

Creating Liveable Cities Through **CAR-LITE** **URBAN MOBILITY**



CENTRE for
LiveableCities
SINGAPORE

ULI Urban Land
Institute
Asia Pacific

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INTRODUCTION

Creating Liveable Cities Through Car-lite Urban Mobility represents the latest collaboration between the Centre for Liveable Cities (CLC) and the Urban Land Institute (ULI). Built on the success of past joint projects of *10 Principles for Liveable High-Density Cities* (2013) and *Creating Healthy Places through Active Mobility* (2014), this project looks to further develop the ongoing dialogue on creating and sustaining a liveable urban environment by generating recommendations that prepare cities for a car-lite urban mobility future. Key principles and lessons distilled in this e-publication will offer valuable guidance to Singapore and other cities facing similar challenges.

This special edition e-publication features key findings of the research project so far. A final version of the publication will be released in October 2016.

WHY CAR-LITE, WHY NOW?

Cities move. The movements of people and goods, supported by extensive transport infrastructure and systems, are like the heartbeats of the city — a reflection of its vigour and health. Just as how the mass production of motor vehicles has changed the way we travel over the past century, it has also forever transformed the way cities measure and plan for their growth in mobility. With more vehicles overtaking the streets, indicators such as volume to capacity ratio, vehicle counts per hour, and number of lanes and efficiency, have dictated the prevailing paradigm of mobility planning and formed the basis of what works and what does not.

Nevertheless population growth and urbanisation has been on the rise, big time. Over the last century, the world's population multiplied more rapidly than before, increasing from 2 billion to over 7 billion today. This powerful whirlwind of urbanisation is expected to sweep across some of the most populous countries. By 2030, 60% of the global population will be living in cities, up from 50% currently. Over

the same two decades, the middle class is expected to expand by about 3 billion, coming almost exclusively from emerging economies such as China and India.¹ One can expect most of tomorrow's middle class population to aspire for car ownership, the likely key contributor to the expected increase in automobile sales from the current 75 million sales per year² to more than 130 million by 2030.³

These figures are of great significance to our future as our long-standing over-reliance on automobiles has negatively impacted society. These include air and noise pollution, unsustainable use of land and natural resources, road fatalities, and social isolation as a result of car-based urban sprawl among the ageing population in most developed countries. Additionally, substantial economic costs have resulted from routine traffic congestion. All these further necessitate the need to urgently look into a new urban mobility model that is more environmentally friendly, socially inclusive and economically efficient.



Rapid urbanisation and increased wealth in major emerging economies such as China and India necessitate the need to adopt a more sustainable urban mobility model. (Source: Safia Osman @<https://flic.kr/p/dreQ72>).

Interestingly, various studies have indicated the changing trends in urban transport choices in terms of declined car ownership and car-based travel in the recent years, especially among the younger generation from the denser urban areas in many developed countries. Riding on such trends and the prospect of an even more connected world, rapid technological advances, new business model innovations and urban

policies in favour of more compact transit-oriented urban developments, it is timely that cities collaborate to embrace a more sustainable urban mobility model. The model should be one that can bring the development of mobility systems in cities back on the right track again while providing cities of tomorrow with the precious opportunity to avoid mistakes of the past.

ACCOUNTING FOR THE COSTS OF “CAR-HEAVY” AND THE BENEFITS OF “CAR-LITE”



(-) Drivers in Singapore currently spend nine hours commuting on the roads on a weekly basis, instead of engaging in leisure activities.²⁶



(-) Road traffic accidents rank as the ninth leading cause of death and account for 2.2% of all deaths globally.²⁷



(-) In 2013, transportation contributed more than half of the carbon monoxide and nitrogen oxides, and almost a quarter of the hydrocarbons emitted into air in the United States.²⁸



(-) On average, cars spend 80% of their time parked at the home of the owner, 4% in motion and 16% parked elsewhere, most notably in urban areas.²⁹



(-) Each car requires road space plus 2–6 parking spaces (at home, work and other destinations). Thus, a car occupies more land than most urban homes while walking, cycling and public transit require far less space.³⁰



(-) The average motorist wastes a total of 2,549 hours circling the streets searching for a parking spot whether it is on the school run, the local high street or a supermarket or airport car park. To put it into perspective, motorists spend 106 days of their lives looking for parking spots.³¹



(+) If ride sharing were to replace all conventional traffic on the roads, the number of vehicles each day would reduce by 90% (or 65% during peak hours).³²



(+) Public transit provides seniors with independence. More than four in five seniors believe public transportation is a better alternative to driving alone, especially at night.³³



(+) Driverless technology can help create a safer mobility world by removing the potential for human error behind the wheel — which causes up to 94% of road accidents in the U.S.³⁴



(+) Studies have shown has found that workers who give up their cars and commute to work are happier despite the crowds and disruptions.³⁵



(+) Traffic casualty rates tend to decline as public transit travel increases in an area. Residents of transit-oriented communities have only about a quarter the per capita traffic fatality rate as residents of sprawled, automobile-dependent communities.³⁶

FUTURE MOBILITY — WHAT MIGHT IT LOOK LIKE?

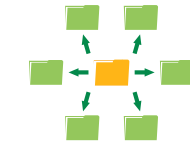
So, if a paradigm shift in urban mobility is a necessary step towards a more sustainable urban future, what would the future be like?



Options, Options, Options!

Limited mobility options, especially options in between private cars and public transit.

Consumers enjoy an unprecedented number of connected mobility options on-demand at affordable prices, making car-lite/car-free lifestyle entirely feasible. In addition, customer-oriented mass transit services will gain popularity from the public.



Greater integration

Government as the main mobility service provider, while the private sector operates by the bottom line.

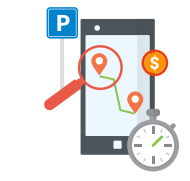
Private sector will fill gaps in the market to provide more mobility services, parallel with services provided by the public sector. Through gap-filling, a convergence of various transport modes and services will occur. Multiple channels and aspects of mobility would integrate, resulting in infrastructure, information and fare integration in a sharing economy.



Human-oriented development

Private car-oriented, ownership-based transport product and low-density infrastructure.

