

TRANSPORTING THE FUTURE: A BUSINESS PERSPECTIVE ON FUTURE MOBILITY

BARO
V34
H-67/46
6.X12

The SBA Sustainable Mobility Project

April, 2018



Contents

- Andrew Petersen - CEO of SBA 4
- Rohan Lund - Group CEO of NRMA 5
- Executive Summary 6
- Glossary 15
- Chapter 1: Future Mobility 16
 - What Is It? 17
 - A Driver of Sustainability? 18
 - Existing Cost of Transport* 20
 - Business Involvement 21
 - SBA Sustainable Mobility Project 21
 - Report Objectives and Structure 23
- Chapter 2: Revolution – New and Disrupted Markets 24
 - Connected and Autonomous 26
 - Electric 27
 - Emissions Reductions from EVs* 29
 - Shared, On-demand 31
 - The Future of Public Transport* 33
 - Mobility as a Service 35
 - Conclusions and Recommendations 38
- Chapter 3: Evolution – Workplaces, Customers and Logistics 39
 - Journey to Work and Travel Planning 40
 - Future Mobility and CMM 43
 - Decentralised cities, business and mobility* 44
 - Customer Mobility 44
 - Freight 47
 - Ensuring Future Freight is Sustainable 48
 - Conclusions and Recommendations 49
- Chapter 4: Collaboration 53
 - Precinct Level Management 54
 - Transport Planning and Business Involvement 57
 - SBA and WBCSD Global Mobility Project 57
 - Collaborative Innovation / Accelerator Hubs 59
 - Conclusions and Recommendations 61
- Appendix 63

Project Lead



Andrew Petersen

CEO of SBA

How does Australia accelerate progress towards multimodal, inclusive and low-environmental impact mobility?

Sustainable Mobility. It can be hard to know where to start, whom to involve and what to do – not to mention the practical challenges. But what is already apparent is the critical role that decarbonising transport will play in addressing the climate challenge and how digitalisation, renewables, shared mobility and shifts in attitudes towards personal mobility choices are driving the change, particularly if we want to abide by the Paris Agreement, keeping temperatures below the 2oC threshold.

As SBA's analysis in 2016 showed, cities like Sydney will need a holistic, integrated and multi-modal and multi-stakeholder approach to mobility, backed up by strong engagement of their citizens. Including business. Yes. Business.

But, as analysis in this report shows, Australian companies are currently either unfamiliar about their impact, let alone their dependence, on transportation systems and infrastructure to run their businesses – whether it is their employees, customers or supply chains. And even those businesses that acknowledge strategic importance struggle to identify approaches and tools to integrate mobility measurement, management and valuation within their organizations.

Even so, our research finds that tools do exist and more are emerging. Encouragingly, some of the leading approaches are already being trialled in Australia. As this report reveals, the practice of evaluating mobility impact and dependency is evolving and gaining business momentum.

SBA, as part of the WBCSD, has begun to tackle the challenges of sustainable urban mobility, by taking a data-driven, multi-

stakeholder approach that helps accelerate progress towards multimodal, inclusive and low-environmental impact mobility. The SBA / WBCSD Sustainability Mobility approach wants to see Australia develop an integrated solutions portfolio based on global best practice.

Business has a role in sustainable mobility; by demonstrating that it cannot only offer environmentally compatible vehicles and innovative mobility concepts and infrastructure to support sustainable mobility, but it can take a collaborative, holistic approach to support our cities, precincts, and public transport infrastructure, in setting and achieving business goals in relation to improving sustainable mobility.

In short, focusing on 'sustainable transport' alone is not enough to reduce urban pollution. As this report shows, a multi-faceted approach based on a common vision is essential, which takes a more holistic view of city services, lifestyle and infrastructure, so that companies from different sectors in collaboration with different government can work effectively to achieve shared sustainability objectives.



A handwritten signature in black ink, appearing to read 'Andrew Petersen', with a long horizontal line extending to the right.

Andrew Petersen

Sydney, April 2018

Rohan Lund

Group CEO of NRMA

The world in which we operate our businesses is rapidly changing.

If you go back to the Sydney Olympic Games, it would be hard to imagine the world today. There was no iPhone, smartphone or Facebook, and Google was only just getting started.

The imminent technological changes ahead will make the past few decades look like we were moving at snail-pace. Technology has consistently changed the way we live and it will continue to do so – but in a much bigger way.

Businesses unprepared for what's ahead will be disrupted by a historic wave that will reshape our environment. There are several mega-trends underpinning this momentum, one being the arrival of connected and automated vehicles supported by electric propulsion.

These mobility devices will not just have far-reaching implications for our transport system, they will go far beyond that to alter the way we move goods, interact with customers, use energy and live and travel – effectively transforming the entire mobility landscape.

What does this mean for land-use, planning, logistics and existing infrastructure assets such as carparks and shopping centres? Will we need to commute for work, shop for goods and groceries, take the kids to school or get in the car and drive to visit friends or take a holiday?

Businesses need to think about this change and embrace the opportunity ahead. We need to start thinking about these major shifts and try to understand the implications for our business operations and the sector in which we operate.

The future is filled with possibilities – but it is also filled with risk for the unprepared.

The NRMA has already begun to take steps in preparation for the disruption ahead. We are transforming our business model in preparation to help Members on this journey. Recently, we announced a huge investment to build Australia's largest electric vehicle fast-charge network to enable future regional road trips. We are also broadening our core focus.

Starting with the acquisition of Manly Fast Ferries, we are expanding our transport assets to enable exciting and enjoyable journeys. We know there is a strong appetite for exploration and access to some of our greatest natural assets and we are aiming to provide Members with the opportunity to broaden their travel and tourism options.

Moving into the future, partnerships will play an increasing role, and that is why we have proactively sought opportunities that provide mutual benefits and increased Member value.

No business or organisation alone has all the answers, and with such a dramatic shift just around the corner, there's never been a more important time to work together.

