to produce efficiencies in terms of travel times as well as contributing to health and fitness outcomes.

VEHICLE TECHNOLOGY

In the future vehicles are likely to be considerably different from current models. Generally, vehicles are becoming smaller and lighter and modern diesel vehicles offer greater economy with reduced emissions. Hybrids are also becoming more affordable and many cars of the future may use alternative fuels. Furthermore, it is possible that short journeys could be fully electrical with batteries and mains powered recharging, while smaller zero emission vehicles may be exempted from congestion charges.

Vehicles may also have electronic licence plates, impossible to modify, as part of a 'black box' fitted in new cars or retrofitted into older vehicles that would enable user pricing to be introduced.

Alternative vehicle configurations, enabling extensive sharing of journeys, highly responsive to timing and destination requirements may emerge – particularly around existing public transport nodes and where a culture of car pooling or journey sharing may have a stronger presence.



FREIGHT TRANSPORT

GENERAL

Melbourne beyond five million will need effective and efficient freight services and infrastructure as there will be a considerable urban freight task to import the goods needed by households and industry, export manufactured goods and other products and to distribute the goods within metropolitan areas.

Road transport will inevitably continue to be the dominant mode for freight movement due to the flexibility and broad coverage provided by the road network. Similar to today, most imported/exported goods will have destinations/origins across the city and suburbs, as will food and domestic goods, together with the building and construction materials used to support the growing population.

The likely increases in road freight movements will require consideration in assessing Melbourne's ability to cope with freight movements as the city grows. To move this freight, in a way that does not affect the amenity of the growing population but enhances economic activity, Melbourne will need:

- More arterial freight movements late at night and early in the morning, when traffic loads are less;
- The establishment of freight hubs where containers can be transferred from the ports by high productivity vehicles;
- More smaller vehicles to transfer containers from hubs to their eventual destinations such as B-doubles and small commercial vans;
- A detailed review of freight-compatible road transport routes (possibly including dedicated truckways) will be required, if higher productivity (e.g. multi-container) longer haul container vehicles become necessary;
- Adoption of innovative solutions such as the 'Last Km' initiative, where dispersed distribution of freight using small vehicles in the last part of the freight journey is managed more effectively, which will be fundamental to how freight enters and is distributed across inner Melbourne.

Freight transfer terminals will serve as inland ports to allow efficient movement of goods to and from the ports by rail, reducing congestion in the city centre and allowing the goods to move closer to their destination in more energy-efficient ways. The proposed Metropolitan Freight Terminal Network (MFTN) planned under Freight Futures for the north, west and south east of Melbourne should be programmed to facilitate freight improvements in line with demand.

Increased use of rail transport to move goods from the regions through Melbourne to the Port of Melbourne is needed to save energy and reduce traffic congestion and shuttle trains between intermodal terminals will be important. The MFTN assumes that freight train paths can be accommodated on the broad-gauge network. A barrier to this is the commuter rail which takes up all capacity on the broad-gauge network and will continue to do so into the future.

PORTS

The capacity of the Port of Melbourne will be exceeded as Melbourne's population grows well beyond five million. The overflow of container and other trades, such as vehicle assembly, may need to be handled at the Port of Hastings, whose role as a bulk port is expected to grow. The Port of Melbourne's position as Australia's premier container port, assisted by the opportunities provided by channel deepening, will place increased demand on port infrastructure and its connectivity to Melbourne.

The increased use of rail transport to move goods to and from the Port of Melbourne will be needed to save energy and reduce congestion.

Similarly, there is land-use infill pressure on the Port of Melbourne. There is a need to ensure a balance is achieved so that the port can still operate efficiently, but also so that we can make best use of available land for mixed use development so close to the employment and transport-rich Central Business District (CBD).

For the Port of Hastings to take an increasing share of the freight import/export load will require the construction of a dual carriageway road link (or separate dedicated truck route) and also a standard gauge rail link. Land will need to be earmarked not only for these links but for port infrastructure, container storage and associated truck parking areas.

The Port of Geelong, although challenged by relatively shallow shipping channel access, should also be considered for its potential to be upgraded for some of the future container freight arrivals, destined for the western metropolitan area and Western Victoria.

The Taskforce acknowledges the State Government's progress in planning for the expanded freight needs of Melbourne and its efforts to link sea, rail and road-based freight modes. The challenge will be to implement the capacity expansion required in an affordable and timely manner while not compromising liveability and economic livelihood.

NATIONAL PORTS STRATEGY

The ports of Melbourne, Hastings and Geelong are fundamental to the economics of not just Victoria, but also South Australia, Tasmania and southern New South Wales. Their effectiveness not only relates to their channel access capacity and large on-site cargo handling infrastructure, but also to the effectiveness of associated land-side logistics aimed at the distribution of freight.