As shared mobility infrastructure and services become more common, there will be value shifts from asset ownership and driving performance to software and passenger experience.³⁷ Compact urban topology supported by transit-oriented developments (TODs) as well as inclusive and walkable urban environments will make cities more people-oriented.



Mobility demand management

Peak capacity driven approach to transport infrastructure planning. Much “wasted capacity” is present in the existing system.

Greater focus on mobility demand management can help optimize the utility of both existing and planned urban system in a technology-rich environment. With heightened supply of sustainable mobility solutions, increased competition and higher rates of asset utilisation, cost of travel will also be reduced. Developed economies will continue to innovate, producing new models of mobility, while developing economies would be able to leapfrog to a new norm, and avoid car-centric planning of yesteryears.



Data-driven connected communities

Monolithic and ‘self-contained’ entities with fragmented access to information. Large and comprehensive information systems, founded upon artificial intelligence and big-data. The digitally-savvy younger generation will prefer service-based mobility package instead of owning and maintaining a car. Location-based systems will provide real-time updates along multiple accessibility paths. Through the combination of information from various platforms, insights on personalised user-preferences will become richer.

GOING CAR-LITE THROUGH A COLLABORATIVE JOURNEY

For a long while, the public sector has assumed the key role of addressing major urban mobility challenges. Globally, transport authorities are investing heavily into public transit and hard infrastructure as a way to improve mobility. However, as urban population continues to grow rapidly and commuters' travel needs and behaviours becoming more diverse and dynamic, cities are finding it increasingly difficult to meet demands for good and efficient multimodal mobility.

Over time, one thing has become certain — the public sector can no longer function in isolation as it does not have the right mix of skillsets and capabilities required to build a more robust mobility ecosystem when things are happening at breakneck speed. It is therefore crucial that the public sector stays nimble, forward-looking and be open to collaborating with the experts from other sectors.

In many cases, public and private sectors have started to forge partnerships in providing new mobility solutions. The numerous successful bike-sharing schemes in cities around the world have demonstrated that constructive public-private partnerships built on clear expectations and good understanding of each other's incentives can lead to a win-win situation for both cities and businesses.

In other cases, the market itself has responded by stepping in to fill gaps in a conventional mobility ecosystem.

For example, over the past five year or so, the urban mobility sector has seen the emergence of an ever expanding range of new solutions that are consumer-oriented, on-demand and user-friendly, largely driven by the private sector. While some of these "disruptions" in mobility service delivery was met with mixed responses from city governments, consumers have been extremely receptive. With the private sector having demonstrated great potential in developing smart yet relatively inexpensive mobility solutions that respond well to consumers' demand, it is really up to the public sector to decide how best to harness these solutions for the greater good of their city as a whole.

Last but not least, global ground-up initiatives have shown their power in driving impactful changes. By lending them sufficient support, the public sector can tap on these resources from civic groups and local communities as important agents of change. Engaging these groups at all stages of planning, designing and implementing of the new mobility ecosystem is imperative because fundamentally a good understanding of people's needs and demands should form the basis for the provision of mobility services and urban spaces.



ABOUT THE PROJECT

Recognising the importance of this collaborative approach, this research project seeks to provide a platform for key stakeholders from the different sectors to exchange views and brainstorm ideas on how to collaborate and support one another in the process of this major paradigm shift. As part of the research process, we hope to distil relevant lessons and takeaways through identification of best practice examples, gathering of inputs from international experts as well as multi-stakeholder workshop discussions. The set of recommendations serves to provide practical advice to cities wishing to embrace a car-lite mobility future; and is intended as a useful checklist for both WHAT needs to be done (i.e. specific strategies and initiatives needed to create people-oriented urban districts and mobility systems) as well as HOW to get it done (i.e. approach and mind-set required to get things done quickly and effectively).

FIRST WORKSHOP

Two research workshops were organised as part of the research process. The first workshop, (held in February 2016) highlighted some of the current initiatives taken by selected cities including Singapore in promoting sustainable future mobility. The workshop also looked into the roles of key “enablers”, such as new mobility options supported by technologies and a sharing economy, progressive parking policies and good spatial design, in shaping aspiring car-lite cities’ mobility future. The 62 participants who took part in the workshop provided invaluable feedbacks on the major issues and challenges faced by the respective sector and industry that they represented. Group discussions were held to discuss how stakeholders from the public, and people sectors could work together to clear the major roadblocks.

Presentations and panel discussion touched on the following topics:

- “Going Car-lite: Vision and Challenges Ahead” by Ministry of Transport (MOT);
- “International Scan on Car-lite Initiatives” by Centre for Liveable Cities (CLC);
- “The Role of Shared Mobility” by Park Chan, Uber;
- “Car-lite Compatible Parking Policies for Singapore to Consider” by Paul Barter, Lee Kuan Yew School of Public Policy;
- “Creating Car-lite Cities: The Role of Good Spatial Design” by Terence Seah, Benoy; and
- Panel Discussion with representatives from the real estate industry — “Does Car-lite Make Economic Sense for Real Estate Developments in Singapore?”



Participants at the workshop discussing challenges and opportunities faced by stakeholders as Singapore embraces a car-lite mobility future (Source: CLC & ULI).

SECOND WORKSHOP

Key findings of the first workshop then served as the basis for the second multi-stakeholder workshop on 8 April 2016. The workshop was held at Jurong Lake District (JLD), a major regional centre in the west of Singapore. Envisioned to be Singapore’s second Central Business District (CBD) and also the new terminus location for the planned Singapore–Kuala Lumpur High Speed Rail project, the area presents exciting opportunities to implement new planning and mobility concepts as part of its comprehensive redevelopment plan. In addition, creating a modern district that is more people-oriented and less car-dependent is one key vision for the area.

Using JLD as the case study area, one of the main workshop objectives was to identify a few priority areas of action or “quick-wins” for potential implementation within next 2–3 years to support JLD’s car-lite vision. From real estate developers with existing development projects in the area to urban and transport planners who are involved in its planning and development, many of the 65 participants are stakeholders

who take active interests in shaping JLD’s future. Hence, the workshop provided a good platform for the exchange of ideas and solutions to improve accessibility and attractiveness of the area. Issues such as ways of promoting coordinated travel demand management at district-level, shared mobility and more people-oriented street design were extensively discussed during the workshop.

