

# **Employment decentralisation in South East Queensland: Scoping the transport impacts**

**Matthew Burke, Jago Dodson and Brendan Gleeson**



**Urban Research Program**

**Research Paper 29  
April 2010**



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Scoping the transport impacts**

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ISBN 978-1-921760-04-4

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## **Acknowledgements**

The authors and the Urban Research Program gratefully acknowledge the assistance provided by the Department of Transport and Main Roads during the preparation of this Research Paper. Note that the views presented in this paper are entirely our own and not those of the Department. While the Urban Research Program endeavours to provide reliable analysis and believes the material it presents is accurate, it will not be liable for any claim by any party acting on the information in this report.



## Highlights

- White collar employment in Brisbane is concentrated in the central business district (CBD) and its frame. Government office employment is especially centralised.
- Hyper-centralisation creates travel demands that have strong temporal and tidal characteristics, leading to long commutes, congestion on roads and public transport, and under-utilisation of road network capacity in the contra-peak radial direction.
- State-led employment decentralisation programs elsewhere have had some success in creating more efficient, economic and sustainable urban structures.
- Dispersed (market-led) decentralisation has generally failed to support transport sustainability outcomes.
- A range of government actions may support decentralisation, including land-use zoning, subsidies and incentives, strategic planning, and location decisions for state-sector office accommodation (relocating government jobs).
- Employment decentralisation elsewhere has been associated with congestion reduction and significant reductions in travel times for commuters, but also with increases in vehicle-kilometres-travelled by private car.
- It is not yet known what the likely transport impacts of the Queensland Government's program of employment decentralisation will be. This will likely depend on the particular decentralisation scenario employed.
- A typology of four scenarios is provided:
  1. Dispersed decentralisation,
  2. Decentralisation to inner- and middle-suburban sub-centres,
  3. Decentralisation to outer-suburban sub-centres, and
  4. Decentralisation to corridors.
- Each of these scenarios is likely to offer different outcomes for the transport network and travel behaviour in the city. It is not yet known which of these scenarios would be optimal.
- A number of methods are available to investigate these scenarios and the potential impacts of a decentralisation program in Brisbane. Geographical Information Systems (GIS) and transport modelling offer considerable analytical power.
- It is our intent to pursue such a research agenda.

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## **Executive summary**

Employment decentralisation may be defined as a process by which city-regions increase the proportion of jobs that are located outside of the central business district (CBD) and its immediate frame. The Queensland Government has committed itself to a program of employment decentralisation, seeking to move 20 per cent of its office space, or around 5,600 public servants, out of the Brisbane city centre by 2017 (Sectorwide Sep 2008:2). This intervention represents one of the first attempts at state-led urban decentralisation in Australian cities, other than in Sydney, in many decades. Depending on how the policy is implemented, and the multiplier effects achieved, this attempt at urban restructuring may have a range of impacts, including transport impacts. Such impacts have not, as yet, been appraised or explored in depth.

Our paper seeks to review the likely transport impacts, exploring experiences elsewhere, the types of decentralisation that may occur in SEQ, and means to further quantify the effects.

### **Hyper-concentration**

White collar employment in Brisbane is extremely concentrated in the CBD and its frame. There are many reasons for this ‘hyper-centralisation’, including the accessibility provided by the radial road and public transport system, planning and investment at state and local government levels and restriction of commercial office opportunities elsewhere. Though Brisbane is not completely mono-centric, none of its suburban centres contain more than 15,000 jobs. Suburban office parks are relatively small and few in number compared with many US cities. And decentralisation, either to the regions or the suburbs, has not been a strong policy objective in Queensland.

### **Transport impacts**

The city’s ‘hyper-centralisation’ is helping cause congestion. Even if the congestion effects are not as deleterious as claimed by some economists (Metz 2008) they still represent a significant and highly visible public policy problem, and a disproportionately important one for Brisbane compared to other Australian cities (Bureau of Transport and Regional Economics 2007). Congestion imposes social costs, reducing productivity, increasing stress, wastes fuel, increases greenhouse gas emissions and other air pollutants, can increase accident rates, and increases costs for freight and logistics (Weisbrod, Vary and Treyz 2003). Conceptually, if all the trip origins are suburban and the majority of trip destinations are located in the CBD and its frame, then all that can be done to limit congestion on radial links is to influence how and when people travel.

Recent concepts of transit-oriented development (TOD) seek to bring more residents to public transport nodes, to shorten trip distances and ensure that travel is on more sustainable modes (Newman 2009). TOD is proving stubbornly difficult to achieve in Australia, with little private-sector enthusiasm beyond the inner-most suburbs. A more powerful ‘solution’ appears to be to shift some of the trip destinations to locations which would reduce the growth in demand on the most congested parts of the transport network – the inner-city streets and arterial road links.

Hyper-centralisation creates travel demands that have strong temporal and tidal characteristics. City centre workers typically arrive at similar times generating an inward ‘pulse’ of congestion from the outer-suburbs during morning peak-hours and the converse during the evening peak. In contrast workers in suburban locations nearer their homes may have the opportunity to travel later, avoiding these peak times and peak radial travel volumes. Imbalanced directional flows of morning and afternoon-evening peak-hours result in under-utilisation of road network capacity in the contra-peak radial direction – a clear inefficiency of the radial road networks in mono-centric cities.

With suburbanisation continuing, long commutes are the fastest growing segment of the urban travel market in Australian and US cities (Marion and Horner 2007). The problem primarily

affects outer suburbia, not the peri-urban fringe, and is gaining media attention (Carlisle 2009). Research has demonstrated that the impact of long commutes on individuals and families is a significant cause for policy concern (Williams, Pocock and Bridge 2009:15-16). Long commutes also limit the potential for 'active' transport and individuals undertaking daily physical activity (Hamer and Chida 2008), which expose commuters, especially car drivers, to high pollutant levels (Chertock et al. 2004), and which have long been associated with stress, significant increases in adverse blood pressure and decreases in behavioural performance (Costal, Pickup and Martino 1988; Monica et al. 1988).

Decentralisation may also directly reduce public transport over-crowding, which has been associated with higher levels of individual stress and ill-health (Cox, Houdmont and Griffiths 2006).

Transport is the fastest growing contributor to greenhouse gas emissions in Australia, and the passenger car fleet is the largest single contributor (Bureau of Infrastructure Transport and Regional Economics 2009:v). If poorly implemented decentralisation could create significant increases in both vehicle kilometres travelled (VKT) and greenhouse gas emissions. Employment decentralisation may reduce the growth of noise and air pollution (such as sulphur dioxide, carbon monoxide and particulate matter) on links in and leading to the CBD. But it may increase noise and air pollution both near new suburban locations, and for the city as a whole, should road transport increase its mode share, and VKT increase.

Employment decentralisation may also have impacts on household oil vulnerability, particularly in the urban relationships and spatial geography of car dependence and mortgage tenure, which has only recently received attention in Australian cities (Dodson and Sipe 2008:380). Shorter commutes, and job opportunities nearer housing, may produce a more resilient urban structure should a period of oil scarcity emerge (Newman, Beatley and Boyer 2009).

## **Past experiences**

There are numerous examples of decentralisation including the deliberate and detailed approach to urban structuring within strongly statist developing nations such as Singapore (Malone-Lee, Loo and Chin 2001); the New Towns movement in the UK; the modest decentralisation experiences of European cities: and the mainly market-led Edge Cities of the neo-liberal US landscape (Garreau 1992). But perhaps the worst example is Kuala Lumpur and its administrative centre Putrajaya, and information-technology centre Cyberjaya, which produced an insensitive urban landscape which is 'only a functioning habitat for cars' (Brugmann 2009:115).

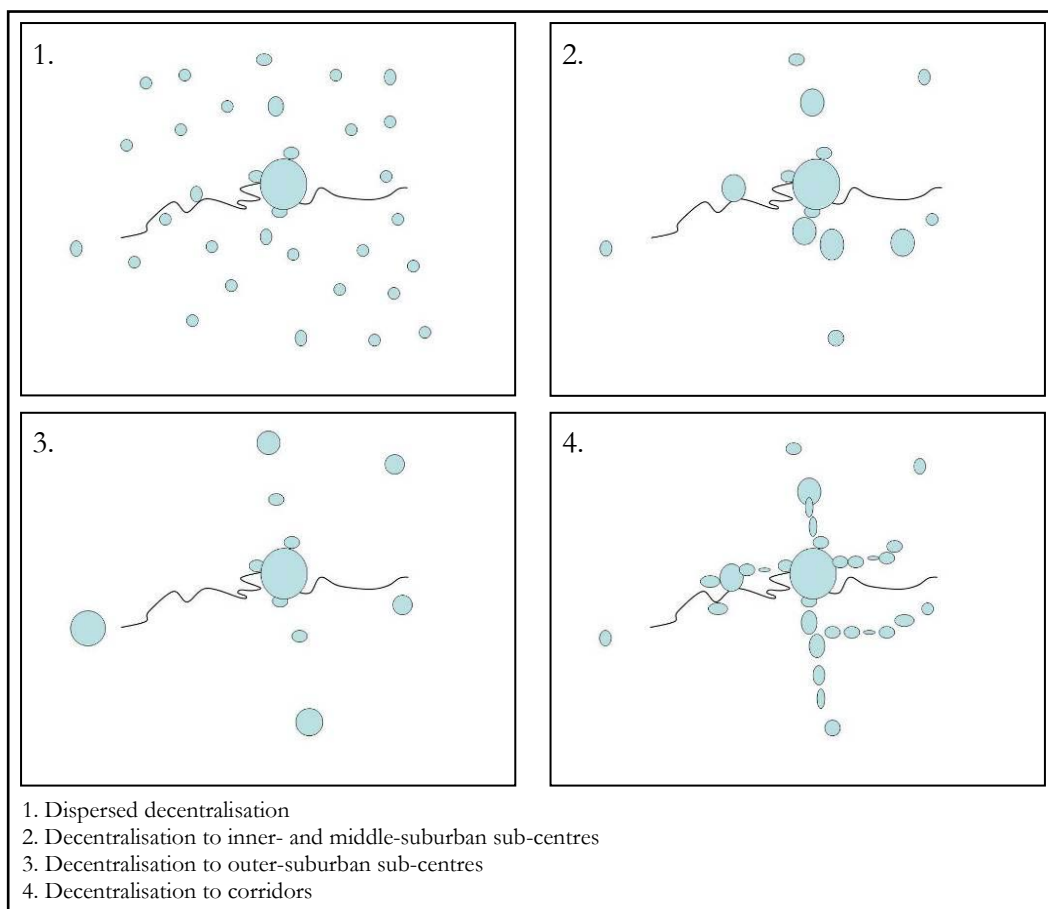
Canberra was designed to be decentralised to a set of key sub-centres. Sydney has done the most in terms of the state capital cities though, using a set of policy levers, including government office relocations, to support the development of centres such as Parramatta, Liverpool and Bankstown. Sydney's average journey-to-work distance to a set of selected employment centres increased from 17.93km in 1981 to 20.66km in 2001 – a 15.2% increase over the 20 year time period (Parolin 2005:8). This reflected the decentralisation of employment, suburbanisation of worker housing, and increased use of the motor car over this period. Importantly, the highest average journey-to-work distances occurred in those centres in the outer areas, where the theory of workers co-locating near their employment was most obviously faltering. State-led decentralisation to sub-centres has created benefits in some locations, but mixed results in others.

Dispersed decentralisation has generally failed to support transport sustainability outcomes, creating increases in car commuting, VKT, and fuel use, though reducing travel times for some cities. Planned decentralisation to key sub-centres appears to offer greater benefits, and reduced disbenefits. Only planned decentralisation to middle- and outer-suburban locations offers the advantage of increased reverse commuting on public transport.

The example of Sydney demonstrates that sustained government effort can generate significant gains from decentralisation, with positive effects on the overall structure of the metropolitan region. However the Sydney example shows that decentralisation policies require consistent and persistent planning implementation to achieve high quality outcomes.

### Decentralisation scenarios

A typology of four scenarios is provided (see Figure 1), which envisages how employment decentralisation policy may work its way out on the ground in the Australian metropolis. This typology considers all office employment, not just government sector office accommodation. Note that these scenarios are not necessarily exclusive of one another, and it may be that aspects of each could theoretically be employed. These scenarios also rely on having viable catchments of working residents for each node.



**Figure 1: Four scenarios for employment decentralisation**

### Next steps

Further research would be of considerable policy and planning assistance if it were to identify the potential or likely impacts of various employment decentralisation scenarios for Brisbane and Australian cities generally. Such analysis should test and quantify the potential transport impacts of decentralisation, while examining the interaction of transport and land-use policies under a decentralisation program.