Such issues are currently being investigated by Infrastructure Australia and the National Transport Commission. This investigation could well lead to the development of a long-term National Ports Strategy with ports in the Melbourne area being the focus for most container trade.

Such a strategy would likely draw on approaches adopted by countries such as the UK, the Netherlands, Canada and the US in recent years.

The State Government, on behalf of Melbourne's ports, should continue to be an active participant in the development of this strategy.

SPECIFIC TRANSPORT OUTCOMES

It is recommended that the preferred outcomes for transport infrastructure should include:

- Further integration of land-use planning and provision of the different modes of transport – road, rail, air, sea – to capture their capacity to meet future transport tasks, taking into account land use planning innovation, different technologies and inherent cost structures;
- Full utilisation of the existing transport networks through pricing, the granting of priority access, and/or removing bottlenecks that are constraining the performance of the associated networks;
- Investment in the capacity of transport infrastructure to meet future transport needs for the movement of both people and freight;
- Development and enforcement of uniform national regulations including removing any policies and taxes that are distorting the decisions of people in how they meet their transport needs;
- Promotion of travel behaviour change initiatives and active transport mode alternatives through education/communication and infrastructure provision.





SECTION

WATER

WATER

A SUSTAINABLE APPROACH

Melbourne with a population well beyond five million will demand a new way of thinking about water management as we move to secure the city's water supply in a potentially more uncertain climate.

Key elements to a sustainable approach will be to offset the growing population's water needs with demand management and optimisation of existing systems. Beyond this, the largest change will be reducing our historical total reliance on catchment rainfall sources to meet our water supply needs through diversifying our water supply options. Important tools in reducing demand will include appropriate pricing signals and consumer incentives.

The Melbourne water supply system will become more adaptable to cope with predicted increased climatic variations as well as changes in external drivers such as energy supply and costs. We will develop grids that link existing centralised sources with new decentralised, alternative sources and we will develop water cycle assets that provide multiple benefits such as treating wastewater, supplying recycled water, collecting, storing and treating stormwater and possibly even generating energy to meet local needs.

Infrastructure planning will include new ways to build flexibility into the water supply and treatment systems that allow new sources of water, energy and nutrients to be produced from cities in cost-effective and sustainable ways. These water, energy and nutrient streams will need to be delivered to the demand centres, so investment will occur in the renewal of distribution networks to meet these new requirements.

The infrastructure required to link and optimise the integration of new and existing sources in this portfolio will be significant. These will be complemented by other non-structural solutions such as further trading between rural and urban areas, third party access and private sector involvement in generating local solutions.

DEMAND AND INTEGRATED WATER MANAGEMENT

We will see new approaches to urban planning that incorporate objectives to ensure urban form maximises the water conservation benefits of increased urban densities, such as Water Sensitive Urban Design (WSUD) and Integrated Water Management (IWM).

IWM provides the opportunity to reduce per capita consumption in new and infill development areas while maintaining amenity. It provides greater emphasis on local capture, and the harvesting and use of stormwater, roof rainwater and grey water, together with the treatment of nutrients and other pollutants carried in this water.

IWM for new and infill developments could include:

- High levels of local recycling of grey water in residences and industry;
- Cost-effective rain and stormwater sourcing on a local basis;
- Water-efficient landscaping, parks and gardens to reduce water demand while maintaining amenity;
- Higher density living, providing opportunities for reduced per capita consumption;
- Creation of multipurpose wetlands to preserve ecosystems, harvest stormwater and reduce urban heat island effects.

These new approaches will require investment in innovation and new technologies. Collaboration between the infrastructure sector and urban planners will promote sustainable water objectives in city planning.

Notwithstanding new approaches, increasing total demand for energy and associated water-consuming energy generating processes, will add to the total water supply needs of a growing Melbourne, especially in the western growth areas. Equally, the more sophisticated and inter-connected our water and wastewater systems become, the greater their operating energy requirements.



WATER SUPPLY

Apart from the efficiencies achieved through IWM and demand management, new bulk water sources will be necessary to provide for the potential doubling of population and the accompanying increase in commercial and industrial activity. Opportunities for supplementing the existing bulk water supply to cater for increased demand need to be identified and investigated. These could potentially include:

- Expansion of the Wonthaggi desalination plant by 50 gigalitres per year (GL/yr) from 150 GL/yr to 200 GL/yr (pipelines, power supply and tunnels have been sized to accommodate this with limited further expenditure/upgrade);
- Recycling from Melbourne's Eastern Treatment Plant (ETP) to displace potable use, including indirect potable reuse opportunities;
- Accessing additional surface water resources in Gippsland, such as the Upper Macalister River;
- An additional desalination facility to the west of Melbourne; and
- A single statewide water market to encourage the sharing of water throughout Victoria.

Each of these options needs to be considered and progressively reassessed taking into account sustainability considerations.

The potential for large scale development to the west of Melbourne in order to accommodate the growing population provides specific opportunities to evaluate integrated solutions and decentralised water infrastructure that could provide multiple benefits.