I commend you for taking the time to contemplate how some of the looming technologies considered in this report will alter your operational landscape over the coming years.



Rohan Lund,
Sydney, April 2018



Transporting the Future: A Business Perspective on Future Mobility

Executive Summary

BARO
V34
H-67/46
6.X12

BARO
V34
H-67/46
6.X12



Future mobility will be cheap, door to door, personalised and 'on demand'.



Executive Summary

Mobility, how people move around and access opportunities, is on the cusp of radical change. New technology and business models are combining with increased and decentralised urbanisation, a more flexible approach to car ownership, and a demand for hyper-connection to generate a new era of mobility that is predicted to be faster, cleaner, safer, and more efficient and equitable, profoundly changing how people and goods move about¹.

Future mobility will be cheap, door to door, personalised and 'on demand'. The boundaries between private, shared, and public transport will be blurred, possibly eliminated, and recast. Transport options will be multi-modal, connected, autonomous and electric with service providers delivering the entire travel experience. While some people will still have private vehicles, the majority could well opt for the far more economic option of a combination of shared and public transport².

This report is part of the three-year Sustainable Mobility Project (SMP), a cross-sector collaboration of Sustainable Business Australia (SBA) members, to lead an Australian business response to the challenges and opportunities of meeting Australia's mobility needs more sustainably. The report examines future mobility trends and predictions; how future mobility could enable a more sustainable future and the impact of this for business. The report objectives are to:

- Inform business about future mobility, including its impact commercially and sustainably;
- Make the case that all business has an important role to play in achieving sustainable future mobility; and
- Make recommendations to enable and incentivise business to play that role.

Future mobility has the potential to improve the lives and livelihoods of billions of people.

Is Future Mobility Sustainable?

Future mobility has the potential to improve the lives and livelihoods of billions of people. Autonomous vehicles (AVs), electric vehicles (EVs) and shared mobility models can reduce emissions, other airborne particulates, congestion and road accidents and improve accessibility. This is true especially for those in areas poorly served by mass transit and people with limited physical accessibility such as the elderly and people with a disability³.

1 Deloitte, Forces of Change: The Future of Mobility, 2017

2 McKinsey and Bloomberg, An Integrated Perspective on the Future of Mobility, 2016

3 BCG, Self-Driving Vehicles, Robotaxis, and the Urban Mobility Revolution, 2016

Lower costs and increased flexibility may result in increased demand and willingness to travel longer distances.

However, in the absence of considered policy direction, future mobility may also exacerbate existing social and environmental impacts. Without widespread adoption of shared mobility, a transport system dominated by private autonomous travel could increase journeys and vehicles on the road. Lower costs and increased flexibility may result in increased demand and willingness to travel longer distances. Private AVs could replace public transport routes, increasing mobility inequality for those unable to afford such a vehicle. Emissions will only decrease with widespread adoption of EVs. The disruption caused by future mobility is also likely to impact employment in many areas.

The Role, Responsibility and Opportunity for Business

Business is a uniquely placed co-collaborator in the delivery of a sustainable mobility future. It can act as a conduit and accelerator between government and individuals to influence the travel behaviour of their employees, visitors, customers, suppliers as well as the public at large through the products and services they bring to market. Business' role in future mobility can be divided into three areas

1. Revolution – New and Disrupted Markets

Future mobility creates substantial new business opportunities for innovative products, services, and business models⁴.

There will be new markets worth billions of dollars across many sectors. Some commentators see the ensuing disruption as destroying trillions of dollars of investor value across the transportation and energy industries, but also creating trillions of dollars in new business opportunities, consumer surplus and GDP growth⁵.

Business needs to critically evaluate how these opportunities are relevant. Some in particular will need to identify and avoid major risks resulting from the disruption - energy companies, auto manufacturers, and the oil industry; while associated vertical businesses including car parking, insurance, car leasing and dealerships, logistics, as well as transport oriented agencies, will have to make some challenging decisions and actions ahead in order to reframe their relevance and role.

4 BCG, Building the Digital Car Company of the Future, 2017

5 Arbib & Seba, Rethinking Transportation 2020-2030, 2017

2. Evolution – Workplaces, Customers and Logistics

Forward-thinking businesses are capitalising on emerging transport technologies to significantly improve customer and employee attraction and retention; make productivity gains from improved movement of goods and how employees get to work; as well as gains from lower emissions, less congestion and greater active transport.

Historically, the role of corporate mobility programs targeted employee journey-to-work, but are now encompassing broader mobility opportunities for customers and supply chains. Business is in a unique position to influence travel demand to benefit the organisation, their internal and external stakeholders as well as the broader community. Business owns half of all registered vehicles on the road⁶ and as such has significant potential to influence markets and behaviour.

3. Collaboration

A sustainable transport future for Australia requires a deliberative and ambitious shift from the status quo along a defined policy agenda. Business is well placed to be a co-collaborator in the design and delivery of Australia's sustainable mobility future. It is a conduit between government and individuals to shape the travel behaviour of employees, customers, and suppliers, as well as the public at large through the products and services that it brings to market.

To take full advantage of the benefits of future mobility, the public and private sectors need to work together to catalyse business action, and ensure the right enabling environment to deliver solutions promoting a sustainable future mobility. This can and should work across a variety of scales including business inclusion in transport planning, and government catalysing business action through innovation hubs and transport management programs.

6 <https://www.theclimategroup.org/project/ev100>

Recommendations

Mobility underpins every aspect of our society – and the challenges and opportunities associated with the fast-changing mobility landscape will affect every sector of the economy⁷. Whilst all stakeholders — government, business, civil society and the community — must be part of the transition to solve the mobility challenge, the Sustainable Mobility Project makes the case that it is business that must take a leadership position on action and solutions on mobility.

Recommendations to enable and incentivise business to play that role are as follows:

For Business

Future mobility is happening now and causing disruption across multiple sectors.