Methodologically, this research could follow the transport and land use modelling used by Alexander (1980), Young & Ku (1996), Schwanen et al. (2001) and Horner & Murray (2003). Key measures of efficiency could include jobs-housing balance, VKT, mode share and travel time savings. Methods could also embrace the industry/occupation matching approach of Cervero and Wu (1998) or the framework provided by Alpkokin et al. (2008). Most importantly the work

could mesh explorations of the travel behaviour of relocated workers, following Bell (1991), Hanssen (1995) and Aarhus (2000), as an input to modelling to provide a new and more robust approach for exploring such issues.

It is our intent to pursue such a research agenda.

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## **Introduction**

The Queensland Government has committed itself to a program of employment decentralisation, seeking to move 20 per cent of its office space, or around 5,600 public servants, out of the Brisbane city centre by 2017 (Sectorwide Sep 2008:2). Employment decentralisation may be defined as a process by which city-regions increase the proportion of jobs that are located outside of the central business district (CBD) and its immediate frame.

The Queensland Government's intervention represents one of the first attempts at state-led urban decentralisation in Australian cities, other than in Sydney, in many decades. Depending on how the policy is implemented, and the multiplier effects achieved, this attempt at urban restructuring may have a range of impacts. Decentralisation is being promoted as assisting with everything from limiting costs due to exorbitant rents for commercial office space in CBDs, to reducing socio-spatial inequalities in employment and income, to revitalising middle-ring suburbs. There has been little consideration or analysis of what decentralisation may mean for transport systems in Australian cities, including Brisbane.

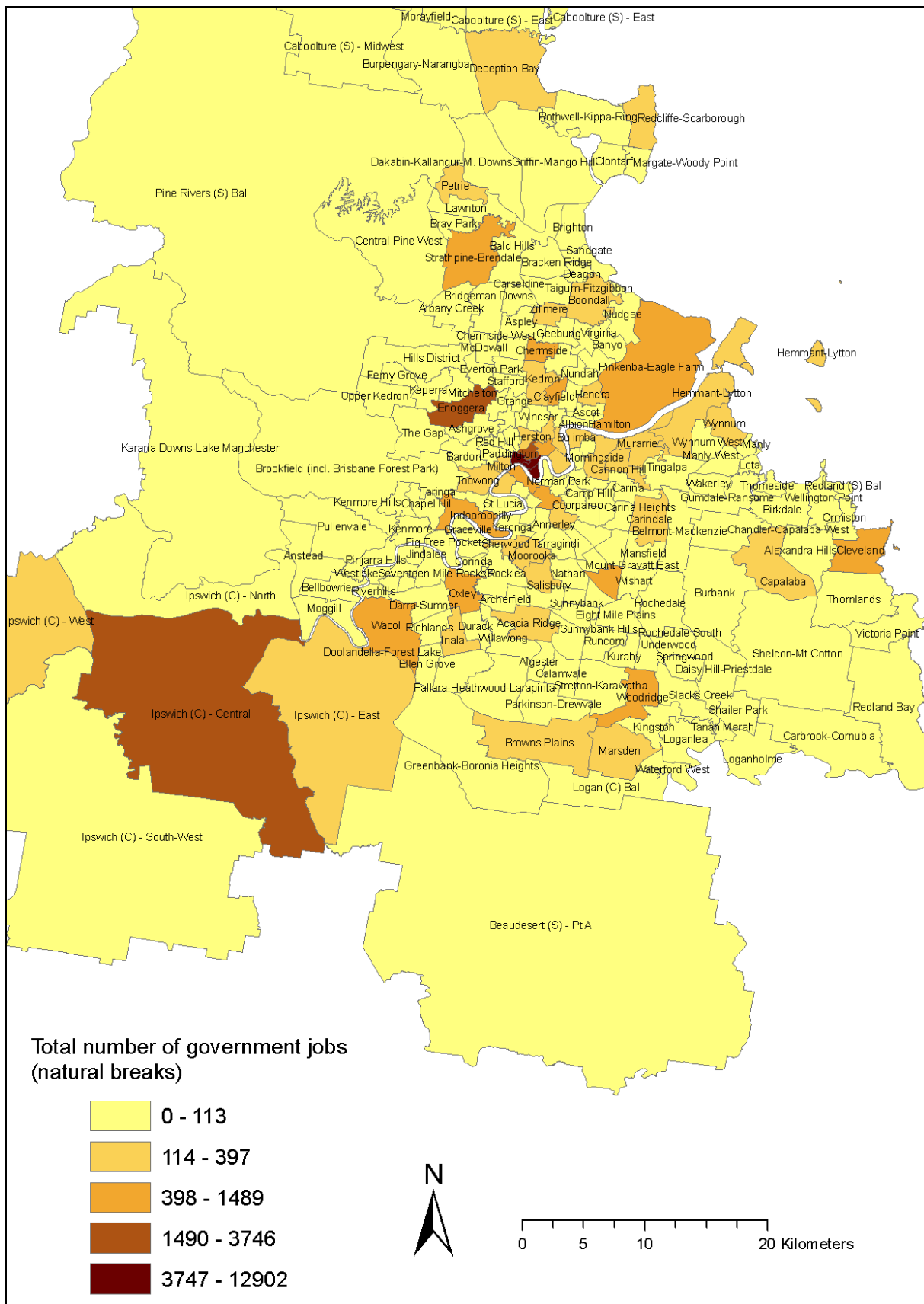
This paper examines the Queensland Government's plans for employment decentralisation and highlights the possible transport problems that decentralisation could, in theory, help to mitigate. By exploring experiences elsewhere, the type of decentralisation occurring in SEQ is assessed, and prospects for the future examined. Lessons are then drawn about what steps might be needed to make employment decentralisation support a broader set of improved urban outcomes based on past attempts at employment decentralisation, and modelling of transport outcomes in other cities.

A separate research proposal to take this work further has been developed by Griffith University, providing a research approach, study design and method that would allow for the impacts of employment decentralisation on actual workers involved in relocations to be discerned, and various scenarios for decentralisation to be modelled and appraised.

## **Brisbane's hyper-concentration of office employment**

Brisbane is highly centralised by Australian comparative levels. By the time of the late-2008 global financial crisis, urban economic restructuring and state policy had helped shape an urban structure wherein the CBD and its frame dominate office employment supported by gentrification of the inner-city in contrast to new 'aspirational' housing development on the urban fringe, and many older middle-ring suburban areas lagging behind (Randolph 2004:1). A shining 'new economy' of high technology and information-based services has made its foothold in only selected locations in Australian cities, clustered in CBDs and a few suburban business parks (Gleeson 2006:33) In Brisbane there are certainly suburban centres providing office accommodation (Toowong, Indooroopilly, Mt Gravatt, Chermside) however few feature key new economy jobs, and these sites are dwarfed in volume by the proportion of employment in the CBD.

Centralisation of employment in Brisbane is most stark for government employees. Analysis of government employee's places of work from the 2006 Census show the Brisbane CBD's dominance, as illustrated in Figure 2. Defence personnel at Enoggera and Amberley air-force base (Ipswich) hide the fact there is minimal government employment outside of the CBD.



(Source: ABS Census 2006)

**Figure 2: Government employees by SLA in the Brisbane Statistical Division, 2006**

It is not only office employment that is centralised in Brisbane. Legal services and the courts, and cultural and social institutions are mostly clustered in the inner-city. Where Sydney has decentralised health services and medical research, Brisbane has not done so (Spearritt 2009).

Even suburban sports stadia such as QEII stadium have been abandoned for redevelopment of inner-city sites (Burke and Woolcock 2009:895).

There are many reasons for this hyper-centralisation. The CBD is supported by the radial road and public transport system, including one of the world's largest commuter rail systems (per km of operating track per capita). This means the CBD provides the highest levels of accessibility for the largest volume of commuters. Planning and investment at state and local government levels has encouraged commercial development in the CBD to grow and expand. Commercial office opportunities were often restricted elsewhere, unlike in US cities where commercial strip zoning on arterial roads allowed commercial office developments to proliferate in ways not seen in Australian cities (see Barnett 1989:131-132). Brisbane has experienced strong economic growth over the last sixty years, ensuring continual demand for central land. The Brisbane CBD and surrounds suffered none of the capital flight seen in depressed US inner-city areas in the 1970s and '80s; indeed, affluent residents reclaimed the centre of Australian through gentrification often bolstered by government-led urban renewal programs (Badcock 1997). Central sites adjacent to the CBD at South Brisbane, Spring Hill, Fortitude Valley and Milton have been gradually re-developed for commercial office accommodation. Though Brisbane is not completely mono-centric, none of its suburban centres contain more than 15,000 jobs. Suburban office parks are relatively small and few in number compared to many US cities. And decentralisation, either to the regions or the suburbs, has not been a strong policy objective in Queensland. The Queensland Government abstained from the Department of Urban and Regional Development decentralisation schemes of the 1972-1975 Whitlam national government (the DURD scheme will be discussed further, below) and has not embarked on any meaningful decentralisation activities to this point.

Some observers and commentators have advocated in favour of decentralisation in Brisbane. The Urban Development Institute of Australia has promoted employment decentralisation commissioning a widely distributed report examining the benefits of such a program, including improvements to housing, employment and social-equity outcomes (see Ward 2007) Yet while this report outlines in depth numerous transport benefits should such interventions be pursued, in the critical 'Outcomes of Relocation' section there is nil reportage of any actual travel behaviour impacts, or summaries of the modelling that have been done. The omission is addressed in this paper later, though it is worthwhile summarising the presumed benefits first.

## **Transport impacts of hyper-centralisation**

Urban commuting has a clear spatial character, and reflects the patterns of travel from home to workplaces, the location of congestion effects due primarily to commuter traffic, and the travel flows on the public transport network in peak hour. Urban commuting affects transport networks in terms of traffic and passenger volumes, congestion, performance and efficiency. It impacts on the environment, particularly through noise and air emissions. And it impacts on society, especially through the stresses of long commutes and over-crowded public transport on the health of individuals and households.

### **Conceptual background**

Recent decades have seen transport authorities in Australia and elsewhere explore a plethora of travel demand management interventions to reduce traffic congestion and to shift travellers to walking, cycling and public transport. Conceptually, however, if all the trip origins are suburban and the major of trip destinations are located in the CBD and its frame, then all that can be done to limit congestion on radial links is to influence how and when people travel. Recent concepts of transit-oriented development (TOD) seek to bring more residents to public transport nodes, to shorten trip distances and ensure that travel is on more sustainable modes (Newman 2009). TOD

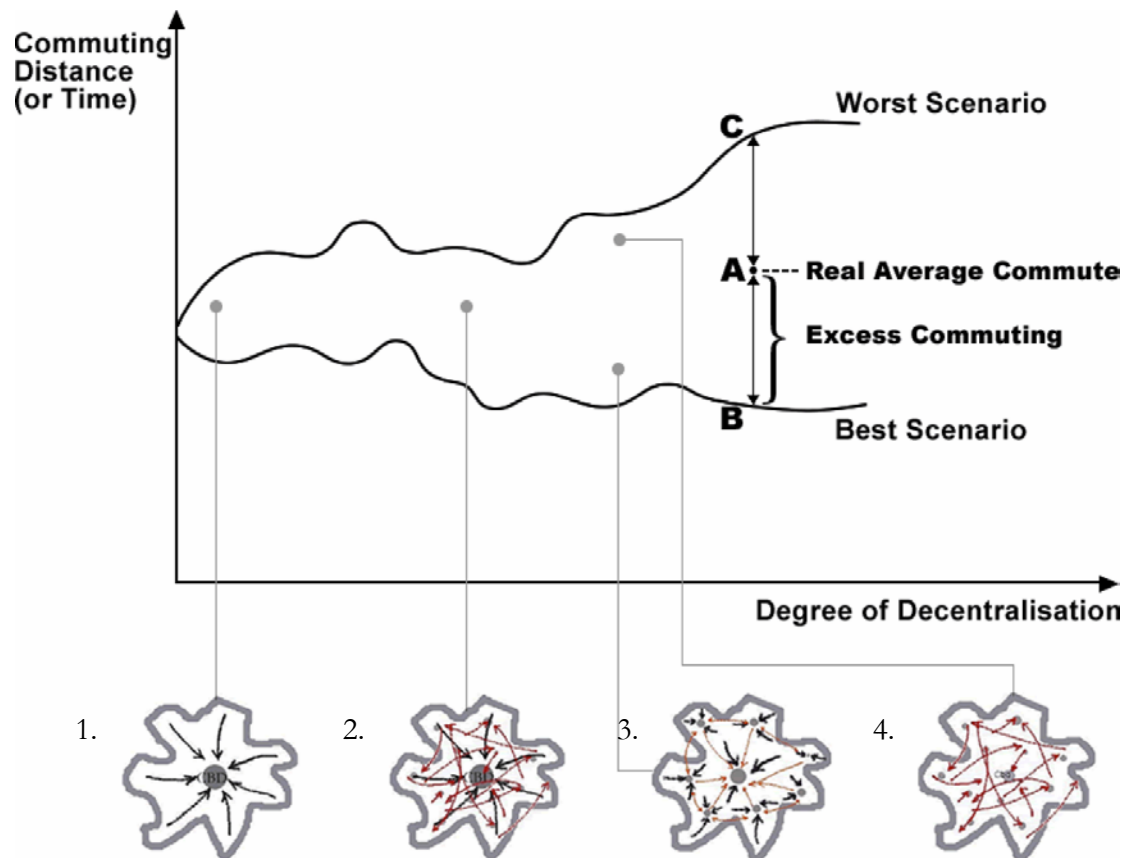
is proving stubbornly difficult to achieve in Australia, with little private-sector enthusiasm beyond the inner-most suburbs where land rents are sufficient to make medium to high-density housing development profitable. A more powerful ‘solution’ appears to be to shift some of the trip destinations to locations which would reduce the growth in demand on the most congested parts of the transport network – the inner-city streets and arterial road links.

