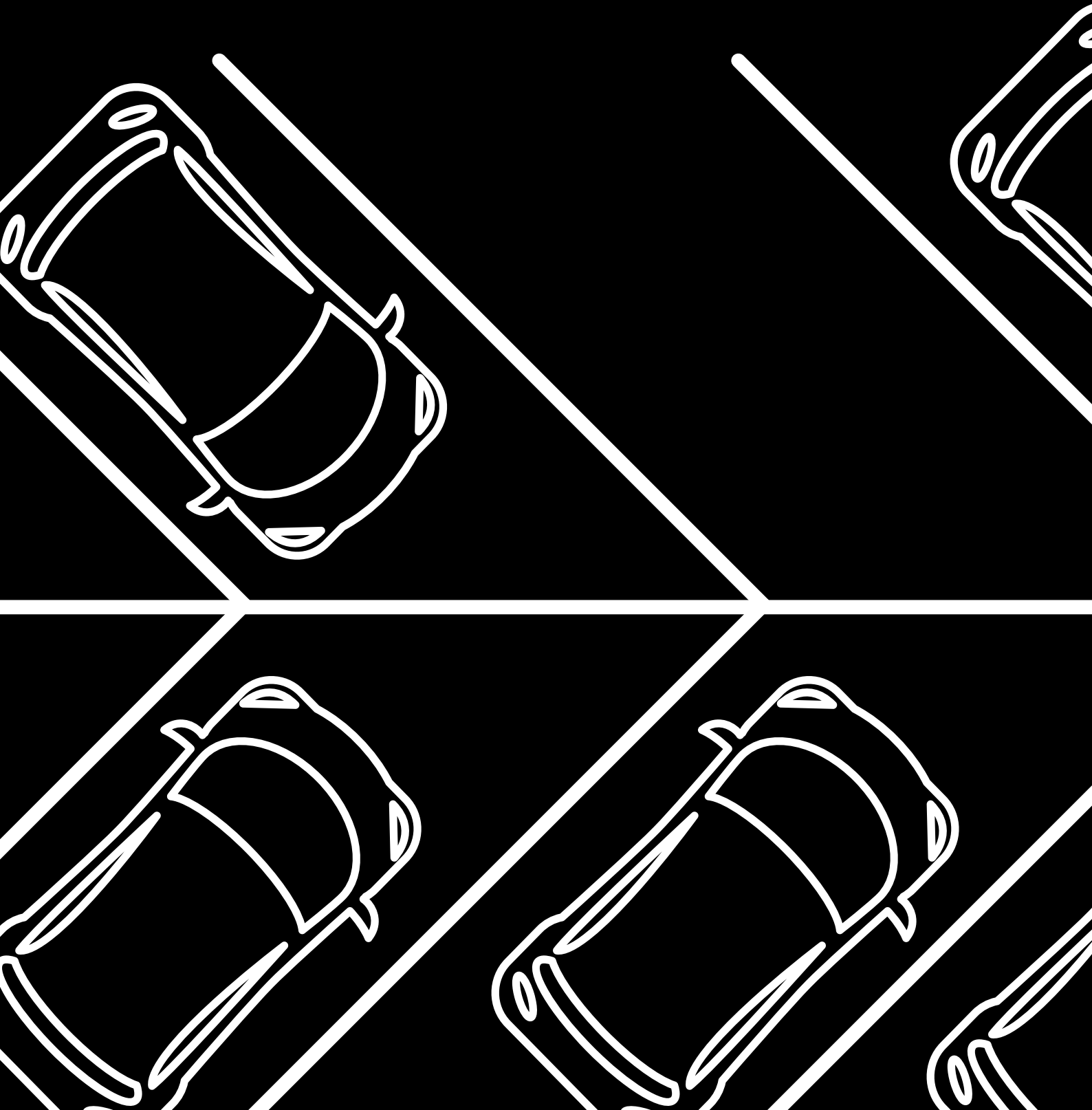




# Smarter Parking

May 2019





DIVVY's original vision was to solve the parking problem by application of market leading technology using a combination of hardware and software to enable a better parking experience. However, now DIVVY provides a seamless journey through all bookable assets. DIVVY can apply the same technology that has been used for parking to end of trip facilities, meeting rooms, hot desks and share workspaces, because population growth isn't just an issue for our roads.

While DIVVY is expanding into other industries, parking remains our focus because there are literally thousands of parking spaces hidden in corporate office buildings and hotels in our CBDs that could be utilised smarter.

DIVVY unlocks underutilised car spaces in commercial buildings, giving drivers exclusive access at the touch of a button through the DIVVY App. We provide commuters access to Australia's fastest growing parking network with unparalleled convenience and flexibility. And we enable owners to enjoy the benefits of a new income stream.

We believe that smarter technology and more efficient utilisation of spaces is essential in handling growth in our cities, and we look forward to playing a part in the solution.



Better road and transport infrastructure has been a core focus of the NRMA since 1920 when our founders lobbied for improvements to the condition of Parramatta Road in Sydney. Independent advocacy was our foundation activity, and it remains critical to who we are as we approach our first centenary.

We've grown to represent over 2.6 million Australians, principally from New South Wales and the Australian Capital Territory. We provide motoring, mobility, travel and tourism services to our Members and the community.

Today, we work with policy makers and industry leaders, advocating for increased investment in road infrastructure and transport solutions to make mobility safer, provide value for money and peace of mind for our Members, and deliver sustainable communities. By working together with all levels of government to deliver integrated transport options, we give our Members real choice about how they get around.

We firmly believe that integrated transport networks, including efficient roads, high-quality public transport and improved facilities for cyclists and pedestrians, are essential in addressing the challenge of growing congestion and providing for the future growth of our communities.

# Table of Contents

Foreword	3
Areas for further inquiry	4
Introduction	7
<b>Parked Policy</b>	
Land-use and development	10
Cost, time and demand	12
The traditional approach	16
Case Study: Zurich	17
Parking utilisation audit – Sydney	18
<b>Parking – part of the solution</b>	
Smart cities	20
The sharing economy	22
Case Study: GoGet	23
Transport hubs and park-and-ride	24
Case Study: B-Line / Sydney Metro Northwest	26
Parking as a policy lever	29
Technology and space utilisation	30
Case Study: DIVVY	33
Complementary amenities	37
Integrated land-use planning	38
Conclusion	40
Comments and queries	42

# Foreword



**David Stuart-Watt**  
President

Population growth and densification are placing pressures on Australian cities, the likes of which we've not before seen.

Perhaps the most visible evidence of this is urban congestion. Despite on-going investment by governments and the advent of new technologies and solutions, our roads are seemingly more congested than ever; our public transport services stretched to breaking.

Last year Roads Australia led a delegation of public and private sector transport leaders to Tokyo, Seoul and Singapore to look at how these three 'mega-cities' were managing the integration of transport strategy and land use planning, employing smart infrastructure and technologies, and delivering customer-focussed mobility solutions.

One of the key take-outs for us was the importance of collaboration – high level, national collaboration between government, industry and academia. Governments in these countries are working closely with key stakeholders – not in a traditional client-contractor relationship, but as genuine partners – to unlock the real benefits of new technology.

Another key characteristic of these cities was their reliance on mass transit to do the heavy lifting – in sharp contrast to the Australian experience, where private vehicle trips still dominate the urban transport mix.

That's not to say roads are the problem – in fact, they are (and will remain) an integral part of the solution. The challenge for us here in Australia is to evolve to a more integrated transport system, where all the parts contribute to a more efficient whole, where new modes and choices are not just supported but encouraged.

And in that context, we can reinvent and reinvigorate much of our existing infrastructure and transport solutions – aided by and integrating smart technologies – to create positive outcomes for people living and working in our cities.

DIVVY is one such example of a technology that leverages real-time data on vacant parking spots in high demand CBD, metropolitan and suburban areas around Australia.

There's no question technology will make our cities 'smarter'. But if we really want to make our cities better places to live, work and play, it starts with collaboration.

That's what our near-neighbours are doing to improve mobility and liveability in their largest cities. And it's what Australian policy makers must embrace if we're to do likewise.

# Areas for further inquiry

## Planning

### Regulatory land-use planning system reform

The traditional passive approach to the development of cities and places is progressively being tested due to technology and rapid pace of change. To develop the built environment holistically, frameworks and environmental planning instruments that enable the regulatory land-use planning system to be more agile will provide for a stronger focus on future community needs and improved mobility. Existing planning instruments and development control plans should be reviewed to give greater consideration to current major projects and trends.

### Transport and land-use planning integration

Through the Greater Sydney Commission, the State Infrastructure Strategy and Future Transport 2056, the NSW Government has strengthened alignment between transport and land-use planning. However, to manage population growth and improve liveability, it is critical that development and transport planning are carefully and fully coordinated. While the Australian Transport Assessment and Planning Guidelines provide a framework for progressing transport and related initiatives, opportunities exist for greater collaboration between planning, environment and transport departments.

### Parking guidelines for local government areas

Transport provision and local government parking policies can play a critical role as policy levers to incentivise or disincentivise car use. State guidelines for local governments where state significant mass transit exists could help to minimise street congestion by discouraging on-street parking (where alternatives are present) and incentivising the expansion of available private parking spaces for use by members of the public. While state parking guidelines should be supported in-principle by local governments, they must be reviewed and adapted to fully consider local circumstances.

### State significant mass transit parking strategies

New and efficient transport options that provide value and reliability must also be accessible for customers. While parking management strategies aim to provide parking capacity to meet projected commuter demands, they are often focused on the transit precinct and do not fully consider surrounding locations in close proximity to transport services. To further incentivise the use of quality transport, localised parking strategies within a defined geo-fence should be implemented for existing and new infrastructure where state significant mass transit exists (e.g. Sydney Metro).

## Productivity

### Parking infrastructure utilisation

In conjunction with quality transport services and appropriate on-street parking pricing that considers the true value of land provision, improving the utilisation of private, off-street parking by members of the public through app-based technology can improve access and ease urban road congestion in densifying centres by encouraging cars off surface roads and promoting transport use.

### Complementary additions for parking facilities

Parking facilities have traditionally been used for a sole purpose, however pace of change has presented opportunities to improve productivity. The provision and expansion of desirable features such as ticketless access, smart parking, electric vehicle charging, car servicing, maintenance and mobile eSafety checks (pink slips) improve convenience and flexibility for consumers.

### Strategic park-and-ride infrastructure

The delivery of state-of-the-art public transport services will continue to incentivise use, however accessibility remains key to attracting commuters. The NSW Government's 'Opal Park-and-Ride' program has demonstrated that value, reliability and accessibility can encourage mode shift. While the program has recently expanded, further opportunities exist to reduce road congestion in strategic locations.

## Pricing

### Price reporting for parking facilities

The NSW Government's online 'Fuel Check' program and the NRMA's fuel app on Blue, which allows motorists to compare fuel prices in real-time, are simple tools that were introduced to improve pricing transparency for consumers. Given the success of these initiatives, consideration should be given to the introduction of price reporting for major commercial and public parking facilities.