Presentations and panel discussion touched on the following topics:

- Key Takeaways from Workshop 1 by Centre for Liveable Cities (CLC);
- Keynote Presentation “Strategies on Creating Car-lite Cities — A Practitioner’s Guide to Driving Positive Changes in Cities’ Mobility Ecosystem Quickly and Effectively” by Gabe Klein;
- In Conversation with Gabe Klein;
- Sharing of Vision and Development Plans for Jurong Lake District (JLD) by Urban Redevelopment Authority (URA) and Land Transport Authority (LTA); and
- Panel Discussion with representatives from the real estate industry — “Can ‘Car-lite’ Work in JLD?”



Participants trying out personal mobility devices as part of the second workshop at Jurong Lake District (Source: CLC & ULI).

As part of the workshop, participants were taken on a field trip around Jurong Gateway, the commercial hub within JLD. Conducted on foot and on personal mobility devices (PMDs), the field trip provided an overview of the key concepts and strategies that had gone into the planning and development of the area. It also allowed participants to have first-hand experiences of using PMD as a last-mile commuting mode at JLD.

The workshop also invited former Transportation Chief of Chicago and Washington DC, Mr Gabe Klein, to lead the discussions. Coming from a start-up background and with a prior career path mainly in the private sector, Gabe firmly believes in the need to run the public sector agency with the energy, the pace, the creativity and the change management approach that are typically found in the start-up world. He was therefore able to provide many unusual insights and valuable tips on how city leaders and policy makers could work together with the community and the private sector more effectively to get meaningful initiatives off the ground quickly.



Gabe Klein leading discussions on how stakeholders could work together to make car-lite work at Jurong Lake District (Source: CLC & ULI).



Please scan the QR code below to view video for more information on the research and workshop process.



<https://youtu.be/IXKdf0Wk1rU>

TEN IDEAS IDENTIFIED TO PREPARE CITIES FOR A CAR-LITE FUTURE

IDEA NO. 1 ALIGN VISIONS, BOTH INTERNALLY AND EXTERNALLY

When it comes to driving the mobility paradigm shift with difficult policy changes, getting vision and efforts aligned within individual organisations is a prerequisite to success. Such internal alignment is critical in ensuring support and effective execution at every level of the organisation. At times, it may even necessitate shaking up the existing systems and processes. In Chicago, for example, this had involved dissolving the individual mode-based units at the Chicago Department of Transportation to create a unified Complete Streets Department.⁴ The result, was a more coordinated effort that focused less on the individual modes of transport, but more on creating better streets for people.

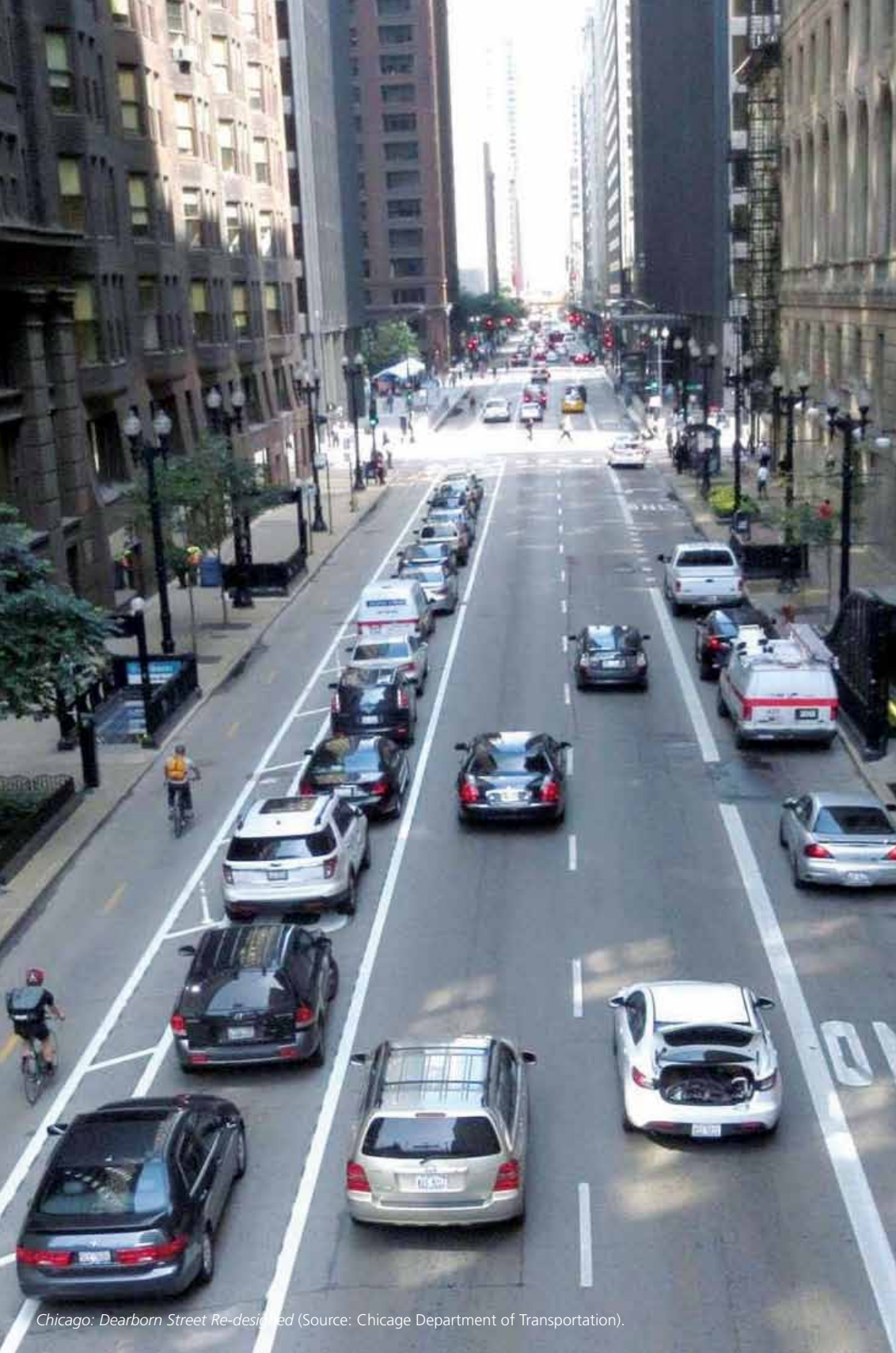
At the same time, alignment of vision across the board is critical. Cities need to ensure that transport planning is not treated in isolation from other related urban policies. To have everyone share the same views, cities need to make promoting sustainable mobility a unifying agenda across all city agencies, reaching beyond transport planning into other essential urban issues of land use, job creation, energy, climate change, health and social equity. Having a goal-based approach recognises and emphasises the need of breaking down the silos of agency-specific KPIs to focus more on strategic “wellbeing” of cities as a whole. Such an approach not only enables design and execution of key policies and plans in a more coherent and coordinated manner, but also results in better projects and outcomes.