These spatial factors are noted by Horner (2004:161):

Evidence suggests there are linkages between commuting and congestion, and efforts focusing on understanding aspects of journey to work travel could assist greatly in the management of transportation systems. From a geographic perspective, there is a clear, spatial insight into the commuting problem upon which to build. That is, the length of people’s commute is influenced, to some degree, by the spatial separation of their home and workplace, and the prevailing urban structure.

If city-regions could be restructured to reduce the distances people on average must travel from home to work, then the congestion and traffic effects of commuting would generally be lesser. As Cervero (1989:136) argues, resolving jobs-housing mismatches may ‘go a long way toward safeguarding regional mobility’. The constraints on the expansion of capacity on radial car, busway and rail networks serving inner-Brisbane have been identified in a range of reports (Queensland Transport 2008). This observation indicates that an alternative strategy which focused on changing the metropolitan urban structure may be warranted.

This alternative approach has been conceptualised by Ma & Bannister (2006) who posit this question in terms of *excess commuting*, which may be defined as the surplus or additional work-related travel that arises from the spatial arrangement of residences and workplaces in the city (White 1988).



(Source: Ma and Banister 2006:2102)

**Figure 3: Maximum and minimum commutes under four decentralisation models**

Ma and Bannister (2006) identify four models of decentralisation ((Source: Ma and Banister 2006:2102)

Figure 3). These include: 1) the mono-centric model, 2) the mono-centric model with simultaneous radial and random movement, 3) the poly-centric model with a weakened CBD but with planned sub-centres, and 4) the poly-centric model with a weak CBD, dispersed employment and random movement. The x-axis of Figure 2 shows aggregate commute travel distance (or time) for all these cities. The authors posit that city 3 would have a lower overall travel distance than the mono-centric model. However, when applying this framework to Seoul (a city which has transformed from a mono-centric model to be very poly-centric with planned sub-centres) they found that whilst there *was* a gradual decrease in aggregate commute times, there was also a significant increase in commuting distance, as people travelled further, and more often by car (Ma and Banister 2006:2110). This is partly due to the result that even if employment centres are evenly distributed across the metropolis commuters may choose distant work locations over proximate ones for reasons that are not necessarily related to commuting factors.

## **Congestion**

Australian cities have seen significant growth in CBD office employment in the last 20 years (Mees, O'Connell and Stone 2008). With free access to roads in Brisbane (other than for orbital road links) peak period demands have increased, and congestion and queuing has increased. Even if the congestion effects are not as deleterious as is has been occasionally claimed by some economists (see Metz 2008) they still represent a significant and highly visible public policy problem, and a disproportionately important one for Brisbane compared to other Australian cities (Bureau of Transport and Regional Economics 2007).

Congestion imposes social costs, reducing productivity, increasing stress, wastes fuel, increases greenhouse gas emissions and other air pollutants, can increase accident rates, and increases costs for freight and logistics (Weisbrod et al. 2003). Adding new radial road capacity to match demand is problematic because of the high cost of traversing the existing urban fabric yet is also often inefficient because these high costs are incurred to service the marginal temporally specific peak hour travel demand. Furthermore additional capacity tends to fill up with 'latent' traffic demand and can induce further traffic growth (Downs 1992; Parry 2002:334). There are still few 'easy' solutions to congestion, and the most effective – pricing and taxation – are the least popular politically (Downs 2004). Employment decentralisation at least conceptually offers the potential, to reduce traffic volumes on the most congested links in the Brisbane road and passenger transport network particularly those within and leading to the inner city and CBD.

## **Network optimisation**

Mono-centric urban structures can fail to optimise potential existing transport network capacities, forcing untimely expenditure on new infrastructure. Hyper-centralisation creates travel demands that have strong temporal and tidal characteristics. City centre workers typically arrive at similar times generating an inward 'pulse' of congestion from the outer-suburbs during morning peak-hours and the converse during the evening peak. In contrast workers in suburban locations nearer their homes may have the opportunity to travel later, avoiding these peak times and peak radial travel volumes. Imbalanced directional flows of morning and afternoon-evening peak-hours result in under-utilisation of road network capacity in the contra-peak radial direction – a clear inefficiency of the radial road networks in mono-centric cities.

Current patterns also stretch public transport resources. At present Brisbane's transport system operates mostly on what Thompson (Thompson 1977:158) describes as 'the downtown oriented transit assumption'. That is, the network structure assumes that public transport can shift from the automobile only those travellers who work in the CBD, in part due to the avoidance of road congestion. Brisbane has strong uni-directional public transport flows, with as few as 20 per cent of passengers travelling contra-flow on some of our rail and busway networks, and fewer for those sections further out in the commuter suburbs. These tidal flows have deleterious impacts

on cost-recovery. 'Dead running' of near empty contra-flow buses and trains is a significant non-recoverable component of the cost structure of our public transport services, and one reason why public transport subsidies in Australian cities remain stubbornly high (Diesendorf 2002). A recent report has indicated that dead running of the Brisbane bus fleet may be as high as 29 per cent (BCC 2009).

### **Long commutes**

With suburbanisation continuing, long commutes are the fastest growing segment of the urban travel market in Australian and US cities (Marion and Horner 2007). The problem primarily affects outer suburbia, not the peri-urban fringe, and is gaining media attention (Carlisle 2009). Research has demonstrated that the impact of long commutes on individuals and families is a significant cause for policy concern. In exploring home-life pressures in ten Australian suburbs, Williams et al. (2009:15-16) found long commutes not only generated financial and time pressures but led to deleterious trade-offs. Men traded off time with their children for the combination of lengthy commutes and working hours. Women had little choice but to abandon careers in the CBD and accept lower skilled jobs in close proximity to home, childcare and schools. The latter impacts were particularly strong in master-planned communities, where many middle-class tertiary educated women reside.

Long commutes also limit the potential for 'active' transport and individuals undertaking daily physical activity (Hamer and Chida 2008), which expose commuters, especially car drivers, to high pollutant levels (Chertock et al. 2004), and which have long been associated with stress, significant increases in adverse blood pressure and decreases in behavioural performance (Costal et al. 1988; Monica et al. 1988). Decentralisation may also directly reduce public transport overcrowding, which has been associated with higher levels of individual stress and ill-health (Cox et al. 2006).

### **Sustainability**

Transport-related environmental effects of employment decentralisation relate directly to how travel behaviour changes in the city. Should urban restructuring reduce, rather than increase, vehicular travel, it may cut greenhouse gas emissions from the transport sector. Transport is the fastest growing contributor to such emissions in Australia, and the passenger car fleet is the largest single contributor (Bureau of Infrastructure Transport and Regional Economics 2009:v). Employment decentralisation may reduce the growth of noise and air pollution (such as sulphur dioxide, carbon monoxide and particulate matter) on links in and leading to the CBD. But it may increase noise and air pollution both near new suburban locations, and for the city as a whole should road transport increase its mode share, and vehicle kilometres travelled increase.

Employment decentralisation may also have impacts on household oil vulnerability, particularly in the urban relationships and spatial geography of car dependence and mortgage tenure, which has only recently received attention in Australian cities (Dodson and Sipe 2008:380). Shorter commutes, and job opportunities nearer housing, may produce a more resilient urban structure should a period of oil scarcity emerge (Newman et al. 2009).

### **Forms of employment decentralisation**

Employment decentralisation is a process by which city-regions increase the proportion of jobs that are located outside of the central business district (CBD) and its immediate frame. Employment decentralisation does not necessarily mean reducing the absolute number of jobs in the CBD, nor does it necessarily mean displacing the CBD as the primary focus of city-region activities. Employment decentralisation simply reduces the relative concentration of metropolitan

employment that lies within the CBD. But this decentralisation must be of sufficient scale to have an appreciable effect.

Employment decentralisation can occur through the actions of the market (i.e. led by the private-sector) or via state intervention. Private-sector decentralisation is often sporadic and focused on the development of low-cost sites that have poor public transport possibility.

A range of government actions may support decentralisation, including land-use zoning, subsidies and incentives, strategic planning, and location decisions for state-sector office accommodation (relocating government jobs). It is important to note that the decentralisation of a proportion of the government workforce does not by and of itself necessitate or imply political decentralisation. Employment decentralisation involves only the location of jobs away from the city centre. In most circumstances this provides for a minor form of ‘administrative de-concentration’ rather than signifying the spatial *devolution* of government functions and decision-making to other levels of regional or local government. Decentralisation can be linked to government devolution processes, though this is usually more important for inter-urban decentralisation.

Nor does the decentralisation of government jobs necessitate restructuring of service delivery. There are many models of employment decentralisation that involve the location of management and back-office functions, rather than workers involved directly in the delivery of services to the public. Further, routine activities and administrative processes are more easily decentralised as they tend not to require constant access to key decision-makers and face-to-face meetings with other agencies. Policy activities and inter-agency activities require a level of spatial concentration that supports their retention in central places.

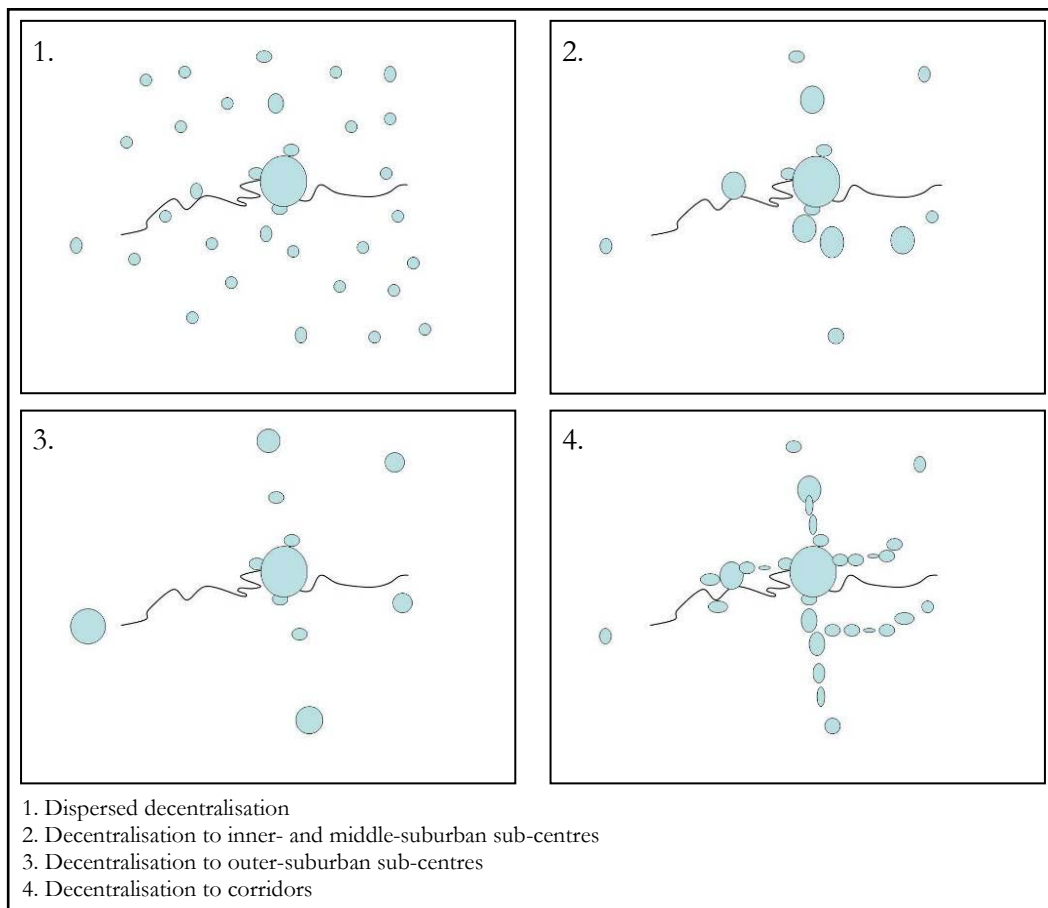
Employment decentralisation has long been linked to advances in information technology, which has reduced the costs of transferring information across distance. The addition of online video- and audio-conferencing to everything from advanced telephony, e-mail and on-line data transfer have transformed the workplace, making dispersed yet networked offices possible, if currently under utilised.