### Longitudinal pricing study on parking facilities

Despite its importance for transport modelling and decision-making, relatively little data exists about car park pricing across Australia's largest cities, particularly price changes over time. To improve knowledge and support strategic transport modelling, consideration should be given to the collection and collation of car park pricing data for Australia's largest cities.

### Parking space levy review

The parking space levy, administered by Revenue NSW, aims to reduce road congestion by discouraging trips made by car and improving public transport. While the objectives of the *Parking Space Levy Act and Regulation 2009* remain valid, new trends and emerging technologies and revised transport and planning strategies demand that the levy is considered in a far wider context.





# NRMA Member statistics

**77%**  
find parking  
**too expensive**

**58%**  
often or always  
**worry about  
finding parking**

**97%**  
have avoided  
a trip due to  
**perceived  
parking  
difficulties**

**69%**  
believe there  
are generally  
**not enough  
available car  
spaces**

**60%**  
generally find  
public **car  
parks too  
crowded**

**66%**  
would consider  
**pre-booking  
parking**

**44%**  
have returned  
home due to  
**lack of  
parking  
availability**

**26%**  
would consider  
making their  
**home parking  
space available  
for public use**



## Introduction

More often than not, the mere notion of parking conjures up gloomy and discouraging thoughts, particularly for those in urban centres who are unable to regularly utilise quality public transport.

Public car parks and streets full of cars; inconsistent signage and restrictions; slow-moving queues and surface traffic at entry and exit points; drivers jostling for position; hard-to-use and malfunctioning ticket machines; and no guarantees that a parking space will be available at one's destination is a snapshot of what NRMA Members experience in search of parking.

Based on this feedback and much empirical observation, it's not a stretch to submit that Australians don't like parking.

Australians do, however, love cars – they are easily our principal mode of transport, and planning has traditionally placed the motor vehicle at the centre of decision-making.

In the past, the effects of population boom, increased car ownership, concentration of traffic in CBDs and standard public transport on parking have been addressed by building more infrastructure and increasing capacity. Sizeable parking structures in close proximity to commercial infrastructure and increased on-street parking are some of the approaches that have been used to accommodate increasing parking demand.

However, urbanisation is putting immense strain on urban roads, transport networks and associated physical infrastructure, making it clear that new strategies are needed to accommodate the increasing populations projected for most of our cities.

In addition, space allocated for parking is becoming increasingly valuable – and is often at odds with best use.

There has been much discussion around what the future of transport will look like given the advent of electrification and connected and automated vehicles. Theories on future transport models, car numbers, and road space and parking requirements are easy to come by, however most investigation and modelling has concentrated efforts on the anticipated end state (full automation) without fully considering any transitional phase.

With technology progressing at an exponential rate, new ways of combatting old challenges are emerging. Cities are becoming 'smarter' and more integrated through the use of data and streamlined communication technologies. Planners are gaining insights into consumer behaviour like never before, and are progressively acknowledging that integrated policies can lead to improved outcomes if properly managed.

While parking policy in itself is relatively unexciting, it is a key component within broader transport and spatial strategies that ultimately impact on liveability.

Through technology, opportunities now exist that can improve parking availability and efficiency. NRMA research suggests there are mechanisms and levers available today that could help to reduce urban congestion and improve productivity.

The time has come to look at parking – our lives and needs are changing and we need to get smarter about tackling new and emerging challenges.

This report examines issues plaguing parking in Australian cities, highlights the ineffectiveness of existing strategies, and provides suggested reform areas for further inquiry. In doing so, the report shines a light on the imbalance between parking supply and demand, particularly focusing on areas that could improve productivity through curbing road congestion and incentivising the use of public transport.



Across the NRMA  
Membership, millions of hours  
have been wasted searching  
for parking.

## Parked Policy





# Land-use and development

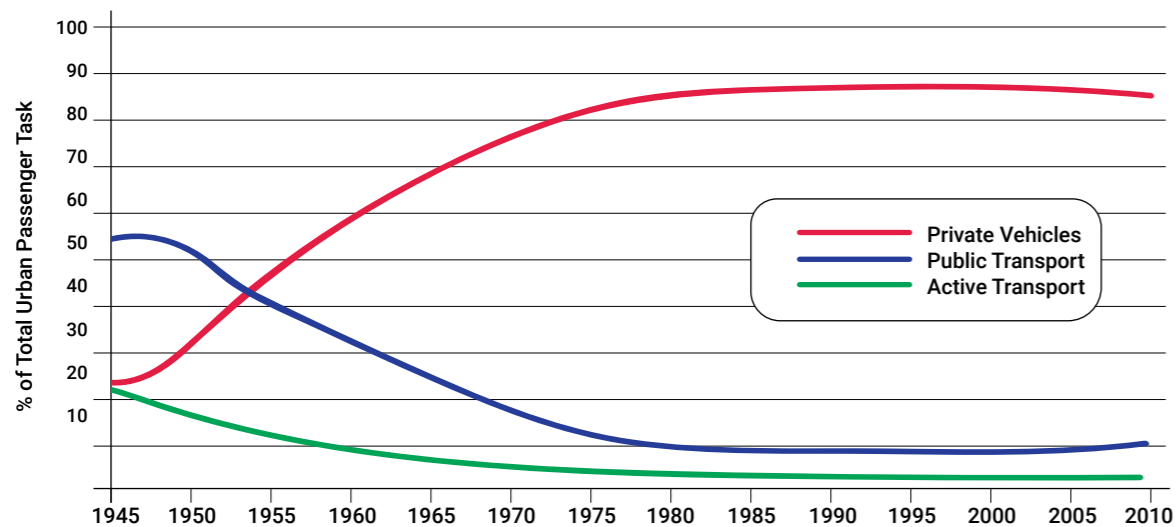
Australia's approach to land-use and planning has traditionally been focused around private vehicles, which has aided dependence and encouraged Australia's fixation with the car. This scenario, however, is not exclusive to Australian cities – North American cities, for example, exhibit even higher levels of car dependence, with around 90 per cent of all trips made by car.<sup>1</sup>

capitals were developed to accommodate families, with urban renewal occurring at the same time throughout inner city areas.<sup>2</sup> Due to increased accessibility to car travel from the mid-1940s, cars quickly became the most desirable means to get around and were the sole transport option for many setting up life around Australia's capitals.

Car dependence has perhaps transpired due to strong government intervention in land-use and development in the post war era throughout Australia, North America and Britain. In Australia, new suburbs on the metropolitan fringes of

Increasing accessibility and desire for the motor vehicle ushered in burgeoning numbers of cars, significantly reducing public transport patronage across buses, trains, trams and ferries over the ensuing decades.<sup>3</sup>

Aggregate mode share for metropolitan travel in Australia – private vehicles vs public transport



Source: Cosgrove (2011)

1 [https://atrf.info/papers/2006/2006\\_Holden.pdf](https://atrf.info/papers/2006/2006_Holden.pdf)  
 2 Gurrin, N 2006, 'Australian Urban Land-use Planning: Introducing Statutory Planning Practice in New South Wales', Sydney University Press, pp. 9–10.  
 3 [https://atrf.info/papers/2011/2011\\_Cosgrove.pdf](https://atrf.info/papers/2011/2011_Cosgrove.pdf)

In support of this major shift to private vehicles, large parking structures were thought necessary where major commercial development was occurring, and private developments increasingly were constructed with parking spaces or garages as this added to their value. As the Australian population continued to increase and the number of cars ballooned, on-street and off-street parking provision continued to expand to support the use of vehicles.

While this shift in focus no longer places the private vehicle at the centre of decision-making, there are many existing barriers to reducing car use and road congestion to keep up with population growth and urbanisation.

Today, in addition to on-street and off-street government-managed parking spaces, parking facilities for use by the public can be owned and operated by commercial organisations, retailers, shopping centres, hospitals, airports and universities.

Prior to these recent strategic initiatives, land-use policy in NSW from around 2000 acknowledged that more needed to be done to encourage mode shift to public transport, however implementing any meaningful change was likely hampered due to substandard transport infrastructure and services.

## Place making and public transport

One traditional approach to land-use has been the expansion of on-street parking for cars, however the provision of on-street parking today comes at a significant cost to some local government areas through congestion, maintenance, landholding, constrained street capacity, and limited growth options for retail and public spaces.

Despite the challenges of progressing practical initiatives to incentivise mode shift to public transport, government departments around this time contributed to the formulation of a Vehicle Kilometres Travelled (VKT) model, which determines likely vehicle distances for different households based on a number of variables. The model incorporated data from the Transport and Population Data Centre's Household Travel Survey<sup>4</sup> and has been a useful tool for determining the impacts of policy levers designed to minimise private car use among other objectives.

This has led to governments at all levels exploring ways to curb car use and incentivise public transport, particularly for those commuting for work or education on a regular basis.

Through the Greater Sydney Commission, the State Infrastructure Strategy 2018–2038 and Future Transport 2056, the NSW Government has strengthened alignment between land-use, place making, infrastructure development and transport with the aim of meeting some of the challenges presented due to changing times and community needs.

4 [https://atrf.info/papers/2006/2006\\_Holden.pdf](https://atrf.info/papers/2006/2006_Holden.pdf)

# Cost, time and demand

NRMA research suggests the overwhelming majority of Members find parking too expensive and, quite often, too time consuming.

In Sydney, 77 per cent of Members believe that parking prices are too high, making cost the greatest parking concern for motorists – this is closely followed by the limited availability of parking spaces.

In Australia, the Adelaide CBD has one of the cheapest average daily parking rates at \$22.29, with the Sydney CBD the highest at \$70.85. The biggest jump in average daily rates over a five-year period occurred in Brisbane between 2011 and 2015, where rates increased from \$39.00 to \$69.03.<sup>5</sup>

Car park daily rates for Australian CBDs

	Min.	Max.	Avg.	Early Bird Avg.
Adelaide	\$10.00	\$29.00	\$22.29	\$13.08
Brisbane	\$40.00	\$89.00	\$69.03	\$25.25
Canberra	\$7.00	\$30.00	\$18.21	\$11.33
Melbourne	\$15.00	\$89.00	\$63.61	\$17.74
Perth	\$15.00	\$55.00	\$31.89	\$18.75
Sydney	\$25.00	\$89.00	\$70.85	\$27.00

Source: Colliers Edge

In Sydney, one mechanism that has likely put upward pressure on pricing is the parking space levy, which is administered by Revenue NSW. The levy aims to reduce road congestion by discouraging trips made by car and improving public transport, however while the objectives of the *Parking Space Levy Act and Regulation 2009* remain valid, new trends and emerging technologies and revised transport and planning strategies demand that the levy is considered in a far wider context.

A further frustration for NRMA Members, particularly in the Sydney CBD, is the ambiguity of parking pricing and availability throughout the day. This includes on-street and off-street parking where unclear or confusing signage means pricing is not readily transparent.