“Is having good data important for driving this mobility paradigm shift? Sure, but we also need to remind ourselves that Mr Lee Kuan Yew was known as a man with vision and determination, not a man with data. Policy makers have a critical role to play in this process by driving the right changes.”

Mr Mark Boland⁵
Head of Projects (South-Asia),
Hongkong Land

IDEA NO. 2 FOCUS ON PEOPLE’S NEEDS, WORK WITH COMPETITION AND FIND WIN-WIN SOLUTIONS

The wide range of mobility services and concepts that are becoming available has the potential of profoundly transforming the future of both public and private transit. While some of these new kids on the block are seen to have stepped on the toes of existing players, consumers have demonstrated strong receptiveness towards trying out and eventually taking up many of these new-age transport services and products. According to statistics released by Singapore’s Land Transport Authority, the number of rental cars on the roads has risen to a record high of 24,573 as of August 2015, a 38% surge from August 2014. The probable cause of this trend is the rising popularity of ride-hailing apps like Uber and Grab as these services work with rental firms to provide cars to drivers.⁶





With a better understanding of the impact of service options such as car clubs and ride-hailing on the bigger mobility ecosystem, cities may be more willing to integrate them as a part of the car-lite mobility solution (Source: Felixkramer @ <https://flic.kr/p/61Uu5q>).

In an increasingly service-conscious age, it no longer matters who provide the services. What matters, instead, is how attractive the provided services, and for that consumers act as very reliable barometers. Like it or not, fair competition in the transport sector is a prerequisite for innovation and efficiency, and it is probably not overstating to say that fair competition among different transport modes and business models is a prerequisite for networking the system to create a truly integrated package of mobility services.⁷ Nevertheless, it is important to recognise that this is not a one-way street. For ride-hailing and car-sharing services to be accepted as part of the future mobility ecosystem, much is needed to demonstrate that these new services can complement public transport modes, instead of attracting passengers away from public transit and generating more traffic on the roads. As it is now, there is a lack of definitive answer

on their exact impact on transit. While more surveys and researches on this topic would certainly be useful, sharing data with cities and the public would be an essential first step on the part of these new service providers.⁸

“I think it is for the public to understand that there are all of these different options and one of the option may not be able to completely replace car ownership or be as good as owning your own car, but together — by walking and cycling more, by using public transit more, by sharing the rides — as a package it can for sure replace the convenience of driving your own car.”

Mr Park Chan⁹

General Manager (South-East Asia),
Uber

IDEA NO. 3 CREATE DEVELOPMENT-BASED MOBILITY DEMAND MANAGEMENT STRATEGIES

While the public sector has a key role to play in driving cities towards a more car-lite future, they CANNOT carry out the task alone. End-users, be it individuals or organisations, ought to play a bigger role alongside city governments in promoting sustainable travel behaviours because ultimately it is their collective travel decisions that will have a significant impact on cities' transport networks and urban environment.

In cities like London, having individual “trip-generators” on board of the travel demand management process has always been a key part of the overall transport strategy. From government buildings and schools to shopping malls and hospitals, developers of major development projects are often required to put in place a site-specific “travel plan”, comprising a survey of current travel

patterns, a set of new travel targets and a travel demand management package, for trips to and from home as well as business trips during office hours. For example, in the case of a “workplace travel plan”, the travel demand management package would often require employers to provide incentives to their employees, to promote greener and cleaner travel choices (e.g. work from home, flexible working hours, company bike rental scheme, discounted public transport season pass, free car share membership) as well as “sticks” to discourage staff from driving (e.g. removal of season parking for staff). In a study conducted by Virginia Tech transport scholars, Hamre & Buehler, when a company offers transit benefits for its employees (instead of free parking and subsidies to drive), the probability of taking the bus or train exceeds 76%, and driving becomes less appealing.¹⁰ Not stopping short at just developing the plan, individual organisations as custodians of the travel plan are also tasked to monitor its effectiveness and report on the progress.



London: The business district of Canary Wharf adopts an estate-wide mobility demand management approach to ensure coordinated efforts in promoting sustainable personal mobility choices and freight arrangement among businesses and visitors. (Source: La Citta Vita @ <https://flic.kr/p/ouyWjp>).

Over time, this approach would have encouraged the development of “customised” mini transport strategies that better cater to the context and needs of individual projects. It would have also fostered a shared sense of responsibility among developers and users to ensure that every single new development is contributing instead of compromising cities’ overall efforts in promoting sustainable urban mobility.

In Singapore, while more can still be done, the Land Transport Authority (LTA) and Urban Redevelopment Authority’s (URA) latest decision to introduce a new requirement for developers to submit a Walking and Cycling Plan (WCP) so that the needs of pedestrians and cyclists are considered foremost as part of their development plans is certainly a move in the right direction.¹¹

“The car-lite future is not something that the government can do alone. It depends a lot on the private, public and community partnership. For the private sector, they can incorporate amenities into their developments such as bike parking and shower facilities. In some of the cities that we have visited, it is even in the employees’ contract that they have to take public transport to work. This can be something that we can look into in future.”