Finally, there are various ways in which cities arrange office employment across the urban landscape. The type of employment decentralisation employed in each unique city context will have its own potential for success, and its own urban impacts. Employment decentralisation may have impacts on labour markets, transport systems, housing markets, and may directly influence urban futures for parts of the city.

There is a clear distinction that must be made between inter-urban decentralisation (shifting jobs to other regions) and intra-urban decentralisation (shifting jobs within the city-region). Inter-urban decentralisation is often embedded within regional devolution programs. We emphasise intra-urban decentralisation in this discussion, given that it is the focus on enquiry in Brisbane at present.

### **A typology of employment decentralisation**

A typology of four scenarios is provided in Figure 4, which envisages how employment decentralisation policy may work its way out on the ground in the Australian metropolis. This typology considers all office employment, not just government sector office accommodation. Note that these scenarios are not necessarily exclusive of one another, and it may be that aspects of each could theoretically be employed. These scenarios also rely on having viable catchments of working residents for each node.



**Figure 4: Four scenarios for employment decentralisation**

Dispersed decentralisation would occur in a market-led situation, with only limited policy or regulatory oversight producing dispersed employment across the city at any site where land rents are low and opportunities for profit strong. There is strong potential for private sector office employment to move to poorly located and serviced business parks and light industrial estates, as well as to isolated developments in strip malls and other locations where developments, due to lower land costs at sites of low public transport accessibility. Employment in dispersed locations is difficult to service by current public transport configurations and places workers in environments where essential services and amenities are often absent. The car-dominated Edge Cities of the US, though they feature clusters of offices, show that inefficiencies may emerge under market-led approaches (see Garreau 1992). Not only do workers often have little option but to drive to and from work, they must also drive from the workplace to access meals or to undertake personal business during the working day.

Decentralisation to inner- and middle-suburban sub-centres requires planning to encourage development in clustered employment nodes. Middle suburban centres may allow some nearby workers to leave later from home, smoothing out peak hour volumes on the network a little. Inner-urban sub-centres do not provide any such advantage. Further, this model of decentralisation does little in terms of creating reverse commuting on the public transport and road networks, reducing the possible transport system efficiencies decentralisation can encourage.

Outer suburban offices also allow nearby workers to leave later from home, smoothing out peak hour volumes on the network. And they offer the key advantage of strong reverse commuting effects. But this model may also have the largest impacts on existing work units undertaking a workplace relocation, as workers residing on the other side of the city will be more dramatically affected.

For decentralisation to sub-centres to be effective, designated centres generally require co-location of other services and activities. Centres must include a range of cultural and recreational activities that are typically provided by government (legal services, health and education training facilities, art centres, recreational facilities etc.) as well as private sector banking, hospitality, retail, entertainment and other services. Such centres become major sub-regional destinations, create multiplier effects in leveraging additional employment from government workers located there. In transport terms this reduces the need for workers to use their cars to access services from their offices, mainly walking instead.

Decentralisation to corridors provides another alternative. The most obvious expression of the corridor city presently being promoted in Australia is the *Residential Intensification in Tramway Corridors* report released by the Victorian Department of Planning and Community Development (SGS Economics and Planning 2009). The kind of densification being promoted is residential and mixed use (Figure 5).



(Source: SGS Economics and Planning 2009:iv)

**Figure 5: Nicholson Street, Melbourne, before and after proposed densification**

Commercial office employment could feasibly be decentralised in a similar manner in Australian cities. Corridors of office developments already exist at sites such as St Kilda Road, Melbourne. The potential for retrofitting larger building floorplates into some existing streets may be limited though. This problem may limit the corridors where office development could occur, given the present demands of government accommodation for larger buildings.

**The SEQ Regional Plan and the Government Office Accommodation Decentralisation Project**

Present centres policy for Brisbane is encapsulated in the city’s metropolitan strategy, the South East Queensland Regional Plan. This sets out a hierarchy of

- One ‘primary activity centre’ in the Brisbane CBD;
- A small number of ‘principal activity centres’ serving catchments of regional significance; and
- A greater number of ‘major activity centres’ serving sub-regional catchments.

Out-of-centre development is inconsistent with the SEQ Regional Plan’s strategic intent (Department of Infrastructure and Planning 2009:96-97).

Though promoting this centres policy is not its primary concern, the Queensland Government’s moves to encourage targeted employment decentralisation are being influenced by the policy.

The Queensland Government's employment decentralisation policy is modest, limited almost singly to relocating a small number of government employees to inner-, middle- and outer-suburban sub-centres in Greater Brisbane. The Department of Public Works description of the program states:

The Queensland Government is moving 5600 staff from inner city to commercial centres around the metropolitan area.

The 'Government Office Accommodation Decentralisation Project' will be staged over 10 years to help contain demand for office space in the Brisbane CBD.

This will ease pressure on public transport networks and give many employees the opportunity to work close to home. (Department of Public Works 2009)

Details of the policy released to the public are sparse, and there appears significant uncertainty about what is to occur beyond the initial stages. The 'Decentralisation Initiative' is staged.

What has been publicly presented is as follows:

Stage 1 by 2011, 20,000 square metres in the north metropolitan area (Bowen Hills, Chermside and Strathpine).

Stage 2 by 2012, 15,000 square metres in the west (Ipswich).

Stage 3 by 2013, 20,000 square metres in the south metropolitan area (Buranda/Boggo Road, Mt Gravatt and Logan).

Stage 4 by 2017, 30,000 square metres in the north and west metropolitan area.

These dates are a conservative estimate, due to the high level of construction currently underway in the South-East.

Agencies moving out of the CBD will be chosen carefully, ensuring they are relocated into a hub with similar agencies and services.

Northern hub – transport-based, including Main Roads and Queensland Transport.

Western hub – part of the rejuvenation of Ipswich, with water infrastructure and statutory authorities.

Southern hub – health and eco-science (EPA, Primary Industries and Fisheries, Natural Resources and Water, Mines and Energy, and Health).

Eastern suburbs – suitable sites have been earmarked as potential locations for smaller satellite nodes to support the major hub.

(<http://www.premiers.qld.gov.au/publications/sectorwide/assets/2008-september.pdf>; accessed 15 November 2009)

At the time of writing the detailed planning for Stages 1 and 2 were well underway. Expressions of interest have been sought from the market to supply commercial office in these locations, starting with 20,000m<sup>2</sup> by 2011, which should accommodate around 1,300 workers. And the first announcements have been made in terms of which functions are moving to outer-suburban locations. This includes 400 workers from Queensland Rail's passenger transport management functions moving to Ipswich (Moore 2009a).

Media attention is now being given to how the policy will be rolled out in SEQ, and who will be affected (Moore 2009b). There are many questions the policy raises, including how the initiatives will affect the operation of the chosen Departments, how inter-departmental activities will be supported, and whether it will actually allow people to work closer to home and travel less.

Focusing on the transport-related questions, most transport and land use planners would not describe moving employment to inner-urban sites such as Bowen Hills, Fortitude Valley or Buranda as ‘decentralisation’. These sites are very central in Brisbane’s urban structure and share key network links that are already burdened with heavy CBD-related peak hour congestion. Such inner-city sites offer only limited potential for generating meaningful contra-flow public transport patronage.

One may presume that decentralised offices will be located within centres that offer some measure of ‘self-containment’ (defined here in a more limited sense to mean that there are necessary mix of urban functions within the centre that avoid the need for workers to travel beyond the centre for basic services such as meals, banking or postage). This certainly seems to be the intent at Ipswich. But this approach may not be pursued at other locations where cheaper land outside existing or designated centres may present financially advantageous access to floor-space located away from public transport and urban amenity.

It is also not yet certain how this decentralisation policy will be supported by other state and local government policies and programs, such as:

- Transit oriented developments
- Infrastructure development, including public transport infrastructure
- Streetscape and centre revitalisation programs
- Structure plans for key centres (including key aspects such as parking ratios)
- Activities of the Urban Land Development Authority (ULDA) and other actors

Many questions surrounding the DPW program remain unresolved and there may be considerable opportunities to adjust or refine the policy to ensure future office locations meet a range of urban objectives beyond the financial cost of accommodating office workers. Decentralisation program could potentially offer urban managers in South East Queensland a powerful tool to shape the region’s urban structure and to improve transport outcomes.

## **Transport outcomes of employment decentralisation**

### **International experiences**

There are numerous historical and current examples of decentralisation globally, many of which have relevance to the Australian situation. These range on a spectrum that includes: the deliberate and detailed approach to urban structuring in within strongly statist developing nations such as Singapore (Malone-Lee et al. 2001); the New Towns and office relocation movements in the UK; the modest decentralisation experiences of European cities; and the mainly market-led Edge Cities of the neo-liberal US landscape (Garreau 1992) plus more recent moves to public-private joint partnership precinct based transit oriented developments.

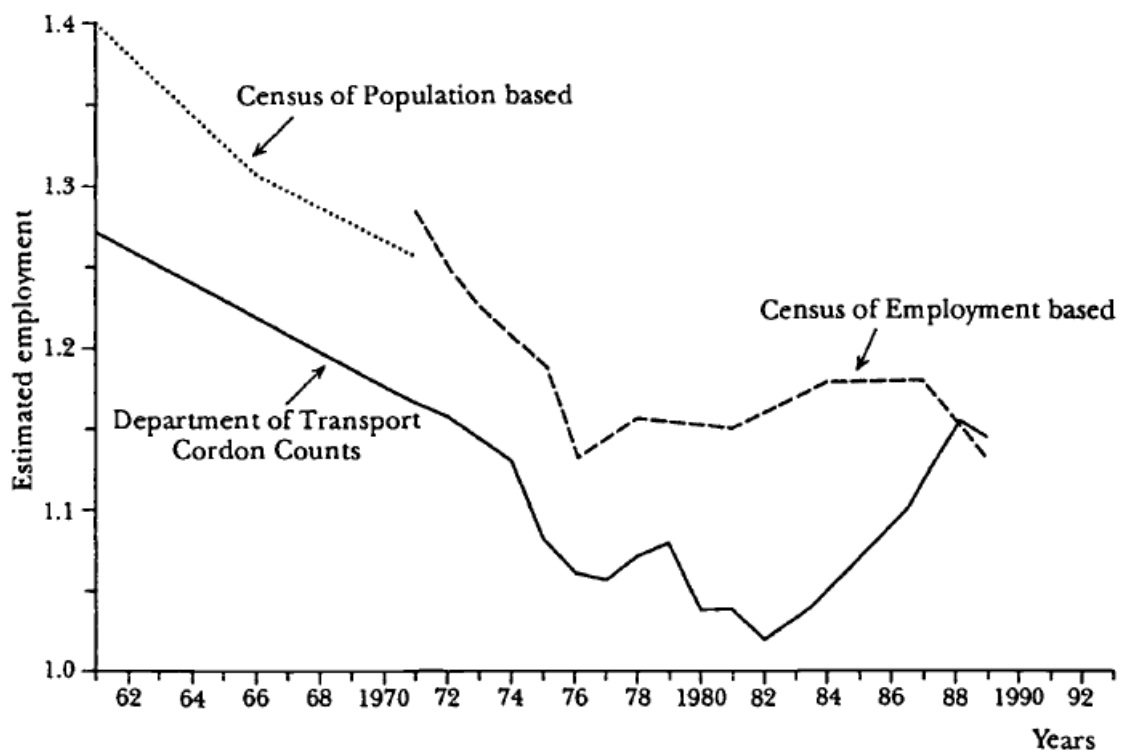
These experiences have produced mixed results, both in terms of the degree of decentralisation they have achieved relative to the city centre, and in terms of their transport and other impacts. In Singapore, one of the world’s most restrictive transport and land use planning regimes has forced a transit-orientation on the city and its populace (Wong 1998). Land development in Singapore is tightly focused on public transport nodes. And while the image of Singapore as a

pioneer of transit oriented developments of a mainly residential nature (Bernick and Cervero 1997) a key part of the Singapore regime is a set of distinct employment nodes across the island in 'Regional Centres'. (Malone-Lee et al. 2001). The city therefore enjoys both strong public transport mode shares, but also significant bi-directional flow on its transport networks, optimising the use of its infrastructure.