The use of decentralised systems may temper the growth in supply to the city's wastewater systems, however capacity improvements could still be necessary to cater for the increased housing density that will occur within the existing urban boundary.

There is likely to be ongoing consideration of the potential for energy generation from wastewater biogas and biosolids, with the latter also having agricultural application.

WATER PRICING

In addition to meeting the full cost of the supply network infrastructure and treatment costs (as is now the case), the price of water could be adjusted to reflect the costs to the environment of withdrawing water for urban consumption as well as, in times of shortage, the relative availability of water in storage. Simultaneously, and because water is an essential commodity, support could be provided to those households that are in need of assistance on social grounds.

Concerning the removal of wastewater, the charges applied could be based on the nature of the waste and the treatment and environmental costs that would be incurred. By pricing the removal of wastewater in this way, incentives could be provided for manufacturers to either change their production processes or treat and reuse the water on site. By doing so, the quantity of water used would be reduced, effectively increasing the overall supply of drinking water for Melbourne.

SPECIFIC WATER OUTCOMES

It is recommended that the preferred outcomes for water infrastructure should include:

- WSUD and IWM features fully incorporated into the development of Melbourne's growth areas and the redevelopment of established areas, particularly during urban renewal cycles;
- Melbourne's water supply, in order to meet future needs, is secured through a diversity of sources, such as desalination, catchment and stormwater harvesting and wastewater treatment and recycling, together with changes in the form of the city to realise the water conservation benefits of increased urban densities and WSUD; and
- The demand for water is manipulated through pricing and other market incentives to promote water efficient behaviour.







SECTION

6

ENERGY

ENERGY

INTEGRATED SOLUTIONS

To accommodate Melbourne with a population well beyond five million, a significant transformation in Victoria's energy systems will need to occur.

Similar to water, the potential for large scale urban development to the west of Melbourne, in order to accommodate a growing population, provides specific opportunities to evaluate integrated solutions, additional sources and decentralised energy infrastructure that could provide multiple benefits.

There are significant opportunities available to reduce energy demand through efficiency improvements. There are still many gains to be made in energy efficiency in residential properties through smarter design, materials selection, insulation and efficient appliances.

The energy efficiency standards of Victoria's existing residential and commercial buildings are well below current world standards. In the commercial and industrial sectors we can expect to see more efficient use of natural gas in local cogeneration and trigeneration facilities including exporting excess power to the grid and the development of district heating and cooling systems.

Throughout Melbourne the electrical distribution system will need to be strengthened to allow for significant quantities of decentralised electrical energy sources to be fed back into the grid. Smart meters at customer interfaces provide opportunities for both small and large customers to regulate their power consumption and generation to suit short-term power pricing patterns. Indeed energy pricing policy and incentives will be a critical part of energy demand management.

Reducing carbon emissions from the electricity system could result in a significant increase in prices, and a carbon-pricing framework would need to be implemented through the wider economy to achieve emission reductions at lowest cost. Higher prices could drive improved energy efficiency, but would have social implications, particularly for low income households.

ELECTRICITY

The challenge for Melbourne will be to increase the capacity of electricity generation at the same time as significantly reducing emissions at the lowest possible cost. An increase in capacity – particularly baseload – will be required. Although there will be improved efficiencies, these will be more than offset by the growth in demand for electricity resulting from population growth and increased electrification of the economy (e.g. electric cars).

Victoria has an abundance of brown coal, sufficient to meet demand for several centuries. Using this as the primary source of electrical power for Melbourne will depend on whether clean coal technology, including carbon capture and storage, can be implemented in a relatively cost-effective and timely manner. Victoria is fortunate in that it possesses potentially suitable geosequestration sites within economical distances of the brown coal deposits that enhance the potential likelihood for success of clean coal technology.

Low emission coal technologies are not currently commercially applied, however, and they face considerable technical and financial challenges if they are to be deployed successfully. Such success is not assured. The alternative of nuclear power is gaining significant attention elsewhere in the world and it would be prudent to ensure that this alternative is given serious consideration.

This could include the investigation of the feasibility of a range of sites for baseload nuclear power facilities, in order to better understand overall planning and infrastructure needs, noting that developments in fourth generation reactors promise significantly lower waste generation and higher degrees of safety. The political issues are considerable and there would be significant planning and other practical issues associated with adopting any level of nuclear power generation for Victoria.

Supplementing clean baseload power in Victoria could come from wind power (of which Victoria has a natural abundance), solar power from both centralised large thermal plants and decentralised systems on building rooftops distributed within urban areas, and combined cycle gas generation. Feasible contributions could also come from Victoria's geothermal, wave and tidal energy resources.

A smarter and more robust National Grid, including extensive long distance direct current links would be required to provide the opportunity to export electricity around both Victoria and Australia to take advantage of local high generation periods for our renewable resources and conversely to import electricity in periods when our wind/solar/gas generation is not capable of meeting peak demands.