Ms Tracey Hwang¹²
Director (Urban Design),
Urban Redevelopment Authority

IDEA NO. 4 EXPAND PUBLIC TRANSPORT AMENITIES TO COVER THE FIRST- AND-LAST-MILE

To achieve car-lite urban mobility, public transport network needs to form the backbone of the mobility ecosystem. Hence, as the first and probably the most critical step, cities have to make development of a safe, reliable and convenient public transport system the priority in planning for their future mobility systems.

But getting people out of their cars takes more than just having a shiny and well-run public transport system. Very often, the challenge of getting drivers to give up their steering wheels lies with the much dreaded “first-and-last-mile” problem, i.e. the extra time and hassle needed to traverse the gaps between homes, mass transit hubs and workplaces. Given that car trips take their passengers from door-to-door; it is important for public transport operators which provide services for the bulk of a public transport-based multimodal trip to look into customers’ needs beyond the service network itself.

One way to do so is for public transport operators to establish strategic intermodal partnerships with taxi, car-sharing and bike-sharing providers to complete the trip ecosystem. For instance, if making space for cyclists and their bikes on congested peak-hour buses and trains is a real challenge, perhaps partnering a bike-sharing service provider would be a good alternative that helps plug the “first-and-last-mile” gaps without compromising public transport commuters’ experiences. In time to come, the smart phone could well be the platform that brings everything, from real-time trip planning to integrated ticket booking and payment system, together to make multi-modal trips truly hassle-free and



Helsinki: The Finnish capital is looking into developing a new transport model of “Mobility as a Service” to meet people’s transportation needs over one single interface. The city hopes that with a well-integrated multi-modal public transportation system, owning a car will eventually be unnecessary. (Source: (left) Kelly Borget, Burnaby, BC, Canada @ <https://flic.kr/p/HzEb73>; (right) City Clock Magazine @ <https://flic.kr/p/mBjfdh>).

attractive. Last but not least, deployment of promotional materials and sharing of information about the services can be done together to improve the appeal of the “enhanced” mobility package as a whole.

“I enjoy taking public transport because it takes away the strain off from having to drive. Although it could be crowded, it is a relaxing way to spend the morning and evening commuting. To make public transit more comfortable and more convenient, we have to work on the last-mile—from MRT station to home—making this leg comfortable is a very important criterion to help make public transport a more attractive and convenient mode.”

Ms Hwang Yu-Ning¹³
Prime Minister’s Office, Strategic Group,
Director (Land & Liveability)

IDEA NO. 5 PLANNING MATTERS!

Solutions to more desirable and more sustainable mobility will not and should not be found solely within the realm of

transport. As a starting point, it is always worthwhile to ask: “Can some of those trips be avoided or shortened in the first place?” Mobility data analytics tools have enabled us to gain useful insights into the traffic issues while new mobility solutions supported by technology have promised faster and more effortless journeys. However, these solutions tend to focus more on the signs rather than dealing with the underlying causes of our urban challenge i.e. the growing volume of traffic that continues to clog up our transport infrastructure, especially during peak travel periods. Minimising the number of road trips that are generated at the source can save us from having to fight the battles that can be avoided in the first place.

At the strategic level, land use policy must continue to address the physical separation of activities and the means by which distances can be reduced. Jobs and homes must continue to be brought closer to each other to relieve unnecessary stress on the road network and public transport infrastructure. Urban structures (in terms of the location, mix and density of land uses) and transport systems must continue to shape each other in ways that promote sustainable travel options.

Beyond horizontal integration of high-density mixed land uses around public transport nodes, compatible uses should also be co-located within the same development vertically to minimise the need to travel. With the improvements in industrial environmental regulations and the shift in economy activities towards more knowledge and creativity-based industry, particularly in more mature cities, we have seen emergence of many new space usage types in the recent years. Increasingly, such a trend has called out for the need to look into the weaknesses of zoning as a mixed-use facilitator, and how it can be tweaked to facilitate the creation of vibrant and diverse urban spaces that respond better to the dynamic market demand.

“Neighbourhoods and urban precincts that are planned and designed in a high-density setting for ease of walking and cycling provide excellent base for reducing reliance on private cars. Instead of continuing to invest in road widening and extension, we need to ensure the type of transport infrastructure investments made is strictly congruous to our car-lite vision.”

Mr Anthony Chia¹⁴

*Executive Vice President, Projects,
City Development Limited*



Singapore: Transit-oriented high-density housing towns like Toa Payoh are well planned with key amenities within easy access in an attractive and walkable urban setting (Source: By Stephanie @ <https://flic.kr/p/7zDUZh>).

IDEA NO. 6 PUT A STOP TO CHEAP AND EASY PARKING

Although frequently underestimated, parking is a critical factor in individual mobility choice. According to research from the Paris-based firm Sareco, people choose their mode of transportation for urban trips based on the parking conditions at their origin and destination.¹⁵ Hence, even with excellent access to public transport, workplaces that provide ample parking spaces at affordable rates are likely to prompt both staff and visitors to drive. Similarly, a generous supply of residential car parking at trip origins encourages car ownership and reinforces the notion of parking as an entitlement. As a result, poor parking policies can be at the risk of being counterproductive and undermine cities' efforts to optimise precious urban land use and promoting car-lite urban mobility.

As a start, cities need to make better sense of their current parking usage. On the supply front, public agencies should take the lead to consolidate parking supply data and put together a city-wide parking inventory. On the demand side, with the help of technologies such as electronic parking and vehicle identification systems, city governments can partner with businesses and commercial car park operators to develop a better understanding of the pattern and duration of parking demand. While considering commercial and personal confidentiality, data collected from such parking surveys can be made available for research purposes to enable development of more proactive policy interventions.