The NSW Government's online 'Fuel Check' program and the NRMA's fuel app on Blue, which allows motorists to compare fuel prices in real-time, are simple tools that were introduced to improve clarity and pricing transparency for consumers. In the case of the NRMA's fuel app, motorists can save more than \$500 per year on average by comparing fuel prices and selecting the most cost competitive service stations.<sup>6</sup>

NRMA Members find the Sydney CBD the most frustrating location for parking, followed by Parramatta, North Sydney, the Eastern Suburbs, the Inner West, and Chatswood.

Given the success of these initiatives, consideration should be given to the introduction of price reporting for major commercial and public parking facilities. This would improve transparency for consumers through real-time information.

In addition, relatively little data exists about car park price changes over time across Australia's largest cities, despite the importance for transport modelling and decision-making. To improve knowledge and support strategic transport modelling, consideration should be given to the collection and collation of car park pricing data for Australia's largest cities.

Crowded surface streets and accessibility to parking also frustrate motorists, which is not surprising given that past studies show around 30 per cent of cars in congested urban centres are 'cruising' or searching for parking.<sup>7</sup>

Typical parking duration for NRMA Members is 2–3 hours for leisure and 8–9 hours for work.

In Germany, cruising for a parking space takes an average of almost 10 minutes; in Italy, the average is closer to 15 minutes.<sup>8</sup>

There is a significant productivity cost associated with cruising, urban congestion and lost time.

In the past 12 months, around 20 per cent of NRMA Members have spent in excess of 30 minutes on one occasion searching for parking – more than half of the Membership have spent in excess of 15 minutes.

Across the NRMA Membership, millions of hours have been wasted searching for parking.

Past studies show that around 30% of cars in congested urban centres are 'cruising' or searching for parking.\*

\* Shoup, D C., 2005, 'The High Cost of Free Parking', Planners Press, American Planning Association, Chicago.

NRMA Members' main concern about parking in Sydney is cost – 77% find parking too expensive.

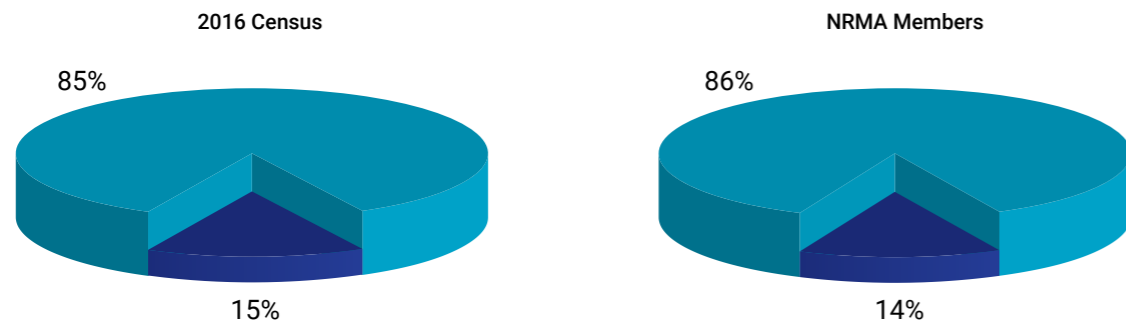
<sup>5</sup> <https://www.commercialrealestate.com.au/news/wp-content/uploads/2015/07/Car-Parking-White-Paper-2015-1.pdf>  
<sup>6</sup> <https://www.mynrma.com.au/-/media/documents/annual-reports/nrma-annual-report-2017.pdf>

<sup>7</sup> Shoup, D C., 2005, 'The High Cost of Free Parking', Planners Press, American Planning Association, Chicago.  
<sup>8</sup> <https://new.siemens.com/global/en/company/stories/mobility/smarter-parking.html>

## How do workers commute?

On Census day 2016, more than 7.2 million commuters (85 per cent) travelled to work by private vehicle, compared with just under 1.3 million (15 per cent) who opted for public transport (bus, train, ferry, tram or taxi).

This statistic mirrors the journey to work habits of NRMA Members.



The overwhelming preference for private vehicle travel is relatively consistent with most other OECD nations, suggesting that the accessibility, flexibility and convenience that comes from private transport remains highly valued, despite evidence to suggest that the growth of private vehicle travel volumes has decelerated in several high-income economies over the past 10 to 15 years.<sup>9</sup>

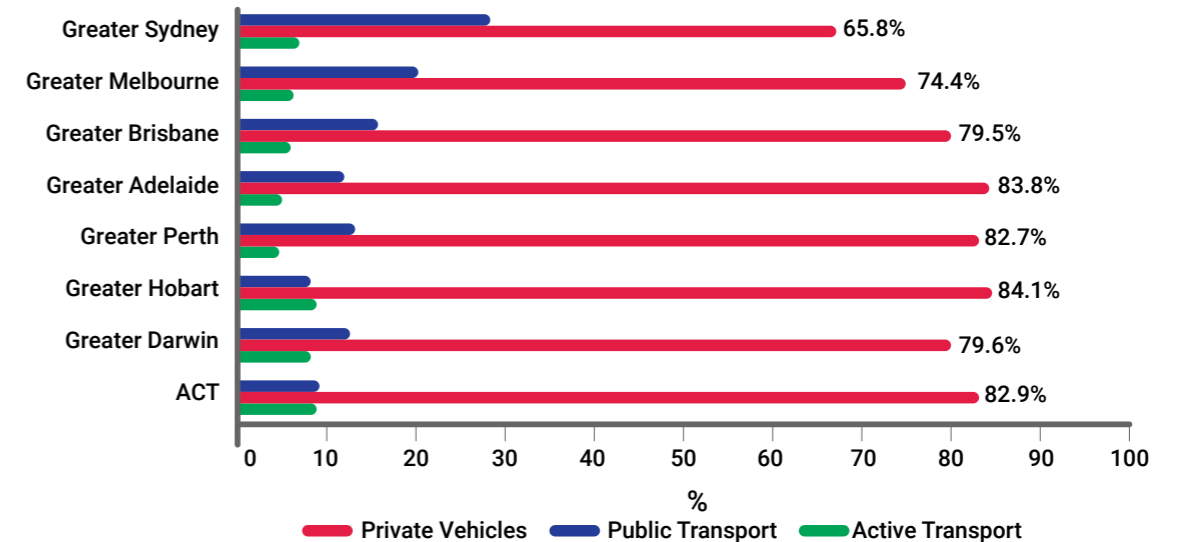
57% of NRMA Members who rely on driving to work (and who don't have access to permanent or pre-booked spaces) are concerned no parking will be available close to their place of employment.

The Sydney and Melbourne CBDs have the lowest ratio of car spaces to workers, with 12.2 and 14.2 spaces for every 100 workers. Globally, these ratios are some of the lowest, making utilisation rates extremely important.

<sup>9</sup> [https://read.oecd-ilibrary.org/transport/long-run-trends-in-car-use\\_9789282105931-en](https://read.oecd-ilibrary.org/transport/long-run-trends-in-car-use_9789282105931-en)

In Australian cities, Sydney commuters make best use of public transport, with around 66 per cent relying on private vehicle travel. In Hobart and Adelaide, around 84 per cent rely on private vehicles for commuting.

Share of commuting by mode of transport (2016)



Source: Australian Bureau of Statistics

In March 2019, The University of Sydney Business School's Institute of Transport and Logistics Studies' Transport Opinion Survey found that "the vast majority of Australians remain wedded to private cars despite the heavy promotion of public transport".<sup>10</sup>

While this comes as no surprise, exceptions to this preference do exist in other jurisdictions. Some of our neighbouring cities such as Tokyo, Seoul and Singapore incentivise mass public transport through the provision of quality services and a range of complementary and cohesive policies, including dynamic road pricing, transport timetable integration, and time-of-day travel incentives.

In Tokyo, where one of the world's best and most extensive rail networks exists, public and active transport account for close to 90 per cent of total journeys. And it's not a dissimilar story in Seoul and Singapore, with public and active transport (bus, subway, rail, ferry, mass rapid transit, walking and cycling) accounting for more than 70 per cent of total journeys.<sup>11</sup>

It is not enough to merely promote public transport to achieve meaningful behavioural change – quality infrastructure and services that meet the needs of consumers must be delivered alongside supportive policies and incentives to inspire mode shift.

In Australian CBDs, Melbourne has the highest number of non-residential car spaces (41,687), followed by Sydney (28,939), Adelaide (26,720), Brisbane (25,633) and Perth (24,424).

<sup>10</sup> <https://sydney.edu.au/content/dam/corporate/documents/business-school/research/itls/TOPS-2019-Q1.pdf>  
<sup>11</sup> <https://roads.org.au/LinkClick.aspx?fileticket=17u2FMISCig%3D&portalid=3>



# The traditional approach

The traditional approach to managing increasing demand for parking in Australia has mostly involved the utilisation of all or a combination of the following strategies:

- Increasing supply to address demand by building more off-street car parks
- Providing more street space for on-street parking
- Setting parking requirements for developments ('parking minimums')
- Introducing parking levies in selected urban centres to discourage car use
- Encouraging the use of public transport in and out of urban centres
- Developing planning policies that incorporate parking strategies

While these strategies have provided solutions or desirable objectives in the past, inquiry into their current validity and effectiveness is likely required given the mobility challenges of today.

Of particular note, the traditional requirement for buildings to provide parking facilities has led to too many underutilised parking spaces<sup>12</sup>, which have been allowed to remain inefficient due to stagnant parking policies.<sup>13</sup>

## Proceed with caution

With the ever existing need to balance the desires of current and future citizens and home or building occupants, governments have traditionally been relatively cautious when it comes to policy changes related to parking.

Established occupants are generally reluctant to change, and tend to react negatively to anything that could bring higher density or put at risk their freedom to park, especially outside their property.

Changes to planning, zoning or parking are naturally met with negativity or caution as a policy shift could lessen the perceived value of an asset without any corresponding benefit.

When someone makes a property purchase, technically they are purchasing just that – the property. However, people often operate on the assumption that purchasing includes other tangible additions, such as the right to park on-street, just outside their property.

Governments have traditionally encouraged this type of thinking, which is evident through schemes such as on-street parking permits. These schemes exist even in some areas where public transport provision is excellent and rated exceptionally highly by residents and members of the public.

Caution, however, does not mean that all parking related strategies have not progressed with the aim of meeting our changing needs. The Government of Western Australia, in cooperation with the City of Perth, implemented a new parking policy around 2000 to better manage parking, the amenity of the environment in Perth, and urban road and pedestrian traffic. The policy introduced licensing fees for parking facilities and placed restrictions on the quantity and placement of parking within the Perth Parking Management Area.<sup>14</sup>

Following the adoption of this policy, parking supply decreased by approximately 10 per cent with little public resistance. At the same time, despite not possessing or claiming one of the world's best mobility systems, vehicle traffic within the city also reduced.<sup>15</sup>

While complexities exist with policy change and the management of parking across various governments and operators, a continued traditional approach will either exacerbate problems or, at the very least, ensure that parking policy remains stagnant and unfit for purpose.