GAS

Natural gas is a relatively clean and efficient fuel within the residential, commercial and industrial sectors as well as providing a fast-responding, low emission generation source for electricity.

Victoria's principal reserves of natural gas are located offshore in the Gippsland and Otway Basins. With increased use of gas in electricity generation and as a result of population growth, the long-term adequacy of our local gas reserves may be in question. It would therefore be advisable to investigate the use of natural gas from other sources such as Australia's abundant North-West Shelf and Queensland. Infrastructure and planning needs that may be needed as a result, such as a transcontinental pipeline, port facilities, processing/distribution for Liquefied Natural Gas (LNG), also need investigating.

In the past decade, there has been significant expansion in the coal seam gas (CSG) industry in Australia, with tens of billions of dollars currently in planning for LNG export facilities. This parallels a great deal of development in other unconventional gas sources in countries like Canada and the United States. To date, the balance of supply and demand for natural gas in Victoria, and the price of coal-fired power generation for baseload, has provided little incentive to explore Coal Seam Gas (CSG) in this State. These factors are likely to shift fundamentally in the next decade and it would be in Victoria's energy supply interests to assess the potential for CSG in coal seams beneath the level of brown coal currently mined.

TRANSPORT ENERGY NEEDS

Emissions targets will put pressure on transport systems that currently contribute around 20 per cent of Victoria's carbon emissions. A dramatic reduction in emissions could be achieved through a transformation of transport fleets to electrical propulsion. However, this will in turn put pressure on our electricity generation capacity. As an indication, if all of Victoria's land transport petroleum fuel use today was displaced by electricity, Victoria's electricity demand would increase by around 50 per cent.

Beyond the use of electricity for propulsion in transport, increased electricity demand may also arise from other changes in our economy (e.g. changes in our water management regimes including increased use of decentralised systems, recycled water, rainwater and desalinated water). These have a higher electrical demand than Melbourne's traditional gravity-fed surface water supplies.

COST OF SUPPLY

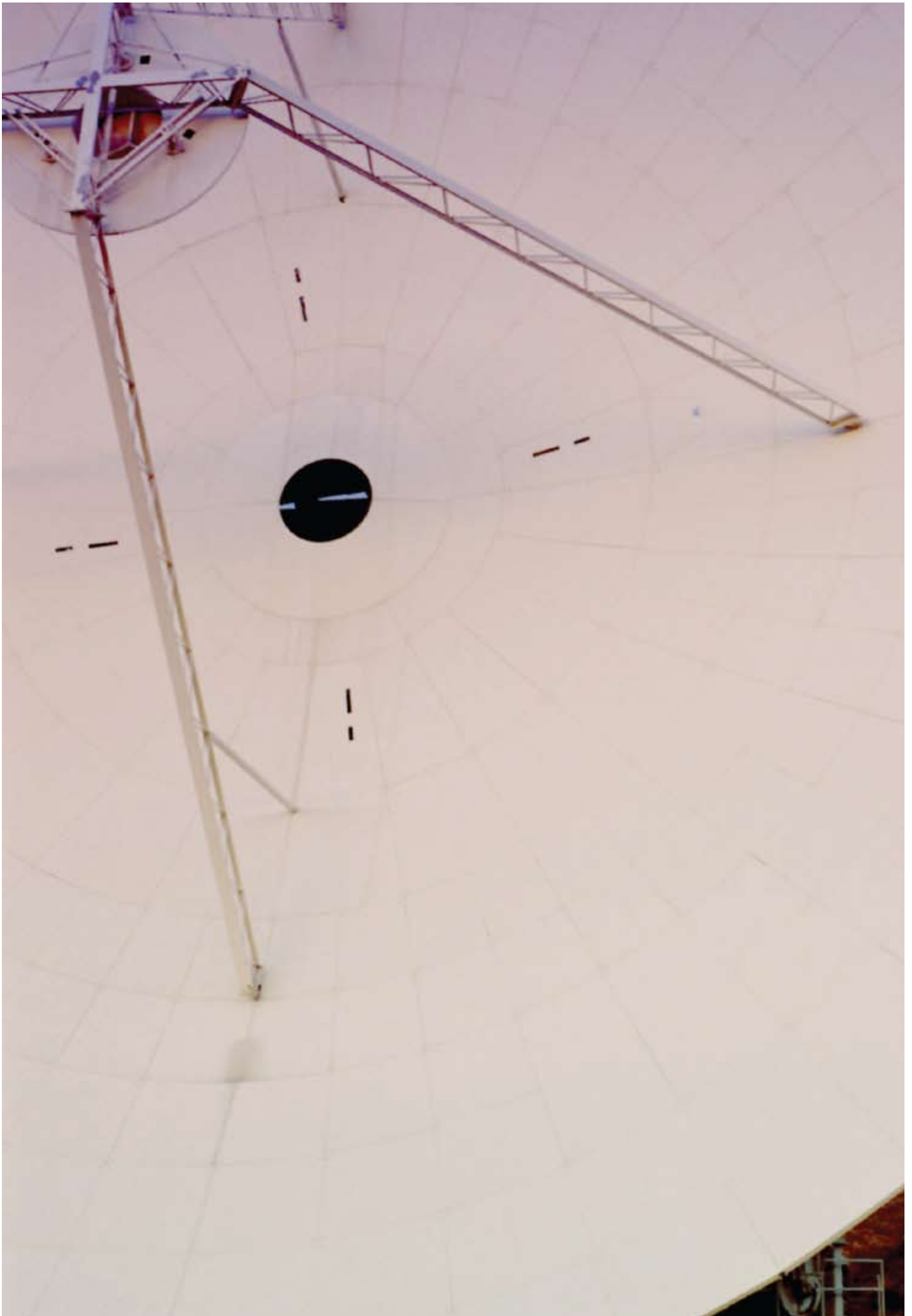
The need to upgrade and expand energy supply infrastructure to meet demand, combined with the impact of climate change policies, will lead to significant increases in electricity prices in real terms in the coming decade. Such increases will have implications for both energy-intensive manufacturing and resource processing as well as for low income households who spend a higher proportion of their incomes on basic utilities.