A more stringent parking provision framework that caps parking supply within individual development has proven to be an effective parking reform tool. For existing developments with excess parking provision,

the public sector can encourage conversion of underutilized parking spaces for alternative revenue-generating uses through incentives such as granting of bonus GFA. Nonetheless, to prevent an overly broadbrush approach, such reviews can be fine-tuned by calibrating provision standards against factors such as public transport accessibility and access to amenities and services etc. In larger new development areas, consolidated public parking provision coupled with district-wide parking strategies should always be considered to encourage more efficient sharing of parking facilities and minimisation of space redundancy. To encourage a switch-away from private car ownership, car sharing parking lots should also be provided whenever new car parking provision is made within newly-built development projects, and be given greater ease of accessibility compared to normal parking lots, similar to electric vehicle or handicap spaces.

Parking rates has always had a significant impact on parking usage. Season parking or full-day parking passes do not reflect the real cost of parking spaces. In addition, as parking demand varies during different times of the day and locations, conventional parking pricing system that is less sensitive to time and space has shown its limitation in managing parking spaces efficiently. Cities like San Francisco and Los Angeles have attempted to solve this problem by piloting new demand-responsive systems that enable more systematic and precise pricing setting. For instance, SFpark, San Francisco's new pricing programme, enables parking rate variation by tiny parking zones, time of day and day of week. Frequent price adjustments are also made based on occupancy data and occupancy targets.

Last but not least, to ensure that parking planning and management are more aligned with overall land use and transport policies,

it is advisable to house municipal parking policy under a single authority. In doing so, the role of parking policy as a powerful travel demand management tool will be significantly enhanced.

“Plentiful parking promotes car ownership and driving and is incompatible with a car-lite city. Yet, Singapore requires parking with every building, based on an outdated fear that parking shortage means chaos. Cities such as London and Berlin have, without problems, abolished such minimum parking requirements, allowing developers to build less parking, especially in transit-rich locations where buildings can succeed with little or no parking. How do such cities achieve parking success without requiring excess? Modern parking management is the key, enabled by digitally-enhanced enforcement and context-responsive pricing.”

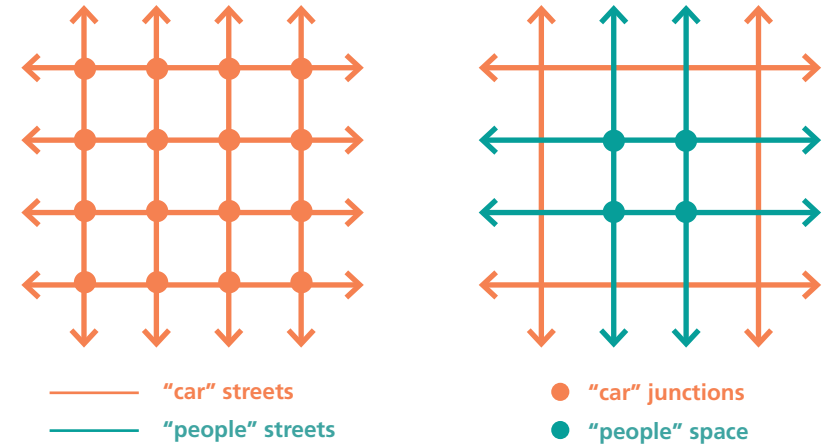
Prof Paul Barter¹⁶

Lee Kuan Yew School of Public Policies,
National University of Singapore

**IDEA NO. 7
TURN STREET DESIGN ON ITS HEAD**

In many cities, prevailing traffic planning and street design are still biased towards avoiding any possible delays for car users. Each time a new development is added onto the road network, the surrounding roads are expanded with the aim of maintaining the efficient flow of vehicular traffic. Unfortunately, streets that are designed to never choke up are great for cars, but terrible for anyone else. As part of the mobility paradigm shift, it is therefore critical to recognise the dual functions of streets as both “links” and “places”, and re-prioritise street design in favour of pedestrians, cyclists and public transit users wherever possible.

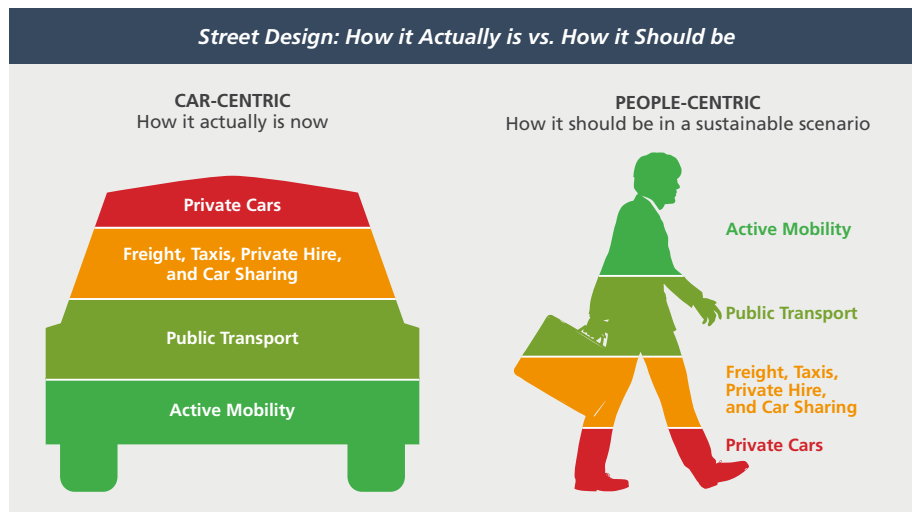
It is a common misconception that creating car-lite urban districts simply means banning cars and removing roads everywhere. However, cities like Barcelona are looking into the exciting concept that hopes to prove otherwise, through reconfiguring existing local transport network within built-up neighbourhoods to create people-friendly “superblocks”. Within each superblock, several smaller city blocks will be joined



Barcelona: Non-motorised movements will be given priority on streets within “superblocks”. The amount of public spaces and parks will also increase significantly as a result of the plan. (Source: (left) Sarah Magwood @ <https://flic.kr/p/2ViSXz>; (right) Lisa Brideau @ <https://flic.kr/p/huwBtU>).

together. All motorised traffic, except those by residents, urban services and emergency services which are required to drive at a slow speed, will be rerouted to the periphery of the superblocks while pedestrians and cyclists will be given priority on all roads within them. Upon implementation, it is expected fast-moving motorised traffic will be removed from 60% of Barcelona’s roads, and provision of public space, parks and greenery can also be increased significantly with the elimination of traffic intersections within these superblocks.