<sup>12</sup> <https://www.parking.org/wp-content/uploads/2016/01/TPP-2014-08-The-future-of-Parking-Policies.pdf>  
<sup>13</sup> <https://grattan.edu.au/wp-content/uploads/2018/10/909-Remarkably-adaptive-Australian-cities-in-a-time-of-growth.pdf> [https://www.finance.wa.gov.au/cms/uploadedFiles/\\_State\\_Revenue/Other\\_Schemes/Perth-Parking-Management-Area-\(PPMA\).pdf](https://www.finance.wa.gov.au/cms/uploadedFiles/_State_Revenue/Other_Schemes/Perth-Parking-Management-Area-(PPMA).pdf)  
<sup>14</sup> [https://www.finance.wa.gov.au/cms/uploadedFiles/\\_State\\_Revenue/Other\\_Schemes/Perth-Parking-Management-Area-\(PPMA\).pdf](https://www.finance.wa.gov.au/cms/uploadedFiles/_State_Revenue/Other_Schemes/Perth-Parking-Management-Area-(PPMA).pdf)  
<sup>15</sup> McCahill, C & Garrick, N 2014, 'Parking Supply and Urban Impacts' in Ison, S & Mulley, C (eds), *Parking Issues and Policies, Transport and Sustainability* (vol. 5), Emerald, Bingley, p. 51.

## Case Study

### Zurich

Contrary to the usual practice of regulating parking in urban centres to ensure minimum provision ('parking minimums'), parking spaces have been capped in Zurich since 1989. Through the introduction of 'parking maximums' – which were further restricted in 1996 – surface level (on-street) parking has steadily been repurposed for public open space, retail facilities or mass transport. Any new parking spaces constructed are required to be constructed underground.<sup>16</sup> This policy restriction on parking spaces was ratified by the public at a 2010 referendum and remains in place today.

To offset the decrease in surface level or on-street parking resulting from the policy, parking spaces accessible to the public through private provision have increased significantly.<sup>17</sup>

While this policy has been successful in Zurich, it is arguably underpinned by one of the leading public transport systems in the world.

From innovative tracking solutions that measure real-time travel to efficient tram, train and bus networks, the city's transport efficiency has kept pace with its growing economy and increasing population. The Sustainable Cities Mobility Index 2017 by ARCADIS ranked Zurich second overall for sustainable urban mobility out of 100 cities, highlighting its very affordable and efficient public transport system as a key contributor to its success.<sup>18</sup>



<sup>16</sup> <https://www.citylab.com/transportation/2012/08/lessons-zurichs-parking-revolution/2874/>  
<sup>17</sup> [https://www.stadt-zuerich.ch/content/dam/stzh/tec/Deutsch/stadtverkehr2025/Publikationen\\_und\\_Broschueren/Stadtverkehr-Report-2012-en.pdf](https://www.stadt-zuerich.ch/content/dam/stzh/tec/Deutsch/stadtverkehr2025/Publikationen_und_Broschueren/Stadtverkehr-Report-2012-en.pdf)  
<sup>18</sup> [https://www.arcadis.com/assets/images/sustainable-cities-mobility-index\\_spreads.pdf](https://www.arcadis.com/assets/images/sustainable-cities-mobility-index_spreads.pdf)



# Parking utilisation audit – Sydney

NRMA Members have highlighted the Sydney CBD, Parramatta and North Sydney as the three most frustrating locations for parking.

With even some of the largest institutional owners of car spaces forced to leave parking assets dormant – often due to restrictions and regulations – the NRMA presents the results of a sample comparison of parking utilisation rates across seven buildings in Sydney with off-street parking assets.<sup>19</sup>

While not all buildings lend themselves to public access, utilisation rates are noticeably lower where parking is restricted. This highlights the fact that, even where road congestion is significant, off-street parking assets are being underutilised.

## Sample comparison of parking utilisation rates

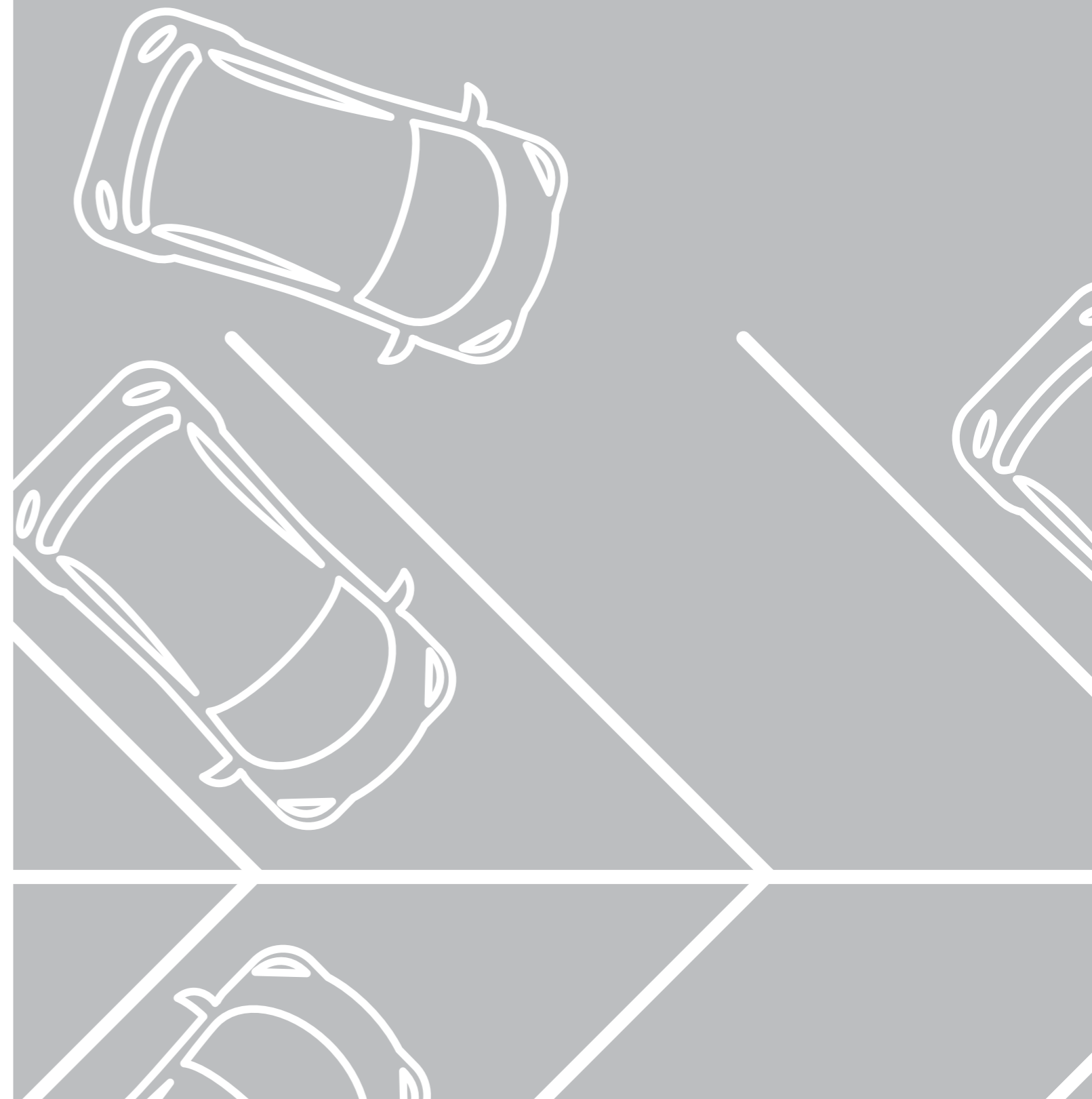
Building	Utilisation Rate Avg.	Advertised DIVVY Price
<b>PUBLIC ACCESS</b>		
George Street, Parramatta	97%	\$15 Daily (weekday)
Hickson Road, Sydney	96%	\$24 Daily (weekday)
Margaret Street, Sydney	95%	\$35 Daily (weekday)
Clarence Street, Sydney	94%	\$30 Daily (weekday)
<b>PRIVATE ACCESS</b>		
Clarence Street, Sydney	80%	
Harris Street, Sydney	74%	
Walker Street, North Sydney	32%	

With restricted parking facilities not visible or accessible to the general public, the issue of parking asset underutilisation is somewhat masked.

From this sample comparison, it is clear that thousands of off-street parking spaces at any given time are sitting unused – a frustrating deduction when our urban places are jammed with cars searching for parking.

And in the case of the Sydney CBD, the frustration is compounded with \$70.85 being the average price for a daily parking space.<sup>20</sup>

# Parking – part of the solution



<sup>19</sup> Parking utilisation audit conducted throughout the month of March 2019.  
<sup>20</sup> <https://www.commercialrealestate.com.au/news/wp-content/uploads/2015/07/Car-Parking-White-Paper-2015-1.pdf>

# Smart cities

There are transformative and inescapable forces that will disrupt economies and societies to define the future of cities, including:

- V2V, V2I and V2N communications<sup>21</sup>
- Battery and fuel-cell electric vehicles
- Transport autonomy
- Data and monitoring technology
- Augmented reality
- Demographics and densification
- Distributed assets and resources
- Health and wellness infrastructure
- Artificial intelligence and robotics
- Changing consumer preferences

The image of the ‘smart city’ – where data, technology, infrastructure and services work together harmoniously to enhance liveability and economic output – is fast becoming a reality.

Cities will increasingly leverage data, including real-time data, from information and communications technology systems, sensors, devices and other connected assets to improve decision-making across multiple urban challenges related to physical and social infrastructure.<sup>22</sup>

Cisco suggests that approximately 500 billion devices globally will be ‘connected’ by 2030,<sup>23</sup> highlighting a shift of focus from personal connectivity to infrastructure connectivity.

The integration of technology into the urban liveability agenda raises the possibility of collecting data and information on things like traffic, parking and pedestrian movements. When collated, this data and information can provide powerful insights into city functionality that can be used to enhance mobility, access and safety.

Through advancing technologies and improved data knowledge, visions of cities groaning through congestion and pollution are slowly being replaced by inspiring illustrations of smart and connected cities making better and more efficient use of existing transport and infrastructure assets.

Wirelessly connected city utilities and infrastructure – everything from trash cans to parking meters and road sensors – feeding systems that help decision makers will help transform cities into greener and more efficient places.

Combined technological advancements could mean better productivity through more reliable information, less road traffic, quicker deliveries, enhanced mobility, and the improved utilisation of services and assets, including water and electricity.

While much remains unknown, many jurisdictions have begun to put in place plans to try and help manage some aspects of the imminent transition to new technologies and norms.

The entire country of Japan is currently being mapped in readiness for Connected and Automated Vehicles (CAVs) by 2020,<sup>24</sup> and in Jutland (Denmark), nine independent electricity, heat and water companies have created a common data platform to optimise the efficiency of all operations across the network while reducing maintenance.<sup>25</sup>

The Smart Islands Energy System project across Madeira (Portugal), the Orkney Islands (Scotland) and Samsø (Denmark) is piloting smart grids – energy networks that automatically monitor flows to optimise grid efficiency and manage power plants, storage and distribution to power everything from streets, homes and offices to electric vehicles.<sup>26</sup>

These are just some examples of what is in store in the not too distant future.