Although average real incomes are forecast to rise and absorb much of this increase, it is likely that the government will need to expand the support structures that it provides to ensure basic utilities are available to all members of the community on an affordable basis.

SPECIFIC ENERGY OUTCOMES

It is recommended that the preferred outcomes for energy infrastructure should include:

- Incentives to encourage the installation of renewable energy sources particularly as distributed power sources;
- Securing Melbourne's energy supply (electricity and gas) in order to meet future needs through investments to achieve the required balance in baseload, intermittent and peak electricity generation capacity and the ability to draw from the National Grid;
- Progressively raising the minimum energy efficiency standards for new buildings and appliances, and support initiatives that eliminate market failures such as incentives that work against the adoption of improved energy efficiency standards for existing buildings;
- Deployment of public funding to accelerate the early-stage deployment of low emission technologies, including carbon capture and storage;
- Assessment of the potential for CSG in coal seams beneath the level of brown coal currently mined;
- Energy supply alternatives which allow the greatest scope within emerging climate change policies, including the possibility of nuclear power if other sources prove to be technically, commercially or environmentally unacceptable; and
- Accelerating the deployment of infrastructure that supports the electrification of road vehicles.





SECTION

COMMUNICATIONS

COMMUNICATIONS

TRANSFORMATIONAL TECHNOLOGY

Investment in communications services, in particular broadband speed, capacity and security, is critical to Melbourne's prosperity. For example, through smart yet easy-to-use applications, broadband underpins efficiencies, improvements and success in all economic and community endeavours.

Our use of broadband applications will transform everyday lives and could perhaps challenge more traditional planning policies that call for increased spending on heavier infrastructure such as roads and railways.

FIXED BROADBAND

Melbourne already has a healthy advantage over other cities in Australia and competes very well on the international broadband stage.

Nearly one million residences in Melbourne have access to network download capacity of up to 100Mb/s (to share across multiple users and devices within the household) through Telstra's HFC cable network – no other city in Australia has this speed over cable across such a large footprint.

The majority of remaining households in Melbourne are able to access ADSL and ADSL 2+ services from a range of providers. While the download speed achievable over ADSL is limited by distance from the local exchange, ADSL 2+ can deliver up to 20 Mb/s.

A small percentage of households in Melbourne only have access to dial-up fixed internet service. These areas are known as fixed broadband blackspots.

The Commonwealth Government's proposed National Broadband Network (NBN), which promises the delivery of 100 Mb/s broadband services to 93 per cent of homes and businesses through fibre to the premise (FTTP) technology, will help ensure Melbourne is ready for future broadband demands and applications.

While NBN trials are about to commence in Brunswick, the timing of the NBN's substantive arrival in Melbourne is still to be determined and connections could be up to eight years away. This emphasises the importance and need for smart policy, continued investment and effective regulation in the telecommunications industry over the next decade.

It also emphasises a need to address current fixed broadband blackspot areas in the short term before the NBN starts connecting customers. With the recent increases in network speeds wireless could be a viable alternative in these areas.

The Commonwealth Government has announced it will mandate the rollout of FTTP technology in new housing estates from 1 January 2011 that will help ensure urban telecommunications infrastructure meets the needs of business and the community as Melbourne's population grows.



SMART COMMUNICATIONS INFRASTRUCTURE PLANNING

Although the telecommunications industry has its own metropolitan network plans, it would be a cost-effective and practical approach to infrastructure coordination, to encourage the use of road and rail reserves for multiple purpose infrastructure corridors, including the installation of optic fibre. This is particularly applicable where new or upgraded corridors are proposed.