In European nations such as France, employment sub-centres have developed relatively close to the central business district rather than on the metropolitan periphery (Aguilera, Wengleski and Proulhac 2009:686). Central Paris actually shed a large number of jobs in the 1980s and 1990s, whilst these mainly inner-suburban centres grew. Some of the sub-centres have been developed explicitly to revitalise sites in the historically less favoured eastern parts of the city (Searle 1996:43). A consequence has been a rise in 'reverse commuting' – workers choosing to live in central Paris for lifestyle reasons, but travelling against the peak flow to access suburban employment. Yet in terms of redistributing opportunity across the urban area of Paris, few jobs have actually moved far out at all, and these reverse commutes are relatively short. La Defence, the largest non-CBD sub-regional employment node, remains within the boundaries of the municipality of Paris. Paris has also experimented with new towns, creating centres such as Mar-la-Vallée (20km east of the city) and Massey-Saclay (20km to the south-west) which incorporate regional town centres and employment nodes. These were designed to create a more 'rational distribution' of residences and employment (Tuppen 1979:56). In 1999 Massey-Saclay had 107,000 jobs, with only 92,200 workers resident locally, meaning it functions as an important employment node in the greater region (Bontje and Burdack 2005:321).

In the UK, more attention has been given to inter-urban decentralisation (as opposed to intra-urban) with the development of the post-war new towns. The UK new towns policy was driven by a range of policy objectives only some of which related to urban efficiency. Most new towns were built beyond the periphery of London which was limited in its outward developmental potential by a firmly enforced 'green-belt' policy. The new towns program also viewed decentralisation as a national security objective which would disperse urban populations and render them less vulnerable to wartime aerial strikes. The UK new towns were intended to provide for local employment opportunities rather than relying on commuting to the metropolis and thus were not supplied with high quality public transport. The majority of wage-earners in post-war UK new towns, such as Milton Keynes and Redditch, work locally and commute internally (Cervero 1995:48) although the new towns overall still experience high levels of radial commuting to London and are highly car dependent due to poor public transport provision. That said, the majority of commuters from the new towns to central London travel by rail.

The UK also used government office relocation as a key strategy. The actions of the Location of Offices Bureau from 1963 to the mid-1980s promoted the relocation of workers from central London to reduce road congestion, decrease over-crowding on public transport, and to slow the replacement by offices of other land uses in the CBD (Hall 1972:385-386). There was a significant decline in central London employment, particularly in the years 1963 to 1976, with commensurate reductions in traveller flows into the central area, as shown in Figure 6.

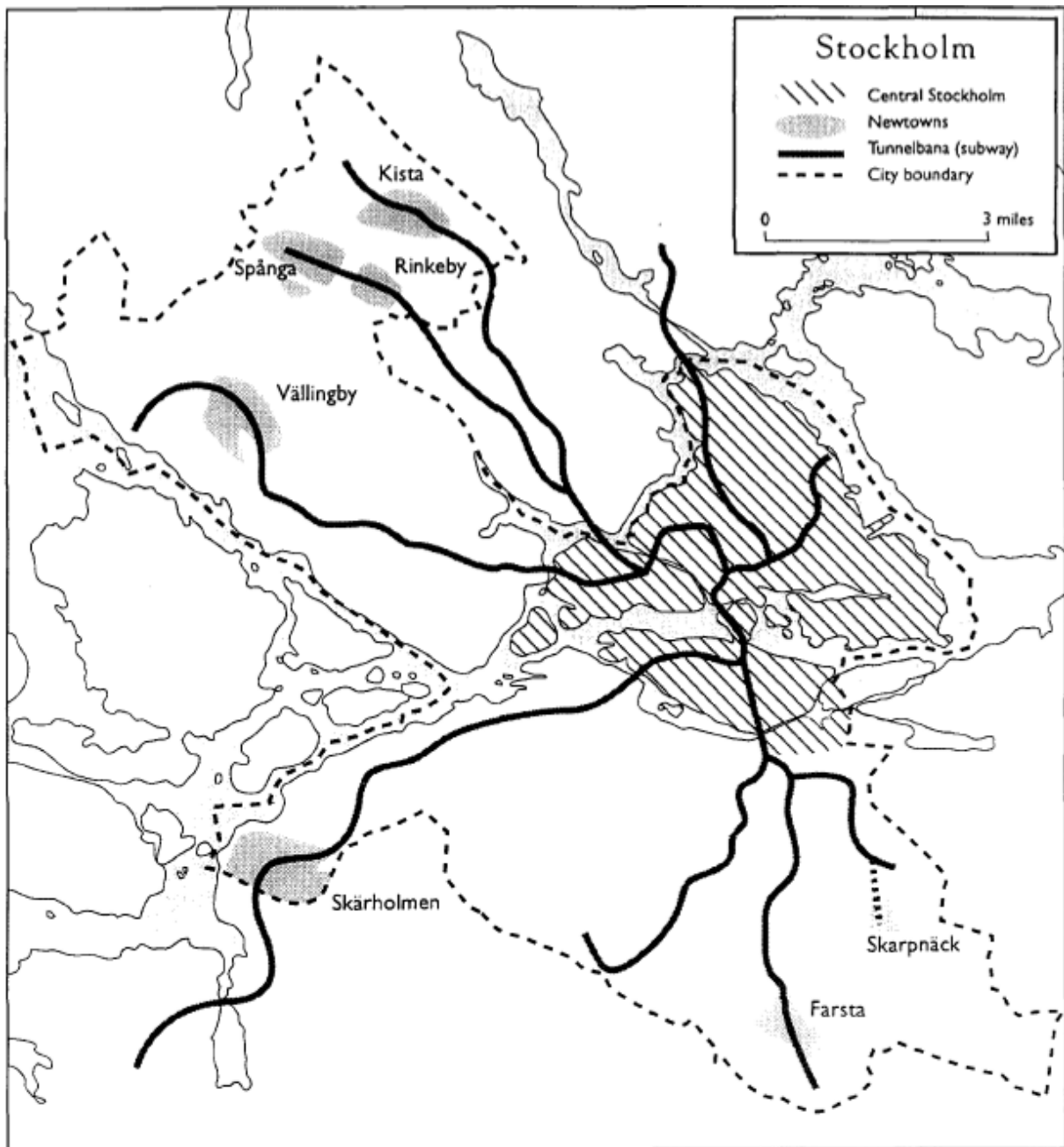


Estimates of employment in Central London. Sources as indicated. (Note that 1977 is omitted from Census of Employment figures due to problems encountered by the Census in allocating incomplete postcodes. Such addresses were allocated to the Westminster Employment Office Area and the Department of Employment has estimated that the statistics for Westminster are overstated by 50 per cent).

(Source: Frost and Spence 1993:550)

**Figure 6: Declines in Central London employment and travellers entering the central area, 1962-1992**

In Stockholm, stronger planning meant the development of new towns (or, more accurately, outer-suburban communities) took place only on the commuter rail system, in relatively short commuting distance to the CBD (see Figure 7). These centres were less self-contained than their UK counterparts, though they still included considerable levels of employment – Vällingby had equal jobs to the resident workforce. The majority of commuting external to the centres was by train, and so overall their travel was more sustainable than in the UK (Cervero 1995). However, Naess and Sandberg (1996) found for those workplaces that moved to the new centres, there were immediate increases in the average commuting distance of Stockholm workers, which were not reversed by subsequent staff turnover. Critically, the location of the new centres, nearer the outer-suburban termini of the rail lines than in the inner-city, created relatively strong employment nodes that could attract contra-flow public transport trips.



(Source: Cervero 1995:42)

**Figure 7: Stockholm's new towns**

By contrast to Stockholm the mainly market-led and dispersed employment decentralisation in the San Francisco Bay Area has not had the desired transport impacts. An analysis by Cervero and Wu (1998) found little evidence of self-containment and no decrease in mean commute trip distances or travel times in San Francisco due to employment decentralisation there. In general, where the proportion of suburb-to-suburb commutes increases in cities, the more that car use tends to increase as workers travel further, faster and more often by car (Aguilera et al. 2009) and follow routes not served by existing public transport services (Thompson 1977).

Perhaps the worst experience of employment decentralisation, in transport terms, has been the experience of Kuala Lumpur, where carefully planned car-oriented centres have flourished. The development of the outer-urban administrative centre Putrajaya, and the information-technology centre Cyberjaya, were both with minimal public transport provision in a city experiencing rapid motorisation (Barter 2004). The result has been a precipitous decline in public transport mode share and one of the fastest rises in per capita vehicle-kms-travelled for any city in recent years.

As Brugman (2009: 115) describes the Putrajaya plan as having produced an insensitive urban landscape which is 'only a functioning habitat for cars'.

The governance structures and political cultures of Australia mean that the statist approach of Singapore, guiding the investment location decisions not just of the state but of large sections of private business, are not directly transferable. However, there are lessons in how urban structure can optimise public transport use and bring diverse employment opportunities to all parts, despite encouraging employment to move to the suburbs. Whilst the worst excesses of Edge City development have been prevented in Australia by more robust regional planning regimes and the radial orientation of functioning public transport links, the model has some application to Australia, especially at locations such as Springfield, in Ipswich City, which has ambitious planning in place for commercial offices, education, retail and other functions in its town centre, plus firm budgeted plans for a rail connection.

## **Employment decentralisation in Australian cities**

### *Federal Government*

The main attempts at employment decentralisation supported by the Commonwealth have been inter-urban regionalisation, rather than intra-city decentralisation. The highpoint of such activity followed the Whitlam Government's victory in 1972, and the establishment of the Department of Urban and Regional Development (DURD). As noted by Self (1995:248) immediately prior to this period, the states had promoted regional development with loans, development of industrial sites, freight subsidies and payroll tax concessions, many of which applied unselectively across almost entire state areas. The result was 'scattergun decentralisation'. DURD sought to avoid these errors, promoting decentralisation to centres, within and across cities.

Bathurst-Orange (NSW), Albury-Wodonga (NSW/Vic) and Monarto (SA – later scrapped) were all promoted by DURD as sites for regional development. Self (1995:249-250) suggests the failures of these sites to meet their targets were due to the policies being too ambitious, financial problems in the development corporations set up to administer each town (due to acquiring too much land at inflated prices), and lack of cooperation by local governments and by state agencies. The decentralisation program was abandoned by the cessation of DURD funding under the Fraser government. The failure of these initiatives should be seen as a failure to develop a bi-partisan approach to urban issues.

The only meaningful intra-city decentralisation brought about by DURD included the ex-urban developments of Campbelltown in Sydney. The Campbelltown 'new town' in Western Sydney was formed to create a new sub-regional centre and including local industrial employment, low-income housing and recreational facilities from a set of six existing small rural villages. White collar professional employment was not a component of this activity. The Campbelltown project never achieved its ambitions, again largely because of a lack of bipartisan support.

There has been little dedicated government action on metropolitan decentralisation since the 1970s. The establishment of the Department of Housing and Regional Development (DHRD) and its 'Better Cities' program, which ran from 1992 to 1996, focused on revitalising inner-city precincts such as New Farm in Brisbane and Southgate in Melbourne, job-creation in problem areas such as outer-Western Melbourne, and public transport investments including tram and rail extensions (Luk 2003:86-87). Employment decentralisation, particularly of professional jobs to suburban centres, was not a component of the Better Cities scheme. Otherwise the location of sections of certain federal departments, such as Australian Tax Offices in Parramatta (Sydney) and Chermside and Mt Gravatt (Brisbane), has been the only meaningful federal intervention.