Review business models to hedge against future disruption and take advantage of emerging markets.

Future mobility is happening now and causing disruption across multiple sectors. This is enabling substantial opportunity for business model innovation, not just in the transport sector itself but also for those with close ties to the transport system such as energy, insurance and transport services, as shown in the three case studies in Chapter 2. Companies are starting to hedge against future disruption and take advantage of emerging markets. Going forward this disruption is likely to spread to increasing numbers of sectors as technology and business models continue to advance and the full scale and impact of future mobility become more accepted and apparent.

Business should review its own business models and service delivery and determine if they are ready:

- What will future mobility mean for overall business strategy, product and service development, asset value, as well as for customers and other stakeholders?
- What will be changing and how can the business proactively leverage this change?

Business should determine whether they are both future proofed and able to take advantage of future mobility opportunities.

Business should undertake a review to determine what future mobility means for business operations.

Business should determine whether it is both future proofed and able to take advantage of future mobility opportunities. It should ask how future mobility could progress business sustainability goals. This should include review of processes, policies and procedures relating to:

- Assets – value and utilisation of existing and future assets, including car parking, EV charging, support of active and shared transport, asset location and co-location;

⁷ Deloitte, The Future of Mobility, 2015

- Fleets – changing to connected, autonomous and/or electric fleets, as well as pooled and shared fleets or, in the future, outsourcing to Mobility as a Service (MaaS), and what these mean for size of fleet, operations and productivity, operating, leasing and purchasing costs and emissions;
- Logistics – the impact of the internet of things and connected technology, digital logistics and supply chain technology, on-demand and shared warehousing and freight provision, autonomous trucks and robotic packing, low carbon fuels and electric fleets as well as supplier collaboration and what this means for the design and scale of logistics operations, contracts and their management, costs and emissions;
- Procurement – the impact of changing technology, business service models and the associated legislative changes that will likely take place over the next few years;
- Sustainability - especially those regarding people, health and safety, diversity, talent attraction and retention and emissions; and
- Flexible working – support and impact on productivity, diversity, talent attraction and retention.

For Government

Sustainable transport planning should be integrated into new development planning with a Travel Plan recommended as the primary method for delivering sustainable transport outcomes.

Whilst several States' planning legislations acknowledge the role of sustainable transport planning measures in delivering sustainable development, this doesn't consistently translate into delivery of practical and effective sustainable transport plans for all new developments. State Governments should further their existing commitment and establish a robust legislative framework to support sustainable transport for new developments, including specific requirement for the development, monitoring and evaluation of Travel Plans for all new developments of a certain size or impact. Travel Plans are management strategies, tailored to an organisation and site, that facilitates and encourages both travel demand management and travel by sustainable modes of transport.

Travel Plans, provide the incentive for an innovative and flexible private sector response...

Such inclusions should support a partnership approach to delivery of sustainable mobility, a collaborative response with shared responsibility between the public and the private sector, and a transparent framework for equitable transfer of responsibility from developer to tenant. Travel Plans, provide the incentive for an innovative and flexible private sector response including technological improvement, developing and scaling up new business models, and leading behavioural change⁸.

8 See SBA Submission on Amendments to EP&A Act 1979: http://planspolicies.planning.nsw.gov.au/?action=view_submission&job_id=8188&submission_

Federal Government should undertake a review of fiscal policy options for future mobility and use the results to introduce incentives for sustainable forms of transport to deliver clear signals to business and consumers.

Currently there are many fiscal incentives for Australians to drive alone to work and not many to commute more sustainably. The provision of generous tax concessions that allows employees to write-off cars and parking expenses from their income tax has been identified as the greatest challenge to more sustainable commuting in Australia⁹.

Moreover, many companies provide company cars and free car parks at work.

The Federal Government should undertake a review of all existing fiscal policy options that influence transport choice for business and commuters. This should include consideration of introducing of incentives that encourage uptake of sustainable mobility including car sharing, pooled fleets, EVs, biking and public transport as commuting methods to encourage mass adoption. Any introduction of road user charging should give consideration to travel options and include incentives for commuters and other travellers to choose sustainable travel options.

For Business and Government

Roll-out Transport Management Associations to collaboratively and sustainably manage travel demand at larger business precincts with transport challenges.

Business parks and precincts with poor or overworked transport links can significantly impact congestion levels, journey to work times and economic opportunity for their business tenants, employees and prospective employees. This in turn can significantly impact asset values, productivity, talent attraction and retention as well as health and well-being.

State and local government and business should work together to determine a strategy to identify and develop collaborative precinct-based travel demand management strategies, such as those implemented by Transport Management Associations (TMAs). TMAs are non-profit, member-controlled organisations dedicated to solving mobility concerns within a particular area, such as a commercial precinct, shopping centre or education hub.

⁹ OECD, Effective transport policies for corporate mobility management, 2010

The strategy should include identifying priority precincts that have a significant transport impact (for example, Sydney's Olympic Park or Norwest Business Park; Melbourne's Frankston or Box Hill), provision of start-up funding mechanisms and a governance, management and membership framework. It could be based on the successful Connect Macquarie Park and North Ryde TMA (see case study in report). Such a scheme should be designed to ensure the TMA is self-funded through membership fees within a defined period.

Business investment and influence on their employees and customers can both significantly enhance mass demand and behavioural acceptance for electric vehicles.

Develop a collaborative corporate EV Program for Australia.

Business investment and influence on their employees and customers can both significantly enhance mass demand and behavioural acceptance for electric vehicles, as shown in the New Zealand EV Partnerships Program case study in the report.

However, there are currently many barriers to the corporate uptake of EVs in Australia, including high purchase price, limited range of available models as well as limited charging infrastructure and range anxiety. Moreover, Australia represents a small proportion of EV sales globally and as such it is very hard for a single organisation to influence car manufacturers supply priorities. Without intervention from government and industry, this situation is only likely to get worse for Australia as EV markets grow globally – lacking a clear signal that there is a significant market in Australia, larger jurisdictions will likely continue to get priority.