Even for expressways and arterial roads that have a key “link” function to play, designing them innovatively to be inclusive of all modes is worth exploring. In Singapore, the government’s plan to re-design a planned major expressway corridor to also incorporate cycling and walking paths and express bus lanes was hailed a “bold” move towards making walking, cycling and public transport “the way of life for Singaporeans”. Decisions like this ensure that all transport infrastructure investments, no matter big or small, are strictly congruous to the nation’s car-lite vision.



Ultimately, a paradigm shift towards car-lite mobility requires a fundamental review of the way cities design their streets such that multi-modal streets that look after the safety and needs of all users are no longer treated as “special projects” but a norm for all road network expansion and improvement projects.

“One of key areas when we plan for our car-lite vision is not to look at it in the obsession of removing cars but to look at it from a more holistic point of view which is the experience of the people. For instance, walking along link ways and overhead bridges are actually not a very fun experience for people. But, if I can walk and cycle through streets that are filled with interesting stalls and activities on my way to office, then that is an experience.”

Dr Arthur Aw¹⁹
Chief Development Planning Officer,
Ascendas Singbridge

IDEA NO. 8 USE PUBLIC SPACES AS COMMON GROUND FOR PUBLIC-PRIVATE- PEOPLE COLLABORATIONS

Streets provide precious public spaces that support urban life. This function of streets is particularly important in high density urban contexts where public spaces are limited to contribute to liveability.

The role of the public sector to lead or initiate the transformation of car-dominated streets into people-oriented places is essential. As the custodian of public interests, the government needs to ensure that the interventions benefit the people while mediating between the diverse interests of stakeholders.

However, the government cannot achieve this single-handedly. Local communities and stakeholders have to be part of the process and solution to ensure that interventions and proposals align with local needs. Involving local stakeholders also helps promote sustainability of the initiatives. Recognising the benefits that car-free/car-lite environments can bring for the neighbourhood — in terms of vibrancy, safety or improved businesses — communities would be receptive to investing the necessary resources to maintain the interventions, even building on the initiatives over time. Such place-based collaborative efforts can also serve as an effective means to shift cultural mindsets by demonstrating tangible benefits for the people.



Singapore: Community-initiated street closure at Keong Saik Street as part of the Urban Redevelopment Authority's Streets 4 People programme (Source: Urban Ventures by LOPELAB).



Singapore: Proposed North-South Expressway re-designed as North-South Corridor to be inclusive of all modes of transport (Source: Land Transport Authority).

In Singapore, the Streets 4 People programme by the Urban Redevelopment Authority creates a platform for local communities to initiate street closures, and transform their streets into car-free public spaces for events. URA formalised the street closure procedure, drew up guidelines (e.g. approval of surrounding stakeholders) and adopted the role as a middle man by assisting members of the public in navigating the process of street closure by connecting applicants to the relevant agencies, such as the Land Transport Authority (LTA), the Singapore Civil Defence Force (SCDF), the Singapore Land Authority (SLA), the Singapore Police Force (SPF) and the National Environment Agency (NEA).

Furthermore, necessary equipment for street closure (barriers, signs, and safety personnel) and seed funding of up to S\$10,000 are also provided to offset costs incurred for agency clearance and marketing purposes.

“Here in Singapore, you have great examples of public spaces that are activated, like Haji Lane. In fact, when it comes to creating vibrant public spaces, it is often much more effective when the public and private sectors work together, as compared to the government coming in to do a mega project. And you can even use public spaces to create a common platform so that the entrepreneurs can plug in, the non-profits and the local community can plug in, the business community can plug in, to use them as a platform, as we did in Chicago.”

Mr Gabe Klein²⁰
Former Transportation Chief of Chicago
and Washington DC

IDEA NO. 9 DRIVE CHANGE THROUGH DATA-DRIVEN RESEARCH AND PILOTS

Unlike in the private sector where the process of trial-fail-iterate is embraced, this is typically absent in the DNA of public agencies. However, under the leadership of open-minded and innovative leaders, cities such as New York and Washington DC are showing that low-cost and quick-built urban projects can be highly impactful too, and doing it right can be a win-win situation for both government and businesses. In times of tight budget and uncertainty over a project's worth, government can use pilots to establish the optimum solution. As part of Washington DC's revamp of its parking system, the city decided to try out 8 different parking systems by 8 different companies before settling on the final configuration with inputs from the public who had used the systems. Companies loved the idea too as nothing beats being able to test their products and services in the real world.

The pilots also provide opportunities for evidence gathering. For mobility modes like walking, cycling, personal mobility devices (PMDs), car-sharing or ride-hailing, the amount of reliable and accurate data necessary to support their growth still remains extremely limited in most cities. This is because reported travel data collected via conventional methodologies such as household travel surveys often fall short

of providing an accurate snapshot of their usage to inform policy and funding decisions. However, through pilots and trials, data can be gathered to enable better understanding of usage pattern, user profile and sometimes "latent demand" associated with some of these modes.

In Paris where numerous major public spaces are being re-designed and transformed as part of the city's ongoing efforts to reclaim car space for people, the re-design process is backed by comprehensive data analysis of existing usage patterns, user profile, traffic volume of various modes etc. In time to come, the city also hopes to work with companies that provide dynamic urban analytic tools to explore testing of various design scenarios. Through an iterative process of designing, testing and redesigning, the decision makers can make sure that the best outcomes are achieved and that public fund committed to these projects is well spent.

As Ms Janette Sadik-Khan, former New York transportation commissioner, well-known for tackling tough challenges and building consensus through her data-driven approach, puts it: "It was all about the data. If it works better for traffic, if it was better for mobility, if it was safer, better for business, we would keep it, and if it didn't work, no harm, no foul, we could put it back the way it was."

"Coming from the start-up world, I'm a big fan of experimentation. When I say pilots or experiments, I do not mean flying by the seat of the pants. These should be controlled experiments which involve putting together plans for quick iteration so that you can execute them over and over in different contexts, for different purposes. If you make your stakeholders, be it the mayors, the council members, the business shopkeepers, the land owners or the residents, part of the diagnosis and experimenting process, you find that they give you a lot longer leash to play with. And I would also argue that what I've learned, it's typically much more fiscally responsible to pilot something, to show people how it works, and get their buy-in. Tactical urbanism projects can be extremely cheap but effective. Then you can make it permanent later."