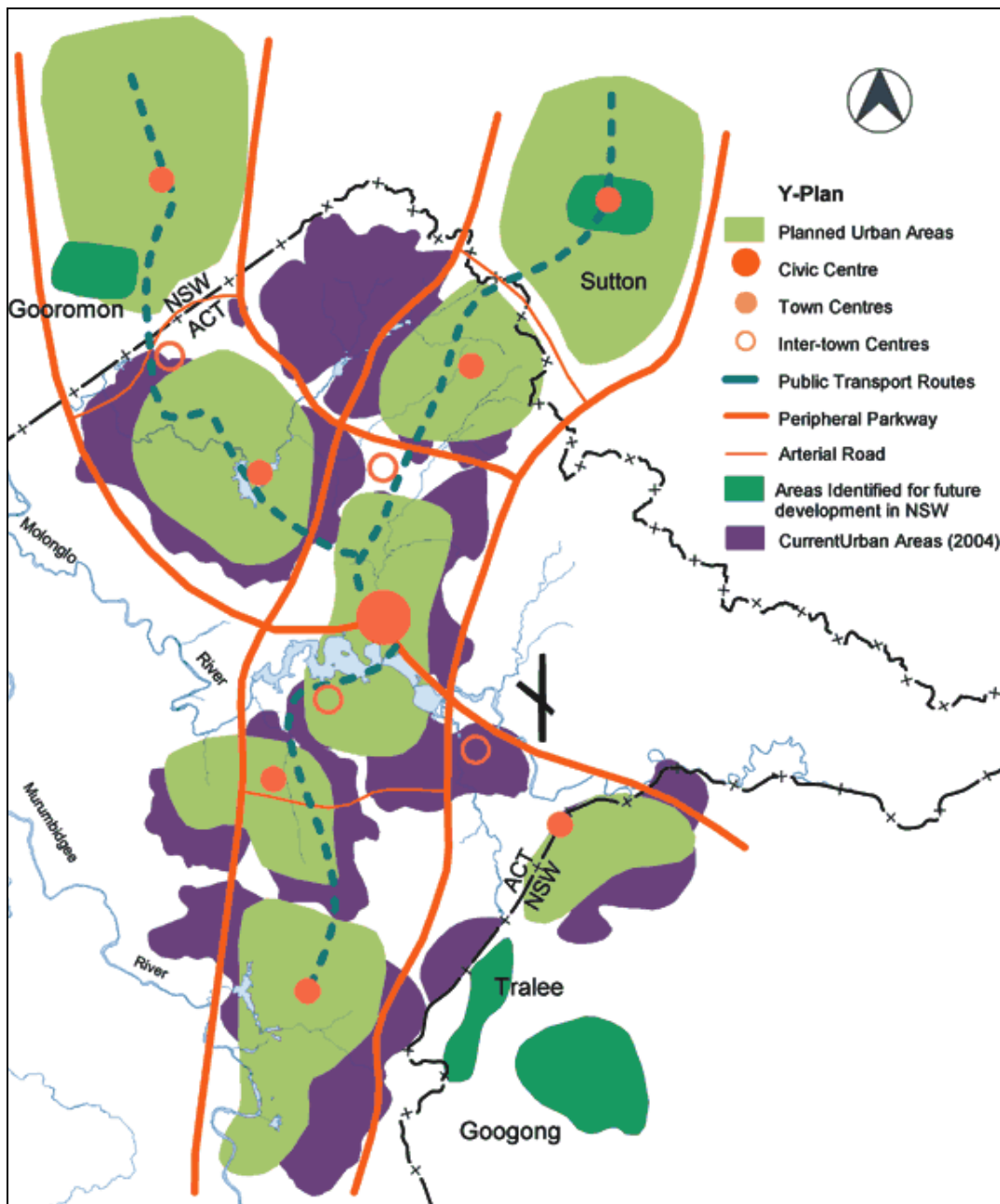
### *Melbourne*

Melbourne's metropolitan planning scheme of 1954 pursued a form of decentralisation via five suburban 'district centres'. Enforcement of this policy was limited and the policy was largely abandoned in the subsequent 1971 plan in favour of metropolitan expansion along weakly described, and subsequently weakly applied, suburban corridors. The 1980 Melbourne Metropolitan plan introduced a set of 20 existing and proposed 'activity centres' reflecting the previous district centre policy. All of these lay on rail lines. Despite a statutory requirement for large office and retail developments to locate at these activity centres from 1983 onwards, there was significant resistance, continued and often successful attempts by non-designated shopping malls to expand, and the policy was breached when Coles Myer were allowed to develop their large corporate headquarters at Tooronga (see Logan 1986). McLoughlin (1994:1116) suggests that by 1993 it was obvious 'by far the greater proportion of new retail and commercial growth was occurring outside the ... centres' when the incoming Kennett government gave the green light to numerous shopping mall expansions. The next major planning approach to decentralisation emerged with the 2002 Melbourne 2030 metropolitan strategy which included 112 activity centres across the metropolitan area. This activity centre policy has been widely criticised however because the number of activity centre sites impedes the achievement of substantive concentration. An update to Melbourne 2030 released in March 2009 includes a proposal for five additional 'CBD' nodes in middle and outer suburban locations although the implementation strategy for this new policy is indistinct. There remain outstanding issues like lack of land assemblage or infrastructure provision by government, and therefore little likelihood of success.

Notwithstanding, employment decentralisation in Melbourne has actually been a prominent feature of the city's post-WWII development. But much of the development that has occurred in middle and outer ring locations in Melbourne is highly dispersed and has failed to support a range of planning objectives, such as (public) transport and land-use integration. The dispersed journey patterns that result cannot be conveniently served by radial public transport systems (Mees 1995:21). There is evidence that some re-centralisation has occurred with the rise of the 'information' economy focused on the CBD, with a significant increase in business services and finance jobs in the 1990s (Tsutsumi and O'Connor 2006). A recent consequence of centralisation has been the interplay of housing markets and transport systems. There is anecdotal evidence that some households with CBD employed members have been pushed out of inner housing markets but are locating near rail lines to ensure commuting accessibility and have added to strains on network capacity.

### *Canberra*

The national capital's urban structure is organised around a set of employment centres both within Civic, at Russell and Campbell and the parliamentary triangle, as well as in the suburban town centres. These were largely set out in the 1965 and 1970 plans for the city (National Capital Development Commission. 1970). Large government offices were located in Belconnen, Woden and Tuggeranong, with more being directed to Gungahlin town centre today. Though Canberra is a small city (presently fewer than 350,000 persons) some 40 per cent of the workforce is employed in either government administration or defence, ensuring strong metropolitan demand for office accommodation.



(Source: ACT Government)

**Figure 8: Canberra's 1960s Y-Plan and urban areas in 2004**

Canberra's urban structure was explicitly selected in part to protect the city from land use and transport pressures (National Capital Development Commission 1970:61). It sought to reduce the 'length and cost of the journey to work; to minimise traffic congestion; to reduce public investment, and to provide opportunities for people to live and work in the same town' (National Capital Development Commission 1984:54). With generous road provision, built on an extensive arterial road plan with no significant segregated line-haul public transport, the city is highly car dependent. But it does not suffer the traffic congestion the city might expect were it to be highly centralised. However Canberra suffers from weak activity concentration. Despite its centrality the nominal Civic centre situated at the crux of the 'Y' has not until recently achieved a high level of activity intensity despite the presence of a number of departments and retailing functions.

Some of the potential advantages of a dispersed metropolitan structure have not been achieved in Canberra. Employment self-containment was a major objective of the 1970 Canberra 'Y' plan this has not been substantively achieved in practice. Tuggeranong, for example, where 25 per

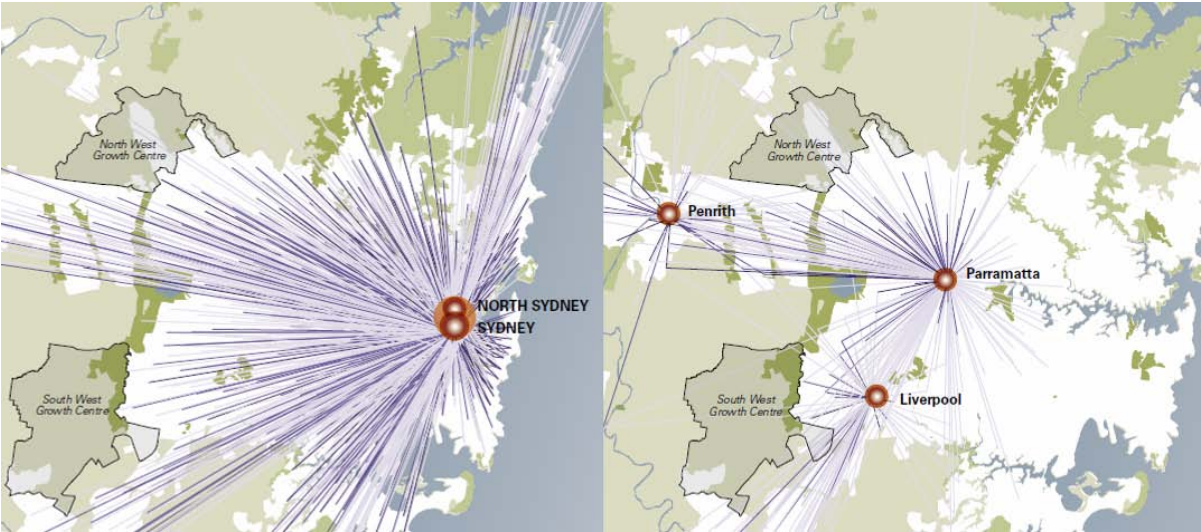
cent of the city’s population resides contains just 9 per cent of metropolitan employment. Similar imbalances are apparent for retail activity of which 30 per cent is located in Fyshwick while tertiary education is concentrated in the city centre and in Belconnen. Canberra has been criticised for being under-centralised, with the current ACT spatial plan seeking to revitalise Civic. Despite the linearity of the ‘Y Plan’ the highly decentralised structure of Canberra has been used to justify a lack of investment in line-haul public transport, although this is a matter of some debate. Further, there has also been a lack of migration of government offices into the Tuggeranong town centre.

*Sydney and NSW*

The NSW government has perhaps provided the strongest degree of Australian support to employment decentralisation through its planning of activity zones within Sydney. The earliest large-scale strategic plan for Sydney, the *County of Cumberland Plan* (1948) proposed the division of the city into districts, each with a distinct centre, in addition to the CBD. The *Sydney Regional Outline Plan* (SROP – 1968) went further designating Parramatta as the site for a second Sydney CBD.

Parramatta has achieved some success – possibly the most noteworthy example of intra-metropolitan decentralisation seen in Australia thus far. Beginning with only 10,000 jobs in 1970, by 2005 around 40,000 persons worked in Parramatta’s civic heart, including jobs in the key employment categories of business and finance (New South Wales Government 2005:86).

In the current metropolitan strategy, *City of Cities* the NSW Government proposes to strengthen three further key ‘regional cities’ within greater Sydney – Parramatta, Liverpool and Penrith – which already act as significant employment attractors. These operate without much meaningful regional self-containment – as shown by journey-to-work plots (see Figure 9). In total 27 existing strategic centres are identified in the *City of Cities* plan, and the strategy seeks to distribute an additional 236,000 jobs within these locations. Local governments are to be forced to show that their planning controls provide for future commercial development in these centres, small grants have been provided for centre revitalisation projects, and there are infrastructure plans that support these locations increased employment function (New South Wales Government 2005:89-94).



(Source: NSW Government 2005:105)

**Figure 9: Origin of work trips to Sydney/North Sydney (left) and to Penrith, Parramatta and Liverpool (right) in 2001**

The analysis of successful decentralised employment sites in Sydney, such as Parramatta, Liverpool and suburban town centres such as Chatswood (approx. 20,000 jobs) include that they are located on a major rail line, play a role in bus-rail interchange, have been designated by state planning authorities as subregional centres since as early as the 1940s, and, most crucially, have benefited from the planned decentralization of public sector employment by the NSW Government (Freestone and Murphy 1998:289).

Decentralisation went out of favour in the early 1980s in part due to recession and over-supply of commercial offices. But it returned with later in the decade when a total of 7,500 government jobs were designated for relocation to Western Sydney by 1990, with 4,500 of those going to Parramatta (Searle 1997). Large elements of many government departments were moved and some had multiplier effects on allied private agencies. For example, Housing and Planning departmental functions moved to Parramatta which drew the Housing Industries Association offices to Parramatta. Some of the government functions moved out in Sydney were later moved back to the CBD or to inner suburbs such as Ashfield, but not without having demonstrated their powerful decentralisation potential. Other functions continued to be decentralised with the Roads and Traffic Authority, Sydney Water and the Police all sending work units to Parramatta, and the Workcover Authority moving to Gosford (Ward 2007:9).