Governments and companies across Australia should work together to demonstrate leadership in the transition to sustainable and zero emissions road transport by setting up a collaborative EV program that includes working together, and with car manufacturers. The program should focus on joint procurement models and making commitments for fleet targets for EV integration. By transparently setting out their future EV purchasing requirements on an ambitious timescale, companies can drive mass roll-out and make EVs more rapidly affordable for everyone.

Establish a multi-sector business & government taskforce to ensure Australia's transition to connected, automated and electric vehicles deliver sustainable outcomes.

State Governments are starting to develop strategic planning on future mobility, such as the Draft NSW Future Transport Strategic Plan. These should provide an integrated vision across government levels and departments outlining investments, plans and strategies, and aligning with the Sustainable Development Goals, to deliver liveable, sustainable cities, in the short, medium and long term.

These plans need to involve business, both in their development and implementation. Whilst government is the policy driver and regulator, business is well placed to deliver much of future mobility. By working together from the outset, government can then rely on business to do what it does best; to be innovative, be agile and come up with customer focused solutions that helps the government deliver its policy targets within a common framework and clearly understood regulatory environment, incentives, goals and outcomes.

Government should establish a business taskforce to co-design strategic mobility plans and their implementation in order enable the sustainable transition to connected, autonomous and electric vehicles that enables the maximum safety, accessibility and productivity gains, as well as a pathway to zero carbon and other emissions. Business, both those involved in transport provision and usage, must then engage with this process, including meeting regularly over the lifetime of the strategic plans to regularly review and update agreed pathways.



Image: Bosch

Glossary

AV	Autonomous vehicle
A-EV	Autonomous-electric vehicle
CMM	Corporate mobility management
EV	Electric vehicle
ICE	Internal combustion engine
IoT	Internet of things
MaaS	Mobility as a service
SDG	Sustainable Development Goal
TMA	Transport management association

Transporting the Future: A Business Perspective on Future Mobility

Chapter 1: Future Mobility

BARO
V34
H-67/46
6.X12

BARO
V34
H-67/46
6.X12



Chapter 1: Future Mobility

What Is It?

Mobility, how people move around and access opportunities, is on the cusp of radical change. New technology and business models are combining with increased and decentralised urbanisation, a more flexible approach to car ownership, and a demand for hyper-connection to generate a new era of mobility that is predicted to be faster, cleaner, safer, and more efficient and equitable, profoundly changing how people and goods move about¹⁰.

Future mobility will be cheap, door to door, personalised and 'on demand'.

Future mobility will be cheap, door to door, personalised and 'on demand'. The boundaries between private, shared, and public transport will be blurred, possibly eliminated and recast. Transport options will be multi-modal, connected, autonomous and electric with service providers delivering the entire travel experience. While some people will still have private vehicles, the majority could opt for a more economic combination of shared and public transport¹¹.

This future is approaching fast. We have already seen impacts from new business models, most radically from on demand transport such as Uber, with car sharing services such as GoGet also making inroads. We are now at a new age of electric vehicles and shared transport, with autonomous vehicles following closely behind. As shown in Figure 1, some commentators predict seamless, shared, automated and on demand travel by 2030¹¹.

The sheer breadth of interconnected variables in the future mobility landscape make it hard to predict exactly where we will end up and under what timeframes¹². However, what we can ask now is where do we want to go? – what do we want to get out of future mobility? – how can we make sure that it makes our lives and livelihoods better?

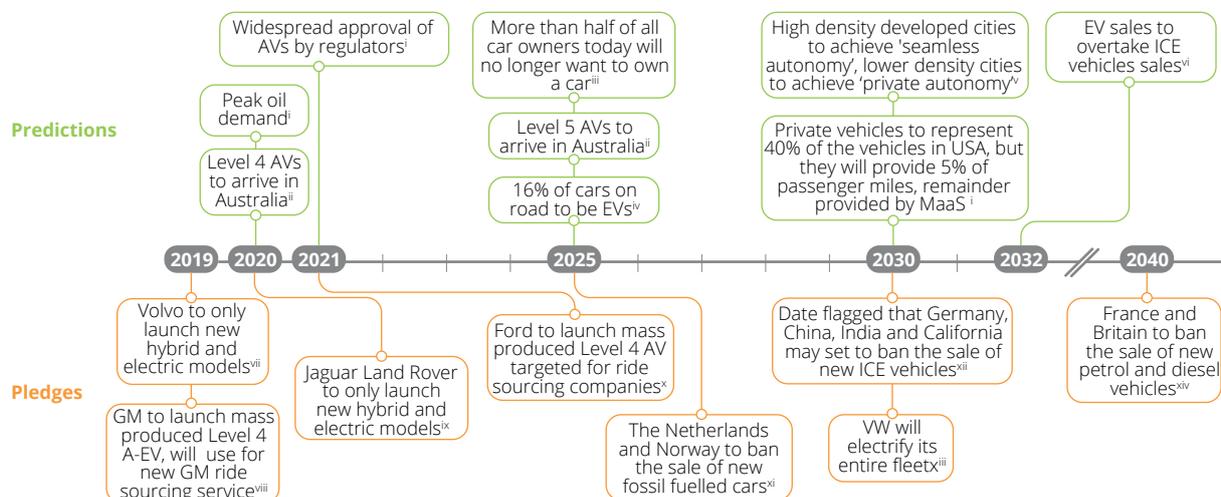


Figure 1: Estimated timeline for future mobility, references in Appendix

10 Deloitte, Forces of Change: The Future of Mobility, 2017
 11 McKinsey and Bloomberg, An Integrated Perspective on the Future of Mobility, 2016
 12 Drive.com, Is the Entire Car Industry Really Doomed, 2017

A Driver of Sustainability?