In the event that the CADs emerge as significant centres, as proposed, they will require reliable and secure access to sufficient capacity broadband. Augmentation of infrastructure at CADs should take into account the potential for the main optic fibre lines to share infrastructure corridors with other utilities.

Telecommunications network architecture should be designed to ensure sufficient bandwidth availability is provided to businesses within CADs to access 'capacity on demand' service. This would deliver improved connectivity, and increased network performance, enabling a suite of applications and services such as high-definition video-conferencing and multi-media communication.

Planning for communications networks should not ignore what is already deployed. Current consumer broadband networks aside, Melbourne has a strong footprint of high-bandwidth business broadband networks that have been purpose-built to service the city's government agencies and departments as well as private enterprise.

Communications technologies are evolving rapidly and wise technology investment choices are critical. Melbourne should observe what has taken place in other major international cities. It should source its needs from the vibrant and competitive global communications market, and balance this with the funding, building and maintaining of its own network where critical sharing and coordination of infrastructure is required.

WIRELESS BROADBAND

The demand for wireless or mobile broadband is increasing everyday as wireless networks get faster, competition increases and people learn about the flexibility it provides. Melburnians and visitors have good access to a growing number of wireless broadband services.

Current wireless broadband offerings using the fastest mobile card and network combination on the market provide typical user speeds of between 1 Mb/s and 20 Mb/s. In the next few years the introduction of 4G mobile technology will see the speed and capacity of wireless broadband networks increase even further.

While wireless broadband can currently provide a high speed service for people who cannot access fixed broadband, it is generally seen as complementary to fixed broadband, rather than an alternative. The benefit of wireless broadband is that it enables consumers, businesses and critical service providers to stay connected when away from where they live or work. As wireless speeds get even faster and the integration of fixed and mobile services increases, people will be able to take the full home/work experience with them 'on the road'.

The speed and service of wireless broadband services are limited by the amount of spectrum available to providers, so careful consideration needs to be given to how relevant spectrum is allocated now so providers can plan for the future. Geographical coverage can also affect reliability and access to wireless broadband in regional areas.

APPLICATIONS

Broadband's transformational qualities will be realised through the applications developed on top of our internet and infrastructure foundations.

Just as governments need to encourage investment in telecommunications infrastructure, there is an opportunity to foster the development of applications and services, through more effective investment in telecommunication applications.

Melbourne has an opportunity to lead the world in the development of smart applications that change the way we live, work and play. Initiatives such as Melbourne University's Institute for a Broadband Enabled Society (IBES), a research laboratory dedicated to innovation in products and services for a new broadband society, will help ensure Melbourne is at the forefront of maximising the benefit of new broadband technologies.

The rise of social networking will extend to a wider cross-section of the community, including the mature age demographic. Such communities are on-line and could use their networks to improve community well-being.

Encouraging innovation, and the opportunity to deliver more services on-line, will drive efficiencies and reach more members of the community.

EMBRACING CHANGE

Melbourne's ability to adapt and embrace broadband as a transformational technology will be a key to its success. Steps have been taken to secure Melbourne as a global leader in delivering telecommunications technology. At this stage, it is perhaps not completely clear what a fully broadband-enabled city will mean for a Melbourne well beyond five million, but it would be expected to have a significant impact on most other matters considered in this report.

The most obvious of these now is the lessening of travel and hence energy requirements. When we all have electronic wallpaper in our homes connected to high-definition video-conferencing for highly immersive virtual meetings; when our homes, workplaces and factories are equipped with sensory-based technology for monitoring and security; and when 3D printing and holograms are as commonplace as a text message, we perhaps might not require all the new roads and railway tracks currently envisaged.

A potential additional outcome of a broadband-enabled city is the lessening of existing social exclusion of those who currently cannot access the Internet and its inherent social and economic opportunities. Programs to provide hardware and software as well as targeted training to appropriate households should minimise such social and economic exclusion.

FUTURE DEVELOPMENTS

Communications technology is a rapidly developing field which calls for a flexible and adaptable approach to minimise the probability of the major capital investments of today becoming superseded by the lower cost smarter solutions of tomorrow.

Although a range of present and (as yet unanticipated) future sophisticated solutions are/will be available, it is by no means certain that the levels of service able to be delivered will be affordable from the perspective of both customers and providers.

It will also be important that the significant investments likely to be required (such as the NBN) are at the appropriate level and do not unduly divert funds away from all the other categories of much-needed infrastructure investment discussed in this report.

SPECIFIC COMMUNICATIONS OUTCOME

Melbourne with one of the fastest (in the world) fixed and wireless broadband systems and being the location of Telstra's HQ and Global Operations Centre, NBN Co's Technical HQ and the IBES has a strong foundation to show national leadership in communications innovation and implementation.