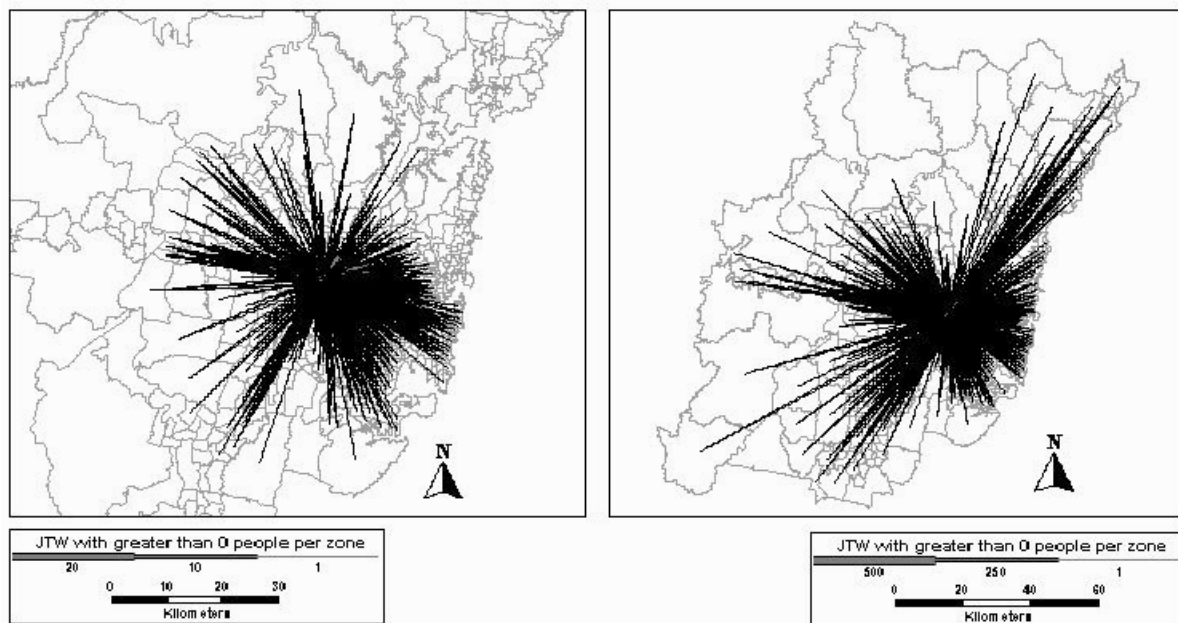
In terms of transport effects, the more recent experience in Parramatta suggests that clustered groups of activities may have an effect on both co-location and on work-related travel during the day. The recent relocation of the NSW Attorney General's Department from Sydney's CBD to Parramatta helped establish a larger cluster of judicial and policing functions, including the NSW Police headquarters, a planned children's court, the Sydney West Trial Court Complex and the University of Western Sydney's College of Law and Business (Ward 2007:14). How such clustering may affect employee travel behaviour is not known, but will be mediated by the particular transport/land-use characteristics of the area.

There is certainly a 'dark-side' to the Sydney experience. Employment has moved to suburban business parks in various locations, some of which were planned for transit investments that never materialised, and others which were always car-centric. The Norwest Business Park in the Hills District, in particular, has little prospect of improving its mode shares and sustainability from commuter travel until a rail link is provided. As Freestone and Murphy (1998) have shown however, Sydney has not experienced US-style edge city development.

There is also a nuance to the program in Sydney post the election of the Greiner government in 1988. Searle (Searle 1997:16-17) suggests decentralisation shifted away from a more state-led and directed relocation program prior to 1988 (mainly to Western Sydney) towards a more market-led approach. After 1988 individual state agencies were handed responsibility for the location of their own offices. Given the high level of rents during an office boom, many chose to relocate to sites cheaper sites conservatively located in the lower North Shore, rather than to sites to the west that may have offered better urban restructuring benefits. In this way, post-1988 relations 'essentially reflected private sector relations' (Searle 1997:17).

Parolin's studies of urban structure and the journey-to-work (Parolin 2005; Parolin and Kamara 2003) show Sydney's average journey-to-work distance to a set of selected employment centres increased from 17.93km in 1981 to 20.66km in 2001 – a 15.2% increase over the 20 year time period (Parolin 2005:8). This reflected the decentralisation of employment, suburbanisation of worker housing, and increased use of the motor car over this period. Importantly, the highest average journey-to-work distances occurred in those centres in the outer areas, where the theory of workers co-locating near their employment was most obviously faltering. Decentralisation occurred during a period where commutes lengthened. The link to suburbanisation is most

obvious when one views the origin-destination plots for 1981 and 2001 for Parramatta (see Figure 10).



(Source: Parolin 2005:9)

**Figure 10 Origin-destination plots for journeys-to-work in Parramatta, 1981 (left) and 2001 (right)**

In terms of mode shares, the proportion of trips made by bus and by train fell, and the proportion of trips made by car rose, across all the employment centres (Parolin 2005:10), though Parolin did not disaggregate this to inner-, middle- and outer-suburban centres. But most critically, there was no thought in Parolin's analysis of what may have happened to journey-to-work travel if Sydney had moved to a different urban structure either of more mono-nucleated employment, or of more dispersed decentralisation.

### *Brisbane*

Brisbane is extremely centralised, particularly for State Government employment. It has been reported that government accounts for over 20% of CBD office lettings, in marked contrast to Sydney and Melbourne, where less than 10 per cent of office space is occupied by government (Spearritt 2009; Ward 2007:43). Brisbane has never been subjected to the kind of deliberate decentralisation pursued in Sydney.

There has been some decentralisation driven by the Federal government, which located Australian Tax Office (ATO) nodes at Chermside and Garden City, Mt Gravatt. The main experience with state government decentralisation in Brisbane was the recent relocation of Emergency Services employees to Kedron. These examples highlight the possible transport implications of poor decentralisation location decisions. Garden City was not a significant transport hub nor transit oriented site until the development of the South-East Busway and many local spatial and design characteristics limit its functional value as a decentralised employment site beyond its existing retail function. The ATO offices at Garden City remain surrounded by a sea of car-parking while the built form of the centre lacks design sophistication and human scale. At Chermside the Northern Busway will eventually provide segregated line-haul transport for the first time since the removal of trams in 1969. Until then, Chermside will remain car-oriented. The Kedron site is similarly car reliant. Anecdotally, car parking ratios at the Kedron site were sufficient that each Emergency Services employee obtained a private car parking space at their new place of work. And very few persons in the workplace used public transport for their

journeys-to-work. This is not surprising given the relatively low levels of public transport service offered at a site distant from existing line-haul dedicated right-of-way public transport.

Replicating the ATO and Emergency Services experiences in decentralisation should be discouraged. If repeated at scale this approach would likely worsen mode share and further entrench automobility.

Yet SEQ has many locations that could serve as decentralisation sites while supporting support transport objectives (including Chermside and Mt Gravatt following recent and planned busway investments). The metropolitan rail network is extensive and operating below capacity on some lines, especially in the peak contra-flow direction. Many stations have little or no significant development and with an appropriate land assembly program could support considerable new activity. And there may be some opportunity to pursue corridors of activity, as proposed for radial corridors in Melbourne. Something of this form is already occurring along the rail stations immediately west of the Brisbane CBD (i.e. Milton, Toowong, Taringa, Indooroopilly) and could conceivably occur in other locations.

## **Summary**

The international and local experience provides certain key insights. State-led decentralisation to sub-centres has created benefits in some locations, but mixed results in others. Dispersed decentralisation has generally failed to support transport sustainability outcomes. The lack of attention to the potential planning value of decentralisation for Australian cities, whether through dedicated scenario evaluation or through international comparative work is a key research deficit. Further research would be of considerable policy and planning assistance if it were to identify what the potential or likely impacts of various employment decentralisation scenarios might have in Brisbane and Australian cities generally. Such analysis would test the potential transport impacts of decentralisation while examining the interaction of transport and land-use policies under a decentralisation program. Such analysis could also identify what new planning opportunities are created if decentralisation were to be pursued – for example leveraging new transport infrastructure investment from suburban activity concentration.

## **Research methods for exploring employment decentralisation in Brisbane**

Researchers have used a number of methods to rationally assess the impacts on commuting patterns for different urban structures. It is beyond the scope of this paper to exhaustively explore all previous work in this field. Instead, a set of key research approaches and methods are described here, highlighting major opportunities and limitations.

### **Land use-commuting modelling**

The rise of geographic information systems (GIS) and large regional household travel survey (HTS) datasets has allowed researchers to explore in greater detail the transport implications of differing urban structures. The main approach has been to harness the scenario-testing capacity of large transport and land use models, or versions thereof, to test the transport impacts of different urban structures.

Alexander (1980) pioneered some of this work, exploring two decentralisation scenarios for Sydney, one concentrating activities to large sub-centres, the other to a broader set of small sub-centres. Using what is today relatively rudimentary four step modelling, he found that both scenarios resulted in considerable work-journey time savings for employees in relocated offices (particularly women) and improvements in job access for suburban residents. The large sub-centre option offered greater net benefits to both employees and firms. But both scenarios generated road congestion, increased fuel consumption, generated losses (in passengers and

revenue) for public transport operators, and created some inequities of access for ‘captive’ public transport users (Alexander 1980:249).

Young & Ku (1996) explored the impacts on travel of three development scenarios for Canberra – a tightly mono-centric model, a model where employment and housing were decentralised to 5 specific centres, and a dispersed decentralisation model. Contrary to expectations, their results suggest that a policy of intense central area intensification will not reduce citywide car travel or increase transit travel, at least in Canberra. Higher densities of population and employment around selected transit nodes are desirable, but these should preferably be located in the middle suburbs (Luk 2003:87-88, 94).

International studies using a similar approach include the work of van der Laan et al. (1998) Schwanen et al. (2001) and Horner & Murray (2003). Key measures of efficiency include jobs-housing balance, VKT, mode share and travel time savings.

### **Type of commute in poly-centric cities**

Methodologically, it also helps to consider the type of commuting evident in cities, in terms of urban structure. A helpful way forward was provided by Van der Laan et al. (1998), who in an attempt to refine and improve models of excess commuting distinguished four types of commute ‘structures’ in cities:

1. Central: where commute flows are predominantly radial, oriented towards the CBD
2. Decentral: where the suburbs attract commuters from other suburbs and the CBD
3. Cross-commuting: where suburban commuters work in other suburbs, and inner-city residents work in the CBD
4. Exchange-commuting: where suburban commuters travel to the CBD, whilst many CBD residents travel to work in the suburbs (see Schwanen et al. 2001:176).

Exploring the type of commuting being experienced at particular sub-centres, in key sub-regions, in corridors, or in the city as a whole, is a useful means to gain insight into the behaviours being modelled. These commuting types may be identified from census data or household travel survey datasets for the city.

### **Industry/occupation matching**

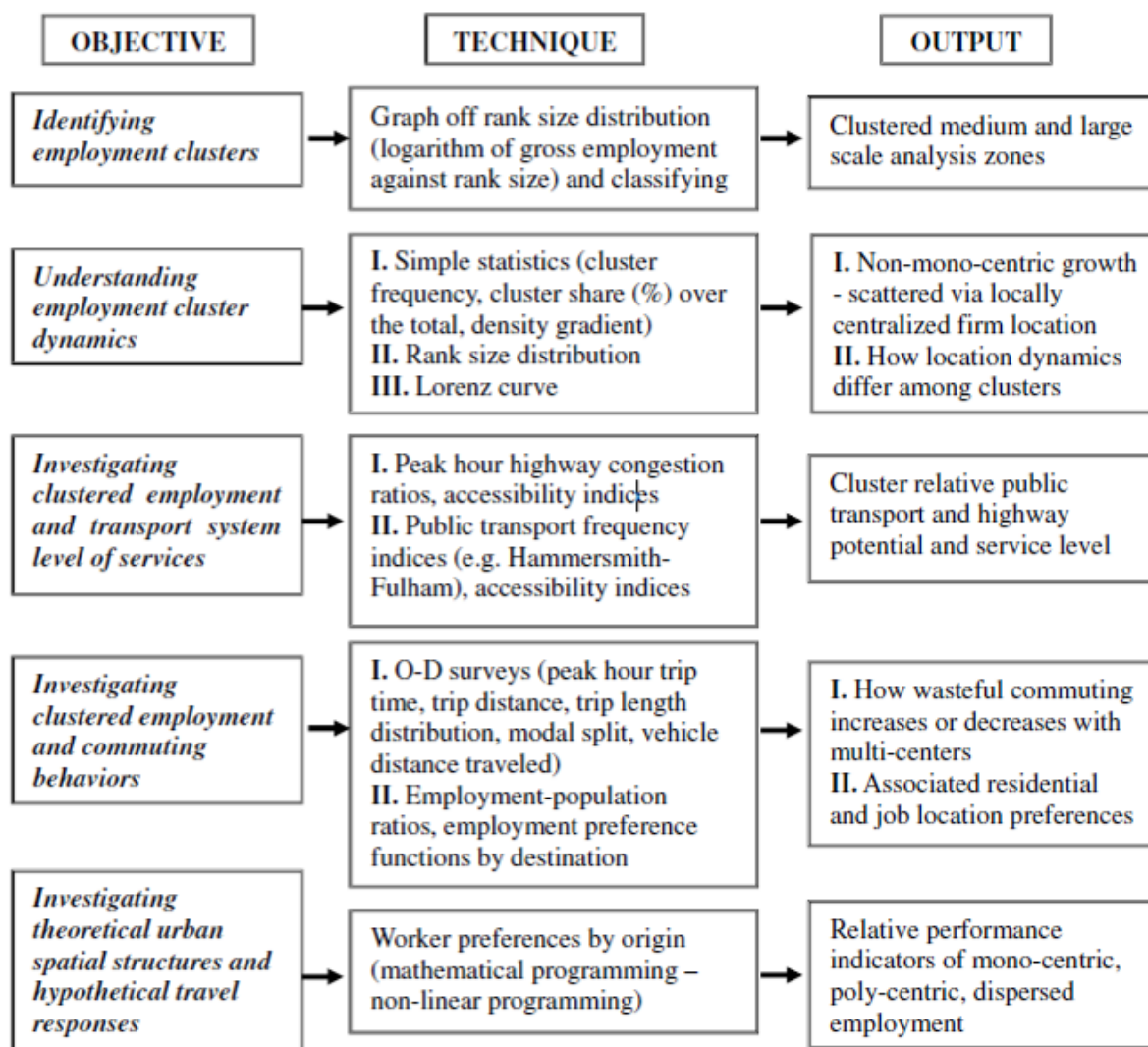
Another advance was provided by Cervero and Wu (1998) who examined market-led decentralisation in Silicon Valley and other suburban employment areas in the San Francisco Bay Area, comparing commuting behaviour in 1980 and 1990 using US Bureau of Census data. They used an ‘occupational match accessibility index’ that included industry/occupation matching for key workers. This disaggregation to industry classification for jobs, and occupation type for workers, provides a more robust assessment of accessibility between jobs and housing.