Future mobility has the potential to improve the lives and livelihoods of billions of people - their quality of life, their health, their environment. It must be aligned with achievement of many of the Sustainable Development Goals¹³ working towards the sustainable mobility vision of safe, affordable, accessible, efficient, resilient and minimising carbon emissions and environmental impacts.

Autonomous vehicles (AVs), electric vehicles (EVs) and shared mobility models can reduce emissions, and other airborne particulates, through electrification, efficiency and removing cars and/or journeys from the road. Even without a renewable energy source and including manufacturing, EVs result in reduced emissions compared to internal combustion engine (ICE) vehicles¹⁴, an average of 40% with a 'typical UK energy mix'¹⁵.

A 100% renewable energy source can result in lifetime emissions up to 90% less than ICE vehicles¹⁶. Benefits are further enhanced with automation¹⁴.

Predictions have widespread urban adoption of shared, on demand autonomous and electric vehicles (A-EVs), that complement effective mass transit public transport, resulting in a 60% reduction of cars on city streets and 90% fewer road accidents¹⁷. Adoption of AVs may save up to one million lives worldwide annually¹⁸. In addition to significantly reducing congestion, shared, on demand and automated vehicles will greatly improve accessibility and shorten journey times, especially for those in areas poorly served by mass transit and people with limited existing accessibility such as the elderly and people with a disability.

13 The Sustainable Development Goals (SDGs) are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. These 17 goals are interconnected – often the key to success on one will involve tackling issues more commonly associated with another. More information can be found at <http://www.undp.org/content/undp/en/home/sustainable-development-goals/>

14 Union of Concerned Scientists, Cleaner Cars from Cradle to Grave, 2015

15 With UK energy mix: Next Green Car, How Green are Electric Vehicles, 2015

16 NRMA, The Future is Electric, 2017

17 BCG, Self-Driving Vehicles, Robotaxis, and the Urban Mobility Revolution, 2016

18 The Atlantic, Adoption of AVs could save up to 1.2 million lives worldwide annually, 2015

Future mobility is also likely to have significant employment impacts across a wide number of industries.

However, future mobility may also exacerbate existing social and environmental impacts.

Without widespread adoption of shared mobility, a transport system dominated by private autonomous travel could increase journeys and vehicles on the road. Lower costs from electrification and increased flexibility of travel time may result in increased demand and willingness to travel longer distances, adding to congestion and urban sprawl¹⁹. In this scenario, passenger miles travelled could grow 25% by 2030²⁰. Private autonomous vehicles could subsume public transport routes, increasing mobility inequality.

Without widespread adoption of EVs, emissions will increase. Under existing scenarios, the International Transport Forum (ITF) predicts that passenger transport could double and freight transport triple by 2050, both contributing to a 60% increase of emissions²¹. The World Bank predicts that by 2030, annual passenger traffic could exceed 80 trillion passenger-kilometres—a 50% increase on today; global freight volumes will grow by 70%; and an additional 1.2 billion cars will be on the road by 2050, double today's total²².

Future mobility is also likely to have significant employment impacts across a wide number of industries. The move to automation will significantly impact those in jobs related to driving, parking and other areas of logistics. Disruption caused by automation, electrification and shared ownership models may also significantly negatively impact jobs in all transport related industries as well as other industries including insurance and oil and gas.

19 Reneweconomy, *Autonomous-cars-likely-to-increase-congestion*, 2017

20 McKinsey and Bloomberg, *An Integrated Perspective on the Future of Mobility*, 2016

21 ITF, *Transport Outlook 2017*

22 World Bank, *Global Mobility Report*, 2017

Existing Cost of Transport

Transport accounts for 20% of global final energy consumption and 23% of the global carbon emissions and has the fastest growing emissions of any sector²². Some 70% to 84% of fuel energy is lost in engine and driveline inefficiencies²³.

Furthermore, vehicle congestion erodes a country's GDP by 1 to 3%, and the Australian economy around \$16.5 billion, resulting from lost time and fuel, the increased cost of doing business and health impacts of air pollution²⁴. The economic cost of air pollution from road transport in OECD countries is estimated at US\$1 trillion per year²⁵.

Within Australia, a study conducted by SBA in 2016 and reported in **A Business Perspective on Sydney's Mobility Challenge, established a baseline of Sydney's sustainable mobility** performance using a globally benchmarked mobility monitoring and evaluation framework developed by the World Business Council for Sustainable Development. The results found that Sydney's mobility performance is let down by extremely poor scores for both greenhouse gas emissions from transport and long journey to work times, the latter are exacerbated by congestion. This in turn affects employment choices with only 34% of surveyed respondents being satisfied that transport options are available for them to reach job opportunities, due to long, complicated and expensive commutes. All benchmarked scores are shown in Figure 2.