The task now is to lead policy development, create innovative applications and enable Melbourne to be first to make use of advanced broadband technology.

The background image shows a wide road intersection with tram tracks. A large white number '8' is overlaid on the right side of the image. The text 'SECTION' is positioned to the left of the number. In the foreground, there is a red-paved area with white directional arrows. A road sign on the left indicates 'DR' with a right-pointing arrow. The scene includes tram infrastructure like overhead wires and poles, and a blue mountain range in the distance under a cloudy sky.

SECTION

**INFRASTRUCTURE
DELIVERY**

INFRASTRUCTURE DELIVERY

DEMAND MANAGEMENT

It is not realistic to expect all infrastructure providers to be able to cope with unlimited demands for service provision.

However, a reasonable level of service is an obligation, and the match between this and system capacity is the challenge facing most providers.

In the case of private transport, such as roads, current peak hour demand is more frequently exceeding capacity. Given that provision of infinite capacity is impractical in such situations, the level of service drops and travel times increase with consequent economic loss and individual personal stress.

An alternative to this scenario is to better manage the demand for road services both operationally and in how our transport systems are configured. Congestion charges are one example, as is the VicRoads 'Smart Roads' initiative, previously outlined.

Similarly, research presently underway at the University of Melbourne in the provision of real time information e.g. to assist car pooling via a 'Real Time' information hub for transport effectiveness may offer a potentially better match between supply and demand.



INTERNATIONAL INFRASTRUCTURE PRACTICE

It is useful to compare our approach to infrastructure provision with that practised elsewhere. Earlier this year the American Society of Civil Engineers facilitated a series of infrastructure roundtables in Washington DC, the findings from which were published in April 2010.

Some emerging themes from the roundtables of relevance to Melbourne (and Victoria's) needs were as follows:

- The need to provide legacy infrastructure for future generations;
- The importance of long term infrastructure master planning;
- The need to build in resilience and redundancy into critical infrastructure systems to ensure their continued operation in the event of unforeseen outages/ shutdowns;
- The need to proactively plan for the refurbishment or replacement of ageing infrastructure;
- The wisdom of managing/ameliorating demand, in lieu of sizing to suit short term peaks in demand;
- The greater cost (in many cases) of doing nothing and hence leaving it too late;
- The need for a nationwide vision to drive the development of state and regional infrastructure plans;
- The importance of ongoing infrastructure maintenance and condition assessment, coupled with life cycle costing;
- That governance and funding arrangements should transcend whichever political party is in power;
- Healthy infrastructure leads to a strong economy which leads to improved quality of life;
- Innovative financing arrangements are crucial to reducing major infrastructure backlogs;
- The infrastructure investment at all levels should be prioritized and executed according to well-conceived plans that both complement the national vision and focus on system wide outputs;
- Consideration of the establishment of an infrastructure bank to facilitate a mix of debt and equity financing;
- Without strong and healthy infrastructure a nation will fall behind and lose its competitive edge.

INFRASTRUCTURE FINANCING

There is the capacity for a significant portion of Victoria's infrastructure requirements to be funded by the private sector.

Australia currently has a \$1.3 trillion pool of superannuation funds, which is expected to grow to \$4 trillion over the next 10 to 20 years. Australian pension funds are global leaders at investing in infrastructure assets, investing in projects such as Melbourne's CityLink in the 1990's, and currently listed and unlisted infrastructure comprises six per cent of superannuation assets.

At this level, the continued growth of superannuation funds means that there is a significant appetite for future infrastructure investment that could finance Victoria's future infrastructure needs. The long-term nature of superannuation, where an individual may accumulate assets over, say, a 45-year period, means that superannuation is perfectly suited to investments in infrastructure, which by its nature has a long term horizon.

Over recent years, despite acknowledgement by governments of the potential for superannuation funds to invest in infrastructure, the number of infrastructure deals has been small and has not kept pace with investors' appetite for infrastructure investment. It is acknowledged that compared to other states, the Victorian Government is a leader in the use of Private Public Partnerships (PPP) to fund infrastructure development including projects such as the Victorian Desalination Plant, Southern Cross Station, EastLink and many other projects.

The Victorian Government's skill at negotiating PPPs, including through innovative financing models, is broadly recognised across the financial services industry. This puts Victoria in a strong position to utilise private sector investment to expand its existing infrastructure development program.

Currently the State's infrastructure expenditure, as outlined in the Victorian Government's Transport Plan is premised around maintaining Victoria's AAA credit rating. The Government's objective of maintaining the credit rating makes sound economic sense, and positions Victoria to withstand future economic shocks. There is a danger, however, that by limiting the Government's transport infrastructure expenditure to Government budget inputs, there is the potential for sub-optimal outputs to be delivered.