The lack of industry/occupation matching in most city-region transport models (including the Brisbane Strategic Transport Model) means they are incapable of exploring accessibility between jobs and housing in the manner of Cervero and Wu (1998). An additional accessibility analysis is required, using supplementary census data.

### **Alpkokin et al. 2008**

Alpkokin et al. (2008) proposed and tested a methodology for assessing such problems as the transport impacts of employment decentralisation, as shown in Figure 11. This involved defining employment clusters within the city, identifying a set of sub-centres that reach a certain employment threshold. Methodologically these sub-centres census districts are aggregated into traffic analysis zones. The accessibility of each sub-centre is appraised, using methods that

consider congestion effects on the road network (as per Cervero, Rood and Appleyard 1999) and methods that calculate potential accessibility by public transport (of a similar form to that used by Burke and Woolcock 2009). The Origin-Destination (O-D) patterns for each sub-centre are then assessed, using the ‘ratio between the employment in a given zone to the total population within a region of a specified radius from that zone’ (Alpkokin et al. 2008:433). Residential location preferences are explored for each sub-centre, and housing opportunity surfaces constructed. Finally, hypothetical scenarios for urban structure are investigated, using linear and non-linear programming, to forecast outcomes for mono-centric, poly-centric and dispersed city forms (Alpkokin et al. 2008:429-434).



(Source: Alpkokin et al. 2008:430)

**Figure 11: Methodological framework for assessing transport and other urban dynamics of poly-centric employment in cities.**

Applied to Istanbul, the method was used to explore changing travel behaviour in a city that has seen significant poly-centric growth in employment. The unique transport/land-use arrangements of Istanbul provide very different results to comparative US cities (in this case, Los Angeles and San Francisco). But more interestingly, the method allows for detailed information to be gathered on existing sub-centres that may then be employed in modelling new scenarios for the city. Such a framework appears appropriate for examination of employment decentralisation in Australian cities.

## **Travel behaviour of the relocated**

What all the above studies ignore, however, is the issue of how those employees affected by relocation behave. This has been a significant area of research in travel behaviour studies.

Bell (1991) investigated the shifting of the head office of the Coles-Myer conglomerate from the Melbourne CBD to a 40,000m<sup>2</sup> building in Tooronga, in the city's middle eastern suburbs. The development was a market-led out-of-centre development of significant scale. The study explored residential location and travel behaviour both before and after the move. Car use and ownership of staff both increased and very few staff relocated their homes. Hanssen (1995) used a similar approach to explore impacts of the move of the Gjensidige company to suburban Oslo. There, next to nil staff moved their homes, instead suffering increases in travel time/cost, though longer term the impacts may be more marked. At the time of the study, the proportion of employee public transport trips requiring a transfer leapt from 8% to 28%. Unsurprisingly, the share of employees with a public transport season pass fell 12% in one year alone. Yet the great travel savings made by a small proportion of the workforce (<25%) were so great that overall workforce travel times also decreased. And the number of trips made during work hours actually decreased (Hanssen 1995:251-252).

The disadvantages of studies on only one firm are the limited transferability of results, given the context-specific nature of each office relocation. Daniels (1981) overcame these constraints by looking at the aggregate impacts on travel across 42 different firms in decentralised locations around London – in a much more ambitious (and presumably expensive) study. He found the proportion of trips made by public transport (bus) and by car drivers at each location related to the ratio of trip time to trip distance from employee's residences. Again, mode shift the car was 'a dominant theme' of employment decentralisation there (Daniels 1981:519). Aarhus (2000) explored impacts for four firms in Oslo that relocated from the inner-city to suburbia. Car commuting again increased across these firms, due to four key factors: access to parking, access to arterial road networks, the share of employees having co-located work and homes, and access to high quality public transport (Aarhus 2000:292).

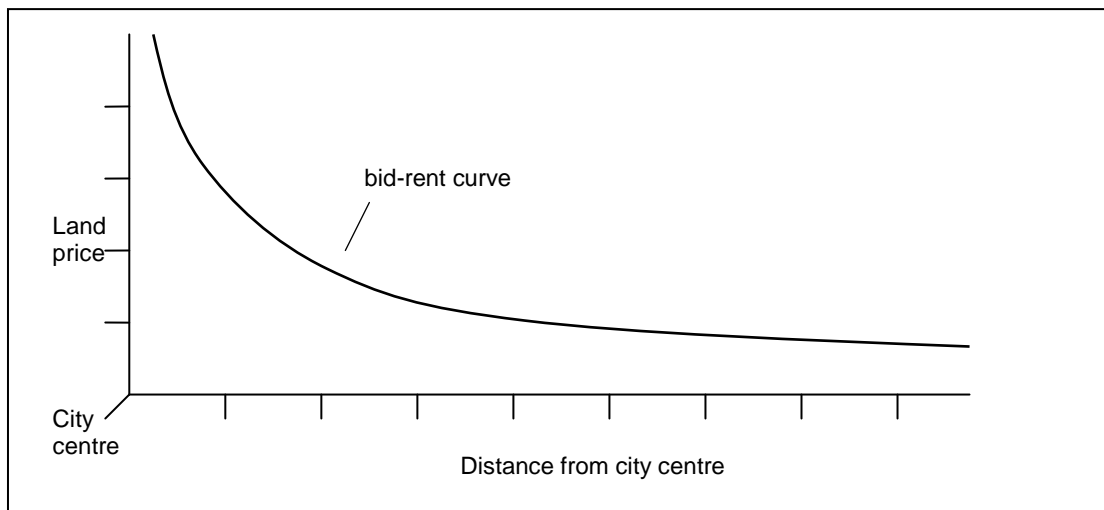
Office relocations in today's Australian cities may produce quite different travel behaviour and residential location impacts compared to those observed in other cities previously. Further, it may be that modern travel behaviour change interventions (i.e. TravelSmart<sup>1</sup>) can influence employee travel behaviour to mitigate against car mode share increases. Research methods that capture observed behaviour change and use that in modelling decentralisation scenarios may provide a new and more robust approach for exploring such issues.

## **Urban development and housing**

There is some probability that any sizeable employment decentralisation program may offer housing affordability advantages for relocated employees. Conventional land market models posit a mono-centric city with a concentrated core zone over which land users bid for access with rents (prices) for land set by the marginal value to the bidder based on the differential value of the land. Value in land is typically the result of some particular productive characteristic but in modern cities is generally a function of accessibility (Wingo 1964). Further versions of these models observe that travel costs from the core are factored into rents such that rents in more distant locations are lower because bidders factor in transport costs. In mono-centric cities with strong city centres this process generates a 'bid-rent' curve in high rents are found in the desirable central and inner urban zones and decline with increasing distance from the CBD (see Figure 12).

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<sup>1</sup> A voluntary travel behaviour change program run by the Department of Transport and Main Roads that encourages people to use public transport, walking, cycling and carpooling. See [www.travelsmart.qld.gov.au](http://www.travelsmart.qld.gov.au).



**Figure 12: Bid-rent curve for a mono-centric city**

The bid rent curve can be conceived as allocating scarce land to bidders in order of capacity to pay. Those with the highest capacity to pay monopolise the centre while those with lower capacity are pushed further out along the curve. In a mono-centric city those with the weakest capacity to pay are pushed to the periphery. This is generally, although not universally, the case in Brisbane, where higher income groups exercise a form of spatial monopoly over central and inner city sites while lower income groups are found in more distant middle and outer suburban locations.

Decentralisation implies the intent to re-locate a proportion of the activities found in the city centre to middle or peripheral locations thus repositioning the accessibility function within the bid rent curve. This offers the potential for housing cost savings or transport cost savings. Households who locate in expensive inner-urban zones to reduce transport costs may re-locate to decentralised sites to take advantage of improved housing market opportunity. Households in already decentralised sites may reduce their transport costs through employment relocation. This shift also potentially offers accessibility improvements for actors seeking to access these activities from more peripheral locations. The key obstacle to this approach is the problem of achieving sufficient activity concentration at a decentralised site that can support improvements to sub-regional public transport networks to ensure that decentralisation does not convert public transport users into car users.

### **Challenges of employment decentralisation**

It is beyond the scope of this paper to exhaustively discuss all the challenges and limitations of employment decentralisation. Business, public sector unions and others often find the prospect of decentralisation unattractive. The lure of a CBD with its strong public transport links is part of this animosity. Agglomeration benefits for specific work units may dissipate if located too far from clients and supports. And the equity advantages of public transport access are presently only available in the CBD of cities such as Brisbane.

As Haywood (1996) notes, a good measure of public transport and land use coordination is required to respond to these concerns. In dispersed Australian cities with strong radial but weak (or non-existent) orbital links, the prospect of decentralisation to sites without reasonable public transport access emerges. Given the existing hub and spoke network, employment decentralisation may actively discourage public transport use, unless higher quality cross-town public transport services are made available (yet such services may be unviable without decentralisation).

Further, there are challenges in encouraging residential mobility in a relocated workforce. Given many households have members in different jobs, schools and universities in different locations remaining in the same house may be rational and optimal. Transaction and relocation costs are high, and with declines in job security having been experienced in most spheres of society, uncertainty will be a strong factor in discouraging residential relocation.

In addition, career opportunities in the public sector relate to the hierarchical structure of the bureaucracy and are perceived to favour those located closer to power and patronage. This factor may not be overcome if there is not some degree of devolution of responsibility to the decentralised offices. This might need to be recognised in designing the new administrative structures underlying decentralised agencies.

## **Conclusion**

This paper has examined the problem of metropolitan activity concentration and has reviewed a range of policy measures that can be used to address the inefficiencies and inequities generated by highly centralised urban structures. The paper has shown that a number of problems can arise from a mono-centric urban structure and which impose costs on individual households, businesses, governments and the environment. These costs include potentially higher transport costs measured in travel time and expenditure, higher rents for constrained CBD land (and conversely underutilisation of cheaper suburban land), crowding out of those firms who do really need to be close to business contacts and networks, increased demand for expensive peak hour road and public transport capacity and contra-flow and off-peak under-utilisation, plus potentially higher environmental costs from vehicle emissions and high-rise building operations.

The paper has also demonstrated that a number of policy measures and models are available that can inform an assessment of the value and design of an active future decentralisation program for Australian cities, including Brisbane. This assessment included examples from international planning experience, including such cities as Singapore, Stockholm, London and the UK new towns, Paris and San Francisco, as well as private sector-led models such as the US 'edge city' phenomenon and tended to show that strong state direction is required for success with decentralisation.

Further examples drawn from Australian experience were also reviewed with Sydney offering the clearest example of a successful decentralisation program via the 'second-CBD' of Parramatta. This example demonstrates that sustained government effort can generate significant gains from decentralisation and which has positive effects on the overall structure of the metropolitan region. However the Sydney example shows that decentralisation policies require consistent and persistent planning implementation to achieve high quality outcomes.

The paper has also shown that a number of methods are available to investigate the potential impacts of a decentralisation program in a major city with GIS and transport modelling offering considerable analytical power. It is the Urban Research Program's intention to pursue such a research agenda.

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