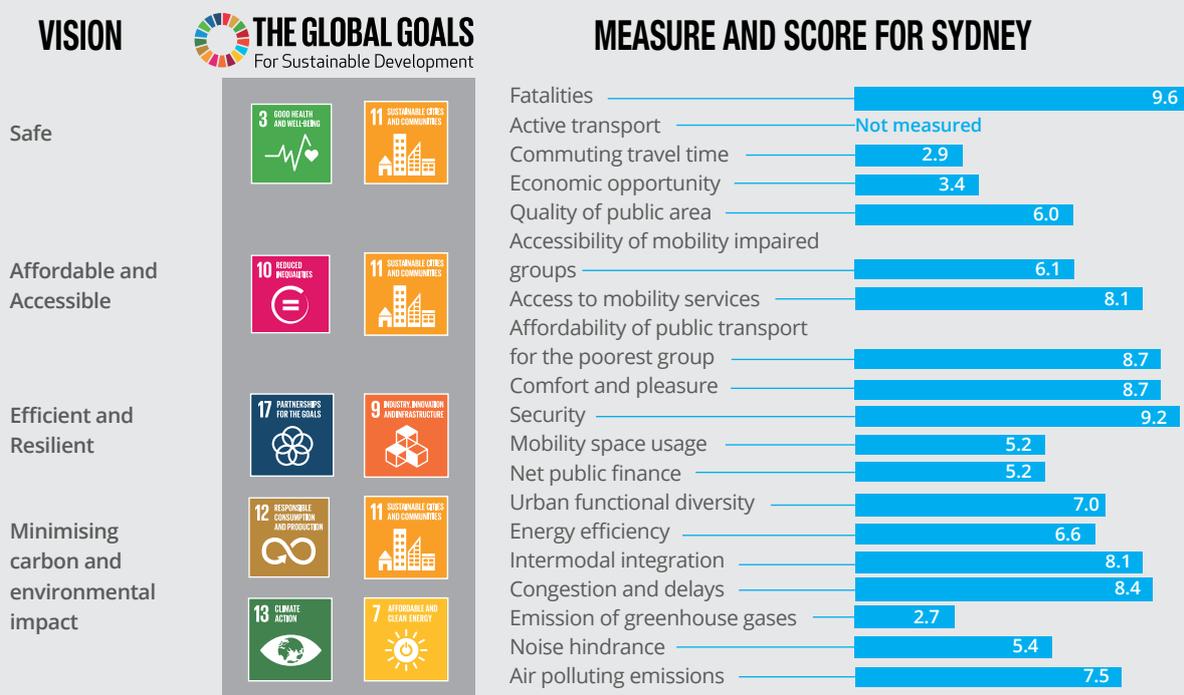


Figure 2: Alignment between the vision of sustainable mobility, the SDGs, measures of progress and scores for Sydney (from SBA Report: A Business Perspective on Sydney's Mobility Challenge, 2016)

23 <https://www.fueleconomy.gov/feg/atv.shtml>

24 SBA, A Business Perspective on Sydney's Mobility Challenge, 2016

25 OECD, The Cost of Air Pollution, 2014

Business Involvement

All business can harness the financial, societal and environmental opportunities of future mobility...

Getting mobility right in a SDG world could be a significant competitive advantage not just for cities but also for business. For example, McKinsey predict the future mobility market is estimated to be worth billions of dollars in sectors as diverse as energy, mining, banking, insurance, technology, telecommunications, retail, consumer goods, automotive and logistics²⁰. All business can harness the financial, societal and environmental opportunities of future mobility to significantly improve customer and employee attraction and retention; make productivity gains from improved movement of goods and how employees get to work; as well as gains from lower emissions, less congestion and greater active transport. The interaction between business benefits of future mobility and overall societal gains is shown in Figure 3.

Business is a uniquely placed co-collaborator in the delivery of a sustainable mobility future. It can act as a conduit and accelerator in that interface between government and individuals to influence the travel behaviour of their employees, visitors, customers, suppliers as well as the public at large through the products and services they bring to market. To take full advantage of the benefits and avoid the pitfalls of future mobility, the public and private sectors need to work together to ensure the right environment to deliver market solutions promoting a sustainable future mobility.

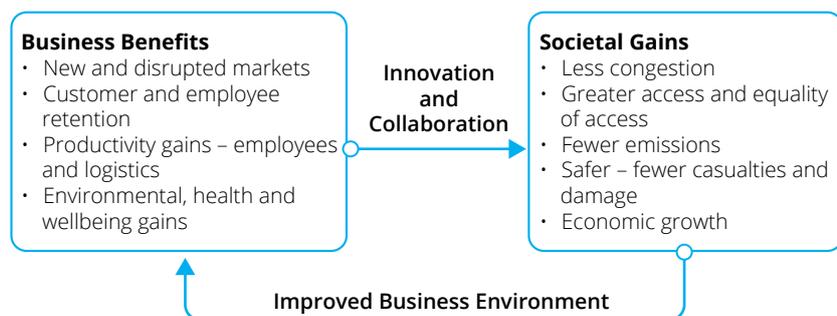


Figure 3: Interaction between business benefits of future mobility and overall societal gains

SBA Sustainable Mobility Project

This report is part of the three-year Sustainable Mobility Project (SMP), a cross-sector collaboration to lead an Australian business response to the challenges and opportunities of meeting Australia's mobility needs more sustainably. Led by a work group of SBA members, the project aims to explore what sustainable mobility means in the Australian context and how business can bring forward solutions that can shape mobility; through collaborative engagement, innovation and new business models.

The SMP is chaired by NRMA and includes SBA Members, AGL, Downer, Energetics, Jacobs, and IAG. It is part of the World Business Council on Sustainable Development (WBCSD) global sustainable mobility project. Now tested in nine cities around the world, the WBCSD methodology has already led to the development of Sustainable Urban Mobility Plans by business and government in Europe, India, China and Brazil. The project methodology has been endorsed by the European Commission and the next stage is to implement 60 mobility plans across Europe, North America, Asia and Australia.



Image: Bosch

Report Objectives and Structure

This report is the output of Stage 2 of the SMP. It examines future mobility trends and predictions; how future mobility could enable a more sustainable future and the impact of this for business. The report objectives are to:

- Inform business about future mobility, including its impact commercially and sustainably;
- Make the case that all business has an important role to play in achieving sustainable future mobility; and
- Make recommendations to enable and incentivise business to play that role.

The intended audience of this report is:

- Australian business, especially those outside of the transport industry who are nevertheless impacted through the effects of future transport on their business, including the movement of employees, goods and customers; and
- Government interested in working with business on mobility solutions.

The report is the result of research, a business work group and interviews with 12 leading Australian businesses. It builds on SBA's previous SMP Report: ***A Business Perspective on Sydney's Mobility Challenge***, which set Sydney's mobility challenge in the global context, provided a baseline of Sydney's current mobility performance and framed how business can be part of solving the mobility challenge.