In an increasingly digital economy and technology-driven age, jurisdictions need to look towards new approaches, innovative technologies and smart infrastructure to create an environment that supports community and economic growth.

## Parking

Parking data, when combined and leveraged with other local data sets, will be extremely valuable for progressive cities looking to optimise the use of technology and data to improve services and the visitor experience.

Parking policy is a key consideration in the smart cities discussion – and there is already a strong case for parking reform.<sup>27</sup> Technology exists today that can provide the ability to tap into existing, underutilised assets to deliver greater societal value.

Smart parking tools that collate information from above-ground sensors can guide drivers via apps and digital signage to empty parking spaces, and even advise on the most optimum route to that location.

In the case of DIVVY’s technology, unused or underutilised off-street spaces can be unlocked for public parking, leading to less congestion and pollution, and greater choice for those commuting by car.

There is increased recognition of the benefits of adopting connected technologies to manage parking, with 11 per cent of public parking spaces globally (on-street and off-street) now considered ‘smart’ – this is expected to increase to 16 per cent by 2023.<sup>28</sup> Adopting connected, data-driven parking technologies is not just the *smart* thing to do to make our cities more liveable, productive and sustainable, it is also inevitable.

While some small steps have been made domestically through the Australian Government’s Smart Cities and Suburbs Program – which has funded around 10 proposals for ‘Smart Parking’ initiatives<sup>29</sup> – far greater progress is possible, even in the absence of future mobility technologies such as CAVs.

Transport infrastructure, including parking, is the backbone of any urban centre – and as Australian cities steadily explore the Smart Cities concept to improve mobility and living standards, parking will have an increasingly important role to play.

21 Vehicle-to-Vehicle; Vehicle-to-Infrastructure; and Vehicle-to-Network.  
 22 <https://www.ey.com/gl/en/issues/business-environment/ey-megatrends-urban-world>  
 23 [https://www.oxfordmartin.ox.ac.uk/downloads/reports/Citi\\_GPS\\_Technology\\_Work\\_2.pdf](https://www.oxfordmartin.ox.ac.uk/downloads/reports/Citi_GPS_Technology_Work_2.pdf)  
 24 [https://japan.kantei.go.jp/policy/it/2018/2018\\_roadmaps.pdf](https://japan.kantei.go.jp/policy/it/2018/2018_roadmaps.pdf)  
 25 <https://stateofgreen.com/en/uploads/2018/05/Smart-Grid.pdf?time=154653259>

26 <https://www.h2020smile.eu/about-the-project/>  
 27 Guerra, E & Morris, E 2018, ‘Cities, Automation, and the Self-parking Elephant in the Room’, *Planning Theory & Practice*, vol. 19, no. 2, pp. 291–297.  
 28 <https://www.smartcitiesworld.net/news/news/11-of-global-parking-spaces-now-smart-3694>  
 29 <https://infrastructure.gov.au/cities/smart-cities/index.aspx>

# The sharing economy

The sharing economy facilitates the sharing and use of unused or underutilised assets or services between individuals or organisations.<sup>30</sup> Airbnb is an example of a worldwide company that has encouraged sharing to flourish by enabling individuals to leverage technology to make passive income through renting out spare spaces or rooms.

In defiance of traditional business logic, Airbnb is an enabler that owns no hotels or real estate. Despite this, Airbnb is easily the largest provider of accommodation in the world.<sup>31</sup>

Sharing is a major global disruptor that will continue to impact industries. According to PwC, the sharing economy was estimated at US\$15 billion in 2015, and has the potential to reach US\$335 billion by 2025 – an increase of more than 2000 per cent.<sup>32</sup>

And it's not just companies that are reaping benefits. Airbnb has estimated that over a one year period in Paris, approximately 10,000 hosts welcomed more than 220,000 guests, generating €185 million of economic activity and supporting 1,100 jobs.<sup>33</sup>

Australia is not immune to this phenomenon. *Collaboration in Cities: From Sharing to 'Sharing Economy'*, a 2017 World Economic Forum report in collaboration with PwC, ranks Melbourne in the top three cities globally for its food-sharing sector, with some 144 technology-mediated food-sharing initiatives. From 99 designs which connects producers and consumers of graphic design and has a turnover of \$60 million, to Bright Sparks, a social enterprise that repairs or reuses small electronic appliances to help reduce wastage, the sharing economy is thriving. Jobs growth in this sector is expected to increase by around 25 per cent over the next decade in Melbourne alone.<sup>34</sup>

The impact of the sharing economy on the transportation sector is more than evident through Uber. Ride sharing and multi modal apps are disrupting transportation through technological innovation and embracing new customer preferences. Companies like General Motors, who are heavily investing in mobility-related technology, have acknowledged how vital sharing is to mobility due to urbanisation and congestion.

With services like DIVVY, the sharing economy revolution is now ready to address parking challenges in congested cities while generating income for owners of empty or underutilised parking spaces. In a recent research study by The Committee for Sydney and Arcadis into property and infrastructure preparedness for future transport technologies, it has been suggested that the sharing economy will likely permeate through car parks. The decoupling of parking spaces from individual lots, which is already starting to occur in the Sydney CBD, could support the expansion of this practice.<sup>35</sup>

While harnessing real time information on the availability of public and private parking spaces presents challenges, current technological advances in remote monitoring, and the ease of scheduling and reporting through apps, will potentially deliver significant growth in this space. Harnessing the power of the shared economy will deliver benefits to the transportation and infrastructure sectors, and create another lever for policy makers and planners to address traffic flow issues and better manage the utilisation of urban spaces.

30 <https://rachelbotsman.com/blog/the-sharing-economy-dictionary-of-commonly-used-terms/>  
 31 <https://techcrunch.com/2015/03/03/in-the-age-of-disintermediation-the-battle-is-all-for-the-customer-interface/>  
 32 <https://imreview.ca/article/1215>  
 33 <https://www.oxera.com/agenda/a-fair-share-the-economics-of-the-sharing-economy/>  
 34 [http://www3.weforum.org/docs/White\\_Paper\\_Collaboration\\_in\\_Cities\\_report\\_2017.pdf](http://www3.weforum.org/docs/White_Paper_Collaboration_in_Cities_report_2017.pdf)  
 35 [https://www.arcadis.com/media/3/3/1/%7B3313EA9B-1261-48C5-B625-B5510096A144%7DAutonomous%20Mobility\\_WEB%20SPREAD%20PAGE.pdf](https://www.arcadis.com/media/3/3/1/%7B3313EA9B-1261-48C5-B625-B5510096A144%7DAutonomous%20Mobility_WEB%20SPREAD%20PAGE.pdf)

## Case Study

### GoGet<sup>36</sup>

GoGet CarShare is Australia's first and largest car sharing service. Started in 2003 with three vehicles shared by 12 members, today GoGet has over 3,000 vehicles shared by more than 130,000 members nationwide.

More than 20 per cent of drivers in the City of Sydney are GoGet members, with similar rates existing across many other local government areas. Back to base car share – GoGet's model – involves a vehicle shared by around 20 people, which can be booked for as little as one hour, accessed from a designated space known as a "pod", and then returned once a trip is complete.

One shared vehicle removes around 10 private vehicles from public roads (the City of Sydney car share fleet alone has removed approximately 10,000 cars from the area).

Car share is a proven solution for improving parking conditions across Australia, and preferencing spaces for car share should be a priority for planners, developers and governments seeking to improve congestion and reduce infrastructure costs. By actively incorporating a Super Pod (10 or more car share vehicles) into a development or commuter hub, transport amenity is provided, which in some cases can eliminate the need to build extra levels of parking, saving tens of millions of dollars.



One shared vehicle removes around 10 private vehicles from public roads.

A network of 100 share cars releases 30,000m<sup>2</sup> of net floor area in a building or 15,000m<sup>2</sup> of kerbside space.

36 Case study provided by GoGet.



# Transport hubs and park-and-ride

Public transport is becoming smarter and more accessible as new infrastructure is delivered, which is likely to increase demand for bus, rail and ferry services. This scenario will progressively drive the need for parking provision in close proximity to these services as users seek to utilise new and improved transport.

The objectives of transport hubs and park-and-ride (commuter parking) facilities include improving the user experience and reducing the number of single car commute trips to achieve congestion and environmental benefits.<sup>37</sup>

In the past, public funding has primarily been targeted at roads as opposed to transport hubs. However, governments have begun to realise the benefits – and necessity – of incentivising greater public transport use through new and improved infrastructure provision and complementary policies, which has led to a recent focus on the provision of these types of facilities.

In 2017, the NSW Government rolled out a new form of commuter parking called 'Opal Park-and-Ride', which utilises Transport for NSW's 'Opal card' to enable customers to access commuter car parks.

Opal Park-and-Ride allows commuters using an Opal card to park for free for up to 18 hours, provided it is for the purpose of accessing public transport.

The program was initially rolled out in Ashfield, Brookvale, Dee Why, Gordon, Kogarah, Manly Vale, Mona Vale, Narrabeen, Seven Hills and Warriewood. Recently, it was announced Opal Park-and-Ride would be expanded to Kiama, Sutherland, Penrith, Holsworthy, Gosford, Campbelltown, Hornsby, Warwick Farm, Revesby and Jannali.

Also in 2017, the NSW Committee on Transport and Infrastructure resolved to conduct an inquiry into commuter car parking.

The Committee ultimately found that commuter car parking has an important role to play in helping people to access transport interchanges, and that it should be offered free for genuine commuters as this is likely to increase use of public transport.<sup>38</sup> This finding is consistent with the NRMA's position on access to government-managed commuter car parking facilities.

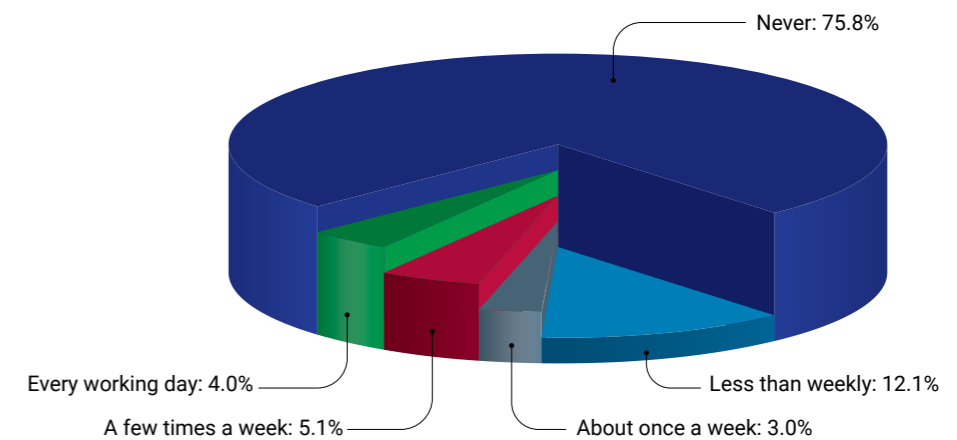
Most recently, through the federal budget in April 2019, the Australian Government announced the allocation of \$500 million for a new commuter car park fund aimed at combatting urban congestion by improving access to rail stations.<sup>39</sup>

Increasing parking availability and commuter car parking facilities around strategic transport hubs, including the expansion of existing, government-owned infrastructure where practicable, will incentivise more commuters to use public transport.