Mr Gabe Klein²³

Former Transportation Chief of Chicago
and Washington DC

Paris: Previously a glorified traffic island, Place de la République was transformed into a place for people as part of a major public space revamp project in 2013. The momentum of re-designing and reclaiming some of the major roundabouts for people instead of cars continues today under the leadership of Mayor Anne Hidalgo (Source: (top left) Eduardo Llanquileo @ <https://flic.kr/p/a9Vm7Z>; (top right) Panoramas @ <https://flic.kr/p/fpK3AC>; (bottom) Jennifer Morrow @ <https://flic.kr/p/fsDtLK>).



IDEA NO. 10 CHANGE MINDSETS AND MAKE CAR-LITE MOBILITY COOL

Commuters often make travel choices based on their perceptions of the convenience, cost, comfort and cool quotient of various mobility modes.²⁴ How far is the nearest bus stop? How much must we pay if we drive to office and park our cars in the CBD? Is the train crowded? How does it affect my self-image if I sell off my luxury car and start relying more on ride-hailing or car-share services? Instead of waiting for a change in mindset or accepting it as a given, the public sector can shape commuters' travel choices by influencing their perceptions. For instance, can city governments work closely with media and educators so that the mentality of car ownership as a status symbol or lifestyle aspiration is no longer perpetuated? Are there ways of shaping a new norm by inspiring people with anecdotes, for instance, of how high-powered executives or political leaders are taking the train and squeezing in with the crowds on their daily commutes, how businesses or government agencies that put in place corporate travel plans have brought about a promising modal shift towards more sustainable modes among fellow employees and visitors.

When it comes to collaborative approach in change management, it is imperative that city governments lead by example by being open and proactive in communicating

their vision and plan as this sets the tone that they are serious about driving and embracing changes. While it is not an easy task changing people's mindsets, effective and clear public communication is of paramount importance in driving such change through better awareness of the mobility choices, their impact and the benefits derived thereof. As a start, it would be useful to consider campaigns targeted at specific groups of audiences, such as school children, large businesses, public agencies, new residents and new employees moving into a certain area.



Copenhagen: Cycle Chic Movement shows that cyclists can be cool and stylish too (Source: Andersen @ <https://flic.kr/p/5T1cud>).



Cycling Skill Workshops for School Children (Source: Green Schools @ <https://flic.kr/p/sePhG2>).

“You have to start to market the savings to people, like you are with the big billboards for transit. When I started at DC, I had a car and driver but I rode my bike everywhere. Seven years later, a lot of Commissioners bike or walk, and are embarrassed to drive. Car ownership should be like shark fin soup — you can create a different culture where people feel stupid and embarrassed buying a car.”

Mr Gabe Klein²⁵
Former Transportation Chief of Chicago
and Washington DC

10 IDEAS TO PREPARE CITIES FOR A CAR-LITE URBAN MOBILITY FUTURE

1

Align Visions, Both Internally and Externally

- Internal alignment of vision across different teams within key agencies to ensure coherent efforts and targeted outcomes
- Make sure all relevant agencies and stakeholders are on board to ensure transport planning is not done in isolation from other related policies

2

Focus on People's Needs, Work with Competition and Find Win-Win Solutions

- Provide customer-oriented services
- Public sector to encourage fair competition as a prerequisite for innovation, greater systematic efficiency and creation of an integrated package of "mobility as a service"
- Service providers to work with public sector to establish good understandings of newer mobility options such as ride-hailing and car/bike-sharing and their impact on the car-lite mobility ecosystem

3

Create Development-based Mobility Demand Management Strategies

- End-users to play their parts in promoting sustainable travel behaviours
- Develop site/estate-specific travel demand management plan that not only caters to local commuters' needs, but also ensures that all new development project contributes towards shaping cities' car-lite urban mobility
- Monitor progress over extended time

4

Expand Public Transport Amenities to Cover the First-and-Last-Mile

- Develop high-quality public transport network as the backbone of cities' future mobility system
- Look beyond public transport network to also address commuters' first-and-last-mile needs
- Public transport service providers to form strong intermodal partnerships with taxi, car-sharing and bike-sharing providers to complete the trip ecosystem

5

Planning Matters!

- Use planning to address underlying causes, instead of symptoms, of urban mobility challenges by finding ways of avoiding or shortening trips in the first place
- Bring jobs and homes closer to each other
- Encourage high-density mixed land uses around public transport nodes

6

Put a Stop to Cheap and Easy Parking

- Ensure better understanding of current parking supply and demand to facilitate development of proactive policy interventions
- Consider a set of more stringent parking provision framework but calibrate provision standards against factors such as public transport accessibility and access to amenities and services
- Price parking correctly by exploring demand-responsive systems with the help of technologies
- District-wide parking strategies to encourage sharing and minimise redundancy of parking spaces

7

Turn Street Design on its Head

- Get the fundamentals right by reviewing prevailing traffic planning and street design which generally prioritise vehicular traffic
- Fine-tune road categorisation and street design in favour of pedestrians, cyclists and public transit users wherever possible
- Make "complete streets" a planning and design norm

8

Use Public Spaces as Common Ground for Public-Private-People Collaborations

- Public sector to lead/initiate transformation of car-dominated streets into people-oriented places
- Communities, businesses and other stakeholders to be included in developing their own car-lite mobility solutions/initiatives that are financially sustainable in the longer term and also sensitive to the local context

9

Drive Change through Data-Driven Research and Pilots

- Embrace "trial and error" in public sector's decision-making process
- Use quick and cost-efficient pilot programmes to establish optimum and gather evidence

10

Change Mindsets and Make Car-lite Mobility Cool

- Proactively shape perceptions instead of waiting for mindsets to change
- Influence commuters' travel choices through creative use of media, education and campaigns
- For a start, target specific groups of audiences, such as school children, corporations, public agencies, new residents and new employees



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