The focus in this Stage 2 report is described in the following chapters, with recommendations made at the end of each chapter:

- **Revolution – new and disrupted markets:** the business opportunity created by future mobility;
- **Evolution – workplaces, customers and logistics:** how business can use future mobility to improve productivity as well as employee and customer experience;
- **Collaboration:** why it is essential for business and government work together to ensure future mobility results in sustainable outcomes for Australian society.

Transporting the Future: A Business Perspective on Future Mobility

BARO
V34
H-67/46
6.X12

Chapter 2: Revolution – New and Disrupted Markets

BARO
V34
H-67/46
6.X12



Chapter 2: Revolution - New and Disrupted Markets

Future mobility creates substantial new business opportunities for innovative products, services, and business models²⁷

As shown in Figure 4, future mobility can be divided into new technology, including connected transport, AVs and EVs; and new business models – shared, on-demand and mobility as a service (MaaS), powered by enablers such as internet of things, big data and blockchain (with the latter securing peer to peer transactions)²⁶. Each of the new technologies and business models can work together or apart, so that in effect future mobility could be all of them or just some of them.

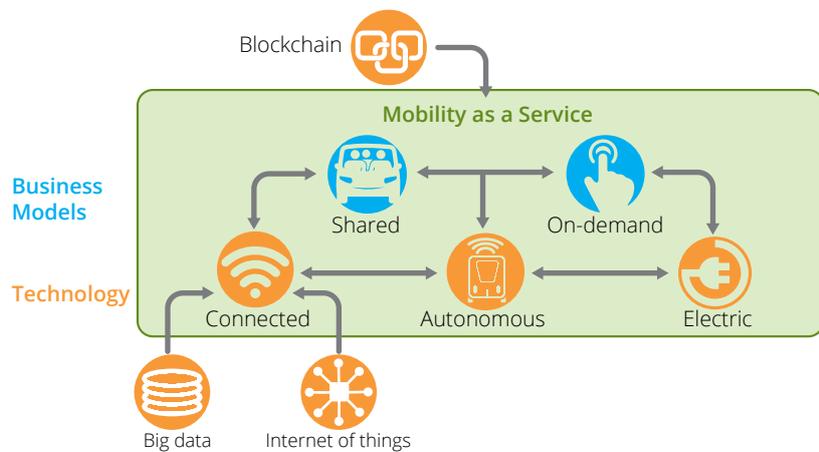


Figure 4: The building blocks of future mobility

Future mobility creates substantial new business opportunities for innovative products, services, and business models²⁷. Some 83% of auto executives think it is extremely or some-what likely that there will be a major business model disruption in the automotive industry²⁸. There will be new markets worth billions of dollars across many sectors. Some commentators see the ensuing disruption as destroying trillions of dollars of investor value across the transportation and energy industries, but also creating trillions of dollars in new business opportunities, consumer surplus and GDP growth²⁹.

Business needs to do some critical thinking to work out how these opportunities are relevant to them. Some in particular will need to identify and avoid major risks resulting from the disruption - energy companies, auto manufacturers, and the oil industry; while associated vertical businesses including car parking, insurance, car leasing and dealerships, logistics, as well as transported oriented agencies, will have to make some challenging decisions and actions ahead in order to reframe their relevance and role.

26 World Economic Forum, Goodbye car ownership, hello clean air: welcome to the future of transport, 2016

27 BCG, Building the Digital Car Company of the Future, 2017

28 KPMG, Global Automotive Executive Survey, 2017

29 Arbib & Seba, Rethinking Transportation 2020-2030, 2017

Connected and Autonomous

By 2020, the world will have an estimated 26.3 billion digital devices and connections—more than three times the number of the world's people³⁰

By 2020, the world will have an estimated 26.3 billion digital devices and connections—more than three times the number of the world's people³⁰. As this connectivity extends to transport systems, it opens the way to more equitable, efficient, and safer mobility, and offer great opportunities for countries, and their governments, to reshape the way people, goods, and services travel. Already, in many urban areas the use of smartphones has already changed the way we access public transport and catalysed a move away from vehicle ownership and toward vehicle sharing, ride hailing and carpooling.

Connected vehicles allow data connection and interaction via the internet with everything else: other vehicles, infrastructure (roads, traffic lights, civil including buildings), maintenance, service providers and anything else that may be of use to the vehicle or driver. Already linked to navigation, roadside and emergency assistance and maintenance diagnostics in many cars, connected vehicles of the future will go much further including vehicle to vehicle accident prevention, payments, and centralised traffic management.

Automation (self-driving vehicles) adds a unique and crucial element to the future mobility mix. According to Wired Magazine, the hotspot for research and investment in Silicon Valley right now is automation and associated technology³¹. Ford, GM, Audi, BMW, Tesla, Nissan, Mercedes-Benz, and other automakers have promised to deliver AVs in the next five years or so. These manufacturers are reforming and reinventing not just their products, but themselves (e.g. BMW i Brand; Porsche's Mission E platform) to accommodate the changes, through mergers, acquisitions and collaborations, all at a pace not seen in the hundred-year history of the auto sector (for example GM has purchased Cruise Automation, Ford as invested heavily in AI start-up Argo AI, Audi has partnered with Nvidia and Volvo with Microsoft and Uber³¹).