Increasing parking availability around strategic transport hubs will incentivise more commuters to use public transport.

At present, the number of people utilising commuter parking is limited, which is mainly due to a relatively small number of facilities being available.

Frequency of using Park-and-Ride for commuting purposes (NRMA Members)



Where facilities do exist, it is important they are managed, as oversubscribed commuter car parking can contribute to surface congestion in surrounding streets and neighbourhoods, affecting residents and businesses. Unlocking underutilised private, off-street parking spaces can help to alleviate this issue by increasing provision and creating the sense for local customers that transport can be a viable alternative to driving.

Leveraging both public and private parking solutions in close proximity to transport services maximises parking supply and encourages more people to use public transport.

To further incentivise the use of these facilities, real-time information for commuters to ascertain the availability of parking spaces at commuter car parks is important, as lost time searching for parking can contribute to congestion, delays and missed connections.

While the continuing delivery of state-of-the-art public transport services will act to incentivise transport use, accessibility and seamless connectivity remain key to attracting commuters.

The NSW Government's Opal Park-and-Ride program has demonstrated that value, reliability and accessibility can encourage mode shift, which is positive for future transport planning. And while the program has recently expanded, many more opportunities exist to combat road congestion through this initiative, especially in strategic locations where congestion causes significant commuter delays.

<sup>37</sup> Marsden, G, 2006, *The evidence base for parking policies — A review*, Transport Policy, No. 13, p. 447–457.  
<sup>38</sup> <https://www.parliament.nsw.gov.au/ladocs/inquiries/2448/FINAL%20REPORT%20-%20Commuter%20car%20parking%20in%20NSW.pdf>  
<sup>39</sup> [https://www.budget.gov.au/2019-20/content/bp1/download/bp1\\_bs1.pdf](https://www.budget.gov.au/2019-20/content/bp1/download/bp1_bs1.pdf)

## B-Line / Sydney Metro Northwest

The new B-Line bus and Sydney Metro Northwest (formerly North West Rail Link) services were designed to improve public transport options for commuters along some of Sydney's most congested corridors.

These services represent high quality transport provision, with the associated 'Park-and-Ride' infrastructure offering a glimpse into the future of state-of-the-art commuter parking.

### Case Study

#### B-Line

Commencing initial services in November 2017 from Mona Vale, B-Line has resulted in high satisfaction levels. As part of the program and to incentivise use, 900 car spaces at six locations can be accessed by commuters through their Opal card.

The Manly Vale B-Line car park – featuring 150 commuter parking spaces and bike storage facilities – is the first of its kind to use rotating Junglify Breathing Wall™ modules. These state-of-the-art modules, which rotate 180 degrees to provide easy and safe access for plant maintenance, support cleaner air for users and local residents.

The native and exotic plants that now surround the car park were chosen to encourage biodiversity and transform the internal and external visual appeal of the building.

The Manly Vale B-Line car park is an example of successful commuter parking infrastructure that has enabled residents to use quality public transport instead of relying on private vehicles.

#### B-Line commuter car park at Manly Vale



Image courtesy of Junglify

In NRMA's recent road and transport survey, all areas serviced by B-Line were rated in the top 20 in NSW for public transport services and options.

### Case Study

#### Sydney Metro Northwest

Sydney Metro Northwest, initially allocated a budget of \$8.3 billion (making it Australia's most significant public transport project), will offer customers a fast metro train every four minutes during the peak at 13 metro stations between Tallawong and Chatswood.

New stations – Tallawong, Rouse Hill, Kellyville, Bella Vista, Norwest, Hills Showground, Castle Hill and Cherrybrook – have been designed as multi-modal transport interchanges to enhance accessibility and improve the customer experience.

The 36 kilometre project aims to transform commuting in Sydney's North West Growth Area, where some of the highest levels of car ownership per household in Australia exist.<sup>40</sup>

Sydney Metro Northwest was designed to be supported by the establishment of 3,000 commuter car spaces; an expanded parking program increased this initial target to 4,000 new car spaces across five locations, with an additional 340 spaces for bicycle parking and more than 100 'kiss and ride' (pick up and drop off) spaces also incorporated into the design to incentivise metro use.

Sydney's new metro system – featuring new-generation, fully air-conditioned trains and Australian-first, state-of-the-art platform safety screen doors<sup>41</sup> – will be extended into the Sydney CBD and beyond to Bankstown by 2024, and will incorporate a connection to the proposed Sydney Metro West project (between the Sydney CBD and Westmead through Sydney Olympic Park and Parramatta), which is likely to extend to Western Sydney International (Nancy-Bird Walton) Airport in time.

#### Bella Vista Station

800 commuter car spaces

- 35 spaces for bikes
- 16 'kiss and ride' spaces
- 6 bus bays
- 4 taxi spaces



#### Cherrybrook Station

400 commuter car spaces

- 45 spaces for bikes
- 14 'kiss and ride' spaces
- 5 bus bays
- 4 taxi spaces



Images courtesy of Sydney Metro

<sup>40</sup> [https://www.sydneymetro.info/sites/default/files/document-library/Parking\\_management\\_strategy\\_overview\\_report.pdf](https://www.sydneymetro.info/sites/default/files/document-library/Parking_management_strategy_overview_report.pdf)  
<sup>41</sup> [https://www.transport.nsw.gov.au/sites/default/files/media/documents/2017/sydney-metro-factsheet\\_0.PDF](https://www.transport.nsw.gov.au/sites/default/files/media/documents/2017/sydney-metro-factsheet_0.PDF)



## Parking as a policy lever

The importance of parking as a policy lever is increasingly recognised among planning researchers,<sup>42</sup> however in practice, parking policies are frequently determined based on arbitrary standards.<sup>43</sup>

There is mounting evidence, however, to suggest that planners are becoming progressively more aware of the effect that parking supply and policy can have on travel patterns.<sup>44</sup>

As technology adoption continues to accelerate and as the future 'smart cities' discussion evolves, parking policy will increasingly be an important consideration for planners, designers and governments alongside future land-use, planning, and transport decision-making.

Ultimately, parking policy has the potential to influence travel patterns and behaviours and encourage mode shift, which will be a key focus point moving forward as populations increase and higher demands are placed on mobility and land-use.

A review of parking policy literature, based on evidence and empirical studies, shows that where new or improved transport alternatives are introduced alongside changes to parking supply or price, substantial mode shift can be achieved.<sup>45</sup>

Transport provision and complementary parking policies also appear to be among the most promising strategies to increase active transport (i.e. walking and cycling).<sup>46</sup>

These types of outcomes (i.e. increasing public transport use and encouraging active transport) are some of the major aims of the most recent strategic planning and transport plans in NSW.

To complement transport hubs and park-and-ride services and achieve these renewed objectives to disincentivise private vehicle use and improve road congestion in urban places, there are numerous policies relating to parking that warrant consideration, including the preparation of state guidelines and geo-fence parking strategies.

### Parking guidelines for local government areas

Transport provision and local government parking policies can play a critical role as policy levers to incentivise or disincentivise car use. State guidelines for local governments where state significant mass transit exists could help to minimise street congestion by discouraging on-street parking (where alternatives are present) and incentivising the expansion of available private parking spaces for use by members of the public. While state parking guidelines should be supported in-principle by local governments, they must be reviewed and adapted to fully consider local circumstances.

### State significant mass transit parking strategies

New and efficient transport options that provide value and reliability must also be accessible for customers. While parking management strategies aim to provide parking capacity to meet projected commuter demands, they are often focused on the transit precinct and do not fully consider surrounding locations in close proximity to transport services. To further incentivise the use of quality transport, localised parking strategies within a defined geo-fence should be implemented for existing and new infrastructure where state significant mass transit exists (e.g. Sydney Metro).

Parking policy will increasingly be an important consideration for planners, designers and governments alongside future land-use, planning, and transport decision-making.

<sup>42</sup> Shoup, D C., 2005, 'The High Cost of Free Parking', Planners Press, American Planning Association, Chicago.  
<sup>43</sup> Marsden, G, 2006, 'The evidence base for parking policies — A review', Transport Policy, No. 13, pp. 447–457.  
<sup>44</sup> [https://scholars.unh.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1003&context=hmp\\_facpub](https://scholars.unh.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1003&context=hmp_facpub)  
<sup>45</sup> Marsden, G, 2006, 'The evidence base for parking policies — A review', Transport Policy, No. 13, pp. 447–457.  
<sup>46</sup> [https://scholars.unh.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1003&context=hmp\\_facpub](https://scholars.unh.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=1003&context=hmp_facpub)



# Technology and space utilisation

According to Donald Shoup, Distinguished Research Professor of Urban Planning at the University of California, Los Angeles, and preeminent authority on urban parking policy, many current parking plans – especially those focused on the provision of on-street spaces – act to subsidise cars, increase traffic congestion, worsen air pollution, degrade urban design, damage the economy and raise housing costs.<sup>47</sup>

Principally, Shoup submits that poorly planned and badly managed on-street parking contributes to cars ‘cruising’ or searching for parking, increasing city street congestion. Indeed, past studies over many decades show that around 30 per cent of cars in congested urban centres on average are searching for parking.<sup>48</sup>

In support of Shoup’s position – which is relevant given local planning in Australia has historically been based on American modelling<sup>49</sup> – it is estimated there are as many as two billion parking spaces in the United States for approximately 200 million cars.<sup>50</sup> Despite this, city street congestion remains a key issue in major urban centres in the United States, including Boston, Washington D.C., Chicago, New York, Los Angeles, Seattle, Pittsburgh, San Francisco, Philadelphia and Portland.<sup>51</sup>

The 2018 INRIX Global Traffic Scorecard suggests that the Sydney, Melbourne and Brisbane city centres are in the top 25 most congested in the world.

Shoup’s main principles are based on parking demand exceeding supply on city streets. The solution rests with shifting this dynamic through off-street accessibility and pricing to minimise cruising, while at the same time reducing the number of cars overall through incentivising public transport use and active transport (walking and cycling).

Given the advent of ‘smart cities’, Shoup’s arguments appear to be progressively gaining greater traction, and with CAVs on the horizon, planners and designers are starting to consider the opportunities that exist around road space allocation.

In Australia, off-street parking can be prohibitively expensive, particularly for casual users. This discourages parking and theoretically car use, however the fact remains that many vehicle owners either choose to drive, or have no viable alternative given their place of origin and destination.

With casual parking rates significantly higher than early bird and daily rates – particularly in the Sydney, Melbourne and Brisbane CBDs – casual parkers essentially subsidise longer term users. From this perspective, the push to decrease the attractiveness of driving into certain CBDs hasn’t essentially reduced the number of city bound vehicles – it has just shifted the increased cost to casual parkers.<sup>52</sup>

While beginning to implement policies in support of Shoup’s research has, to this point, proved challenging in some areas around the world, technological developments are now emerging that enable drivers to access available, off-street car parking spaces.