Where Government finances infrastructure through a PPP model, this enables scarce government funds to be used for other purposes. While there is a variety of projects that are suitable for private financing there other projects, such as the creation of urban and regional parks, that lie in the traditional remit of government spending and for which it would be difficult to create attractive investment opportunities. Government would be better served by not investing in projects where the private sector would willingly accept complete financial and construction risk. Investment in other more worthy projects, requiring government subsidy, is a more sensible use of scarce public resources.

Debate about the appropriate role of government and private sector infrastructure provision has been ongoing. Despite the broad acknowledgement that the private sector has a significant role to play in financing infrastructure, and despite the fact that much work has been done to build innovative financing models that better share risks and rewards, there is still a lack of successful deals.

The lack of infrastructure investment deals is impacting on competition. An increase in the number of deals would enable new entrants to enter the market and would be of economic benefit to Victoria. Melbourne is home to many industry superannuation funds. Some have been long term investors in infrastructure and there is the potential to further develop skills and expertise in infrastructure funds management. This would establish Melbourne as a global centre of infrastructure investment expertise, enhancing Melbourne's reputation as a financial centre.

While PPPs are being approached on a deal by deal basis, long-term deal success could be achieved by Government developing an infrastructure 'pipeline' of projects that explicitly identifies the areas where there is a role for private investors.

It is important that a 'new consensus' emerges, accepting that the private sector has a fundamental role to play in infrastructure financing. The Victorian Government should establish a collaborative dialogue between all stakeholders involved in infrastructure financing decision making, including community groups, constructors and investors.

9

SECTION

**COMMUNITY
INFRASTRUCTURE**

COMMUNITY INFRASTRUCTURE

The delivery of community facilities is a critical component of the social wellbeing of Melbourne, particularly key infrastructure such as hospitals, medical centres, schools, childcare, libraries and community hubs.

Community infrastructure underpins the social resilience of our neighbourhoods and enables robust local economies. It should also respond to particular locational trends, including the ageing population and migrant arrivals.

In new growth areas, the reasoning that key community infrastructure will be provided once a population base is in place is gradually disappearing. While empty schools and child care centres in yet to be developed paddocks are not an option, half-full and fast-filling schools, built in fast-growing priority neighbourhoods are.

In existing neighbourhoods, if there are no opportunities for people to share recreational and community activities, a lack of access to services and information, few places for human contact, and a monoculture of housing typologies, then barren communities with little diversity or opportunity will result. It could be argued, that Melbourne does already have such barren places for middle and even high income communities. The issue is not necessarily one of stereotypical social disadvantage.

Planning for community infrastructure should be based on one or more of the following principles:

- It responds to identified need;
- It is inclusive and accessible;
- It maximises access to opportunity;
- It creates opportunities for social interaction and cohesion;
- It provides opportunity for active citizenship;
- It promotes lifelong learning; and
- It is owned and/or governed by the local community.

The delivery of community infrastructure involves multiple partners, so early engagement of these partners to understand their aspirations and priorities is important to achieve early delivery and ensure facilities enhance the sense of place and character of local neighbourhoods. The identification of local needs should also be central to the planning of community facilities in order to maximise the impact of public investment.

New innovative models for delivery of community infrastructure and services should be considered to make such facilities more accessible, such as co-location of complementary services and local community asset ownership models.

The Committee for Melbourne is considering the establishment of a specific taskforce to focus on the topic of the planning and effective delivery of Melbourne's future community infrastructure needs.

CONCLUSION

This third volume in the *Melbourne Beyond 5 Million* series has examined the need for intelligent, long-term planning and investment in Melbourne's infrastructure to ensure that we get better as we get bigger.

This planning and investment in our infrastructure must be integrated if it is to be successful. It demands the adoption of a collaborative approach that will not only make our city better in future, but will make it one of the world's leading examples of infrastructure excellence and innovation. This collaborative approach requires whole-of-government participation via a visionary, transparent government framework, as well as increased and more active involvement from the private sector and broader Melbourne community.

However, the planning and investment of our infrastructure also needs to both consider and incorporate a wide range of alternative and smart approaches. From making better use of existing infrastructure and influencing supply and demand scenarios, to prioritising needs annually and creating a long-term vision that clearly highlights opportunities for private investment; we must draw on our city's collective talents, skills and innovation to achieve our goals.

In 2010, Melbourne is an exciting place to live and work – it's a vibrant, thriving and blossoming cosmopolitan international city. Our physical and community infrastructure has served us well over the last 150 plus years. However, as we look forward to a city beyond five million we must do so with a solid understanding of what we have, what we need and, ultimately, how best to achieve the progress we all desire.

Ultimately, as this series has consistently highlighted, if we're to get better as we get bigger we must do what our city does best: look ahead and be smart, clever, optimistic, inclusive and bold.

Let's develop a 50-year plan for our city.

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T: +61 3 9650 8800
F: +61 3 9650 6606
W: melbourne.org.au

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