Across the world, apps and platforms such as JustPark, ParkMonkey, ParkNow, ParkMobile, ParkMe, Parkopedia, ParkHound, ParkWhiz and Kerb aim to offer improved parking choice by acting as a mobile payment platform to link drivers with underutilised parking spaces.

These spaces exist due to the traditional approach to parking – requiring most buildings to provide their own spaces. There are thousands of spaces spread around parking facilities that are unused or underutilised.

In conjunction with quality transport services and appropriate on-street parking pricing that considers the true value of land provision, improving the utilisation rates of these private, off-street parking spaces by unlocking them for members of the public through app-based technology will improve access and ease urban road congestion.

Making more efficient use of existing and soon-to-be-completed parking facilities in densifying centres will encourage cars off public surface roads and promote increased transport use.

In commercial buildings – or even residential blocks with off-street facilities – the provision of underutilised spaces to the public for a reasonable charge also allows owners or managers to monetise inefficient parking assets.<sup>53</sup>

Taking some of the stresses out of parking through technology is one way that cities can improve the visitation and customer experience.

In terms of parking security, asset owners and managers and other facility users are acutely aware of the need for restricted or controlled access to mitigate risk. Control mechanisms in more recent times have consisted of keys, fobs and swipe passes, however these devices are progressively being replaced or updated with new technologies such as licence plate recognition systems, apps and digital keys that negate the need for physical devices or paper tickets.

## On-street technologies

### Park ‘n Pay

In February 2019, the NSW Government announced a trial of ‘Park ‘n Pay’, a new parking app which will allow drivers to pay for on-street parking through their mobile phone, negating the need to use parking meters. Initially confined to The Rocks, the trial aims to improve convenience and peace of mind for customers by also sending mobile alerts when the allotted time is close to expiry – customers will have the option to top-up if they require an extension of time.

### Smart parking

In December 2016, the District Department of Transportation (DDOT) in Washington D.C. launched parkDC, an app to help reduce the time needed to find parking, improve turnover of high-demand spaces, provide better parking information and reduce congestion.<sup>54</sup> The app provides real-time parking availability and demand-based pricing information.

In January 2019, the DDOT updated parkDC to allow users to search for on-street and off-street parking, including filters that enable searches for on-street parking by price per hour and/or by time period.

IoT Analytics suggests that market spending on smart parking products and services will grow at a compound annual growth rate of 14 per cent to reach US\$3.8 billion by 2023.\*

\*<https://iot-analytics.com/product/smart-parking-market-report-2019-2023/>

47 <https://luskin.ucla.edu/shoups-2005-book-earns-place-in-planning-history/>  
 48 Shoup, D C., 2005, *The High Cost of Free Parking*, Planners Press, American Planning Association, Chicago.  
 49 Abbott, M 2018, *Markets and the State: Microeconomic Policy in Australia*, 1st edn, Routledge, London, p. 181.  
 50 <https://www.citylab.com/transportation/2018/05/parking-is-sexy-now-thank-donald-shoup/560876/>  
 51 <http://inrix.com/scorecard/>  
 52 <https://www.commercialrealestate.com.au/news/wp-content/uploads/2015/07/Car-Parking-White-Paper-2015-1.pdf>

53 <https://www.commercialrealestate.com.au/news/wp-content/uploads/2015/07/Car-Parking-White-Paper-2015-1.pdf>  
 54 <https://ddot.dc.gov/release/updated-parkdc-mobile-app-makes-it-easier-find-parking-throughout-district>



DIVVY powers over 78,400 boom gate actions every month.

## Case Study

### DIVVY<sup>55</sup>

DIVVY's state-of-the-art technology helps to enable journeys through functional user options and smart infrastructure. DIVVY unlocks spaces in commercial buildings, giving drivers exclusive access to Australia's fastest growing parking network with unparalleled convenience and flexibility. DIVVY also enables owners to enjoy the benefits of a new income stream.

DIVVY's software is the most advanced of its kind globally, connecting sophisticated inventory management to mobile access technology with real-time reporting and an integrated sales tool to market asset utilisation seamlessly on the DIVVY App and online.

DIVVY's innovative solution has introduced the shared economy to the traditional parking management sector. It unlocks car spaces that are underutilised, enabling car park owners and customers to flexibly book car spots. For owners, DIVVY provides the tools to manage space utilisation to offer flexible services and maximise the value of assets.

#### Why does parking matter?

Market research shows that, on average, 333 days of our lives are spent searching for an available, cost-effective car parking space. That's a lot of time and energy wasted, not to mention the traffic congestion and pollution contribution created by driving.

Global research shows that drivers looking for a parking space can account for up to 40 per cent of all inner-city traffic.<sup>56</sup>

And with just one parking space for every eight workers, Sydney's CBD ranks in the Top 10 most expensive places to park in the world, with Brisbane and Melbourne not too far behind.

Car park management and usage – perhaps surprisingly – mostly remains manual and paper-based, compounding problems with parking. This presents difficulties for staff as they are required to physically walk around car parks to check space availability and usage. In Australia's busiest CBDs especially, this scenario impacts consumers by not lending itself to optimised asset use.

Like many sectors, parking has been dominated by large and traditional incumbents for some time. However, with technology and innovation adoption slow-moving, consumer demand for better parking solutions is increasing.

#### DIVVY

DIVVY was founded in 2011 to solve the parking problem and provide an alternative solution in CBDs and popular parking locations across Australia. DIVVY's real-time online booking system solves the challenge of finding an available car park and enables both users and managers to book or free up spots instantly.

<sup>55</sup> Case study provided by DIVVY.

<sup>56</sup> <https://www.mobility.siemens.com/mobility/global/sitecollectiondocuments/en/road-solutions/urban/case-studies-for-traffic-solutions-en.pdf>



DIVVY's business model was built around collaborative consumption, a trend and form of sharing that is sweeping the globe to improve the utilisation of assets between owners and users. DIVVY has already won numerous awards and recognition for its innovative technology, including e27 Technology Awards: Top 10 Technology Innovation in Australia, Top 10 Most Promising Tech Start-up in Australia, and Top 50 Most Promising Tech Start-up in Asia.

In addition to the general public, DIVVY has been embraced by forward thinking businesses wanting to improve parking as part of employee benefits programs in support of more flexible working practices. DIVVY has been adopted by many leading Australian and international businesses, including Suncorp, Dexus and DXC Technology.

### Suncorp

"Suncorp started working with DIVVY in 2017 in buildings in Brisbane and Sydney as we were looking for a better system to fully utilise our larger leased car parks and provide more accurate FBT tax reporting.

Suncorp uses DIVVY to provide convenient and reportable parking to team members with tool of trade vehicles. The biggest change we have experienced since partnering with DIVVY is the ability to have online, accurate reporting of parking usage, along with better utilisation of our car parks. This enables our teams to book leased parks for specific timeframes and provides greater flexibility and efficiencies for our business. We are currently looking at expanding the service to our other buildings. Suncorp is happy to recommend DIVVY to other businesses looking to improve their parking systems."

**Joseph Harmon**  
Parking Administrator

### DXC Technology

DXC Technology is the world's leading end-to-end IT services and solutions company. DXC chose DIVVY to solve the parking challenges at the company's Australian headquarters in Macquarie Park, Sydney, where the closure of the local train line was impacting employees.

DIVVY worked with DXC to develop a bespoke parking program with bookings available 24/7 for peak and off-peak use to offer maximum flexibility and enhanced utilisation.

"Working with DIVVY has been fantastic. We introduced a new flexible parking system enabling our people to book spaces when they want from an allocation of hours to best suit their work and travel needs. With DIVVY's innovative technology and a custom online portal, we can now manage bookings more efficiently and fairly, as well as provide our people with more flexibility. In the first month alone, 5,969 bookings were made by employees demonstrating the success of this innovation solution"

**Nigel Bradley**  
Project Manager

The average cost per booking for parking through DIVVY is \$16.76.

### Building a smarter planet

Connecting drivers with spaces that otherwise sit unused can ease congestion on our urban streets by 30 to 40 per cent, significantly improving traffic flows and reducing pollution created by cars driving around looking for a park.

With businesses and consumers getting on board with the shared economy, the potential to truly improve how cities work is exponentially greater. Providing better and more efficient access to parking is key to more productive cities.

To improve efficiency, DIVVY users can access the capabilities of the system's online reporting tools to track the usage of their assets and share this information with stakeholders, including investors and councils, to demonstrate resource efficiency practices. And as the old saying goes, what gets measured gets actioned!

### What does the future look like?

The future of our cities is fast-paced and changing rapidly, with new technology innovations and data insights transforming the way we live, work and play. DIVVY has been partnering with a number of innovative leaders to provide smarter solutions that offer Australians more choice and flexibility.

In 2018, DIVVY extended its product offer from parking to other bookable assets such as bike lockers and meeting rooms, using the same smart technology for businesses and customers to better manage and utilise these valuable assets. Leading businesses such as Woolworths and Dexus are partnering with DIVVY to provide user-friendly access for their staff to book lockers and bike storage facilities in their offices.

*"At DIVVY we're always striving to deliver better experiences for our customers and we are excited about developing meaningful products that benefit the wider community, as well as driving better performance for our investors."*

*"We've been working with our team and industry partners to truly disrupt and revolutionise the parking sector to provide better, more cost-effective and flexible solutions for customers, and now we're expanding into all kinds of bookable assets such as bike lockers and meeting rooms. Watch this space!"*

**Grant Fowler** - CEO, DIVVY

The average Sydney CBD booking through DIVVY is 3.9 hours for an hourly space, and 7.8 hours for a daily space.

The Sydney CBD is the most searched location on the DIVVY System, with hourly spaces three times as popular than daily/monthly spaces.





## Complementary amenities

Parking facilities have traditionally been used for a sole purpose, however pace of change has presented opportunities to improve productivity.

The provision and expansion of desirable features such as ticketless access, smart parking, electric vehicle charging, car servicing, maintenance and mobile eSafety checks (pink slips) improve convenience and flexibility for consumers.

### Services

Car servicing, maintenance and mandatory checks have often involved a visit to a car dealer or repairer, however mobile mechanical services are increasingly becoming available.

In April 2018, the NSW Government announced a trial of mobile eSafety checks, negating the need for participants to obtain mandatory compliance by visiting a fixed location.

The initial trial of eSafety checks has recently been extended with a view of permanent implementation to make life easier for workers, seniors and families, provided that the service can continue to be delivered safely and effectively.

### Electric vehicle charging

With electric vehicle numbers anticipated to increase sharply over the coming decade, the provision of charging infrastructure will be key to enabling journeys.

Many jurisdictions overseas are well advanced of Australia in terms of preparedness for the electric vehicle revolution. When it comes to home or destination parking, for example, the current draft *London Plan* stipulates that all operational parking must provide infrastructure for electric or other ultra-low emissions vehicles.<sup>57</sup>

Very recently, Australia has started to progress. Transport for NSW's new *Electric and Hybrid Vehicle Plan* commits to delivering co-investment in charging points in commuter car parks and investigating measures to make buildings 'EV ready' by ensuring that charging is catered for, which includes streamlining approval processes for installations.<sup>58</sup>

Wattblock's 2018 *Electric Vehicle Charging in Residential Strata* survey found that more than 20 per cent of residents expected to purchase an electric vehicle within two years, and that 78 per cent are supportive of installing charging infrastructure within their apartment blocks in readiness for electric vehicle technology.<sup>59</sup>

### Autonomy

Increasing levels of vehicle connectivity and automation will present challenges but also opportunities. Automated valet parking, for example, which allows vehicles to navigate off-street parking without a driver, may bolster existing parking capacity through better manoeuvrability, optimised positioning, and reduced space requirements.

This technology is already a reality and is set to feature on a number of vehicles currently in the design stage. The impact of this type of technology on infrastructure will need to be factored in by asset owners and operators.

Global research shows that drivers looking for a parking space can account for up to 40% of all inner-city traffic.<sup>60</sup>

<sup>57</sup> [https://www.london.gov.uk/sites/default/files/new\\_london\\_plan\\_december\\_2017.pdf](https://www.london.gov.uk/sites/default/files/new_london_plan_december_2017.pdf)

<sup>58</sup> <https://future.transport.nsw.gov.au/plans/nsw-electric-and-hybrid-vehicle-plan>

<sup>59</sup> [https://www.wattblock.com/uploads/4/4/9/8/44984189/wattblock\\_ev\\_charging\\_in\\_strata\\_summary\\_260718.pdf](https://www.wattblock.com/uploads/4/4/9/8/44984189/wattblock_ev_charging_in_strata_summary_260718.pdf)

<sup>60</sup> <https://www.mobility.siemens.com/mobility/global/sitecollectiondocuments/en/road-solutions/urban/case-studies-for-traffic-solutions-en.pdf>



# Integrated land-use planning

The traditional passive approach to the development of cities and places is progressively being tested by urbanisation and population growth. In this environment, arising challenges are being compounded by technological advancement and rapid pace of change, leaving public sector planners facing a high level of uncertainty.

To develop the built environment holistically, frameworks and environmental planning instruments that enable the regulatory land-use planning system to be more agile will provide for a stronger focus on future community needs and improved mobility.

In February 2019, the Greater Sydney Commission handed down its preliminary report into planning in the Ryde Local Government Area. The report found that *"significant scale and rapid housing supply has led to a misalignment between the timing of development and the delivery of infrastructure necessary to support it"*.<sup>61</sup>

The report suggests that current observations – which include lack of effective collaboration between local and state government, together with the development sector – and subsequent recommendations will have application across Greater Sydney.

One of the key issues with planning is stagnant policy. Existing planning instruments and development control plans – many of which remain restrictive and act as barriers to innovative concepts – should be adapted to properly support technological advancement and rapid pace of change, and to give greater consideration to current major projects and emerging trends.

Spatial optimisation, transport integration, active lifestyles and useable services and facilities are desirable outcomes that can be encouraged through integrated land-use planning.<sup>62</sup>

## Transport and land-use planning

What is becoming clearer over time is that transport and land-use planning go hand-in-hand, which can increasingly be seen in some of our major neighbouring cities. In Singapore, for example, there has been a strong focus in recent times on intrinsically linking land-use planning and end-to-end commuter journeys through policies that include the consideration of development, car use, access to parking, public transport provision and opportunities for active transport (walking and cycling) – these policies focus on integration and the movement of people to meet common objectives.

While the Australian Transport Assessment and Planning Guidelines provide a framework for progressing transport and related initiatives, opportunities exist for greater collaboration between planning, environment and transport departments.

Through the Greater Sydney Commission, the State Infrastructure Strategy and Future Transport 2056, the NSW Government has put in place strategies to strengthen alignment between land-use planning and transport. However, to manage the challenges associated with urbanisation and population growth, it is critical that this alignment be a major focus moving forward – land-use planning and transport must be carefully and fully coordinated with the principal aim being optimal mobility and liveability.

With a strong general desire to progressively curb road congestion through incentivising public transport use, it is imperative that planning strategies and frameworks are all-encompassing and readily adaptable.

Mounting evidence from empirical studies shows that land-use planning can reduce car use and encourage more sustainable travel.<sup>63</sup>

In London, the provision of public transport has helped shape planning policy. To manage the road network, minimise car travel and alleviate on-street parking, the new 2017 draft *London Plan* sets out policies that:

- Encourage public transport use through improved access, connectivity and capacity
- Facilitate active lifestyles (walking and cycling)
- Adjust housing densities and parking rates according to transport accessibility
- Offer use alternatives for spaces in lieu of private residential parking
- Establish maximum parking provision guidelines for new developments
- Incentivise car-free and 'car-lite' developments

According to the Plan, reducing parking provision can facilitate higher-density development and support the creation of mixed and vibrant places that are designed for people rather than vehicles.<sup>64</sup>

## Transport modelling

Transport modelling is a foundational aspect of all transport infrastructure planning and decision-making. Governments have developed and maintain these models, as have many private sector advisors to assist in informing long-term planning and decision-making.

These models use a series of inputs, including population figures and land-use patterns, to forecast travel using a series of demand and cost assumptions.

There is a need to regularly review these assumptions in order to ensure they remain correct, otherwise planning will be founded on assumptions that lack rigour. Many current assumptions were generated over a decade ago and are increasingly becoming outdated, particularly due to changes in consumer preferences and business models.

The assumptions related to car park pricing are a key element in transport modelling as they can influence the type of journeys that are undertaken.

## Parking

Generous residential parking provisions act as a major incentive for owning and using a car as they bundle the cost of a parking space into the cost of purchase, forcing households to pay a major expense related to vehicle ownership whether they require it or not.<sup>65</sup>

For some car owners, the most significant car-related cost is that of the car parking. Each space in a multi-storey car park costs from \$30,000 to \$70,000 to construct, and car spaces in new apartments can cost \$50,000 to \$140,000 to buy. Housing costs can be reduced if residential buildings do not include car parking.<sup>66</sup>

Through Future Transport 2056, Transport for NSW has committed to investigating the development and implementation of a 'Greater Sydney Parking Guideline' in collaboration with local government to ensure that car parking complements alternative modes of transport. It is also expected to address the future provision of commuter car parks.<sup>67</sup>

This Guideline should be considered in a broad context alongside planning instruments and mechanisms to meet the broader objectives of the aforementioned state transport and planning strategies, and include the consideration of new policies to support the future of mobility, such as designated pick up and drop off zones at bus stops, train stations and ferry wharves for first-mile last-mile vehicles, and mandated electric vehicle chargers and car share spaces in new builds and refurbishments where parking provision remains critical for occupants.

61 Greater Sydney Commission: Findings from Stage 1 of the Assurance Review of Planning in the Ryde Local Government Area, February 2019.  
 62 Gurran, N 2006, *Australian Urban Land-use Planning: Introducing Statutory Planning Practice in NSW*, Sydney University Press, pp. 11–12.  
 63 [https://atrf.info/papers/2006/2006\\_Holden.pdf](https://atrf.info/papers/2006/2006_Holden.pdf)

64 [https://www.london.gov.uk/sites/default/files/new\\_london\\_plan\\_december\\_2017.pdf](https://www.london.gov.uk/sites/default/files/new_london_plan_december_2017.pdf)  
 65 [https://atrf.info/papers/2006/2006\\_Holden.pdf](https://atrf.info/papers/2006/2006_Holden.pdf)  
 66 <http://phillipboyle.com.au/wp-content/uploads/2016/10/Carsharing-Association-FINAL-Report-4.0.pdf>  
 67 [https://future.transport.nsw.gov.au/sites/default/files/media/documents/2018/Greater\\_Sydney\\_Services\\_and\\_Infrastructure\\_Plan\\_0.pdf](https://future.transport.nsw.gov.au/sites/default/files/media/documents/2018/Greater_Sydney_Services_and_Infrastructure_Plan_0.pdf)



## Conclusion

A review of land-use planning and associated literature makes it clear that parking policy has the potential to play a key role in shaping travel patterns to combat congestion in urban places.

However, to be of benefit, parking policy should not be developed in isolation – it should form part of land-use, transport and spatial planning processes. Ultimately, to support the built environment and reflect the needs of the community, strategic planning should aim to support seamless mobility while maximising choice, opportunity and productivity.

Best practice is achieved when government, industry and academia work together to develop long-term, people-orientated land-use and mobility agendas which incorporate strategic parking policies.

While these agendas should aim to continually improve liveability and incentivise mode shift to quality public transport to reduce road congestion, the reality is that private vehicle use will continue to dominate mobility in Australia for the foreseeable future.

It is undeniably the case that, for some, the private vehicle is the only logical option for commuting.

With population projections suggesting continued growth for decades, it is important that technology is increasingly and effectively used to revolutionise how transport and infrastructure is designed and delivered, and how existing infrastructure is made most efficient.

As technology advances at an exponential rate, opportunities for positive change are emerging that demand greater collaboration and coordination across industries, including infrastructure, construction, manufacturing, technology and communications.

Stagnant policies and outdated approaches to managing the growth and development of urban places must be replaced with integrated and dynamic strategies that can adapt to rapid pace of change.

Innovative parking strategies aimed at increasing efficiency and infrastructure utilisation rates can help to reduce road congestion and facilitate access to quality public transport options that offer reliability, value for money and a quality experience for the customer.

Poorly planned and badly managed on-street parking can contribute to congestion or cars 'cruising' for parking, creating unnecessary blockages throughout busy city centres and transport corridors – something that is particularly evident in Sydney, Melbourne and Brisbane.

While absolutely necessary in some locations, the provision of accessible, on-street parking incentivises car use and dependency, whereas managed parking can reduce city street congestion and incentivise public transport use, enabling urban places to better cater for social and economic purposes through expanding useable land.

Car spaces in private, off-street car parks that are sitting unused or underutilised are wasted assets that are not generating revenue or contributing to congestion management.

In conjunction with integrated city and urban planning, technology can now provide part of the parking solution.

As cities become smarter and more integrated, and as quality public transport programs are progressively rolled out, utilising data and adopting new, innovative and agile ways of tackling issues related to urbanisation and population growth will ensure our cities continue to thrive for the benefit of residents, commuters and visitors.



# Comments and queries

**Ms Katherine Fowler**

Marketing and Communications Manager

**DIVVY**

Level 2, 12 O'Connell Street, Sydney NSW 2000

**Email:** [Katherine.Fowler@DIVVY.com.au](mailto:Katherine.Fowler@DIVVY.com.au)

**Web:** [DIVVY.com.au](http://DIVVY.com.au)

**Mr Robert Giltinan**

Senior Policy & Public Affairs Advisor

**NRMA**

PO Box 1026, Strathfield NSW 2135

**Email:** [Public.Policy@mynrma.com.au](mailto:Public.Policy@mynrma.com.au)

**Web:** [mynrma.com.au](http://mynrma.com.au)

The NRMA and DIVVY would like to thank Roads Australia, Sydney Metro, GoGet and Junglify for their contribution to this paper.