³⁰ Cisco, Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2016–2021, 2017

³¹ Wired, Mapped-top-263-companies-racing-toward-autonomous-cars, 2017

90%
US traffic accidents caused by human error³⁴

76%
Fall rate of number of US accidents if 90% of vehicles were AVs³⁴

65%
Fall in US road deaths per year if 90% of vehicles were AVs³⁴

Table 1: Stages and anticipated arrival of autonomous vehicles³²

SAE Level	Name	Description	Debut
1&2	Driver Assistance & Partial Automation	Some automated feature	Since mid 2000s
3	Conditional Automation	Hands off the wheel and eyes off the road but driver ready to resume control	2018
4	High Automation	Driver no longer needed in limited environments	2019*
5	Full Automation	Steering wheel and pedals are gone	2025*

**Pending regulatory approval³³.*

When combined with connected technology, an AV will know where it should be and get itself there whether it's picking up passengers for an on-demand bus route, picking up cargo for an on-demand delivery service, finding the most economic parking, getting a service, picking up the kids from school or being part of a car share scheme. Congestion can also be minimised with such vehicles by platooning – where vehicles travel much closer to each other and at greater speeds. AVs can undertake trips more effectively by optimising acceleration and braking, and rerouting when necessary to avoid converging traffic and congestion hotspots.

Safety is also predicted to be greatly improved. At present, 90% of traffic accidents are caused by human error. It has been estimated that if 90% of cars on US roads were AVs, the number of accidents would fall 76%, and that road deaths would fall 65% from 32,400 per year to 11,300 per year³⁴.

Electric

Vehicle manufacturers are also turning to EVs and new models are increasingly being announced, due to increasing costs of complying with emissions standards and decreasing costs and efficiency of batteries. In early 2017, Ford's CEO announced that the "era of the electric vehicle is dawning", going on to predict that the number of models of EVs will exceed ICE vehicles within 15 years. Ford has committed to 13 new EV models in the next five years³⁵. Most other manufacturers have made similar commitments with Volvo pledging to have all new models being EVs by 2019 and Jaguar Land Rover and VW by making the same commitment for 2020 and 2030 respectively³⁶.

³² NRMA, Future of Car Ownership, 2017, The Verge, GM will make an autonomous car without steering wheel or pedals by 2019, 2018

³³ A regulatory roadmap is provided in: NRMA, Transforming Mobility, 2017

³⁴ NRMA, The Future of Car Ownership, 2017

³⁵ The Economist, Electric cars are set to arrive far more speedily than anticipated, 2017

³⁶ NRMA, The Future is Electric, 2017

Other vehicle manufacturers are investing in fuel cell technology, including the Toyota Mirai, Hyundai Tucson Fuel Cell and Honda Clarity Fuel Cell. There have also been demonstration models of fuel cell buses. Fuel Cell Electric Vehicles (FCEVs) do not use batteries and instead utilise compressed hydrogen and only generate water and heat and no carbon emissions. The hydrogen is typically derived from reformed natural gas through a process which is not currently zero emission. FCEV have the advantage of being able to be refuelled at modified service stations, with little change in consumer behaviour. For this reason, a recent global automotive sector survey reported that a majority of executives interviewed (62%) believe battery EVs will fail due to infrastructure challenges and 78% of executives interviewed believe that the real breakthrough for electrification of vehicles will be FCEVs³⁷.

Globally EVs represented 0.2% of car stock in 2016 but are predicted to grow rapidly. In 2016 sales volumes exceeded 750,000, representing a 40% increase on the previous year³⁶. Even more, conservative forecasters have estimated that by 2025, EVs will make up 4-11% of global car stock³⁵ and it has been estimated that they will represent 3% of electricity demand globally by 2030³⁸.

With transport currently representing 16% of Australian emissions, the electrification of transport can result in substantial reductions...

Australia, however, has experienced a low EV uptake compared to its global counterparts. EVs represented 0.1% of new car sales in 2016, versus 30% in Norway and 1.5% in China, UK and France³⁹. The key reasons are said to be high purchase prices and a lack of charging stations and models in the Australian market. Despite this, Australia has the potential to change this around quickly. New EV products are about to enter the Australian market at a rapid pace (e.g. the Renault Zoe in early 2018, the Hyundai Ioniq in mid 2018, and the Nissan Leaf in late 2018, to name three). In addressing the 'range anxiety' issue commonly associated with slow EV uptake, EV charging networks are also being expanded, including the recently announced NRMA network of at least 40 fast charging stations across NSW and ACT⁴⁰ and the Queensland Government's roll out of fast chargers between Cairns and the Gold Coast⁴¹.

Concerted and targeted effort by Government could accelerate and scale up this transition. The New Zealand Government has introduced a suite of initiatives, including tax incentives, government fleet targets and development of a corporate fleet target program, as well as support for charging infrastructure; with an overall target to have 64,000 electric vehicles on their roads by the end of 2021⁴², representing approximately 2% of total car stock (as described in the case study in the Collaboration chapter).

37 KPMG, Global Automotive Executive Survey 2017.

38 The Conversation, Jobs-tax-and-politics-three-ways-electric-vehicles-will-change-our-world, 2017

39 ClimateWorks, Electric Vehicle Council, The State of Electric Vehicles in Australia, 2017

40 Drive, NRMA announces EV charging network, 2017

41 Renew Economy, Queensland Government launches "world's largest" EV fast charging network, 2017

42 <http://www.transport.govt.nz/ourwork/climatechange/electric-vehicles/>

EVs could result in transport generated carbon emissions being reduced by up to 90% compared with current levels³⁶. Whole of life emissions, including those from production and disposal, are around 46% of ICEs, potentially dropping to under 30% by 2050 depending on the renewable energy mix⁴³. With transport currently representing 16% of Australian emissions, the electrification of transport can result in substantial reductions, significantly helping nations meet their commitments under the Paris Agreement.

Energetics Commentary - Emissions Reductions from EVs

EVs have the potential to eliminate almost all operational carbon emissions from road transport. Of course, this depends on the vehicles' access to 100% renewable or zero carbon electricity.

While Australia's electricity system is slowly but clearly decarbonising, as renewable energy becomes ever more cost-competitive and ageing coal stations are replaced, achieving significant national emissions reduction from a switch to EVs would be greatly enabled by a faster transition to clean energy.

In 2016, renewable sources provided 17% of Australia's electricity, and are projected to provide at least 23% by 2020. However, there are large regional variations in renewable energy generation. In 2016, Tasmania and South Australia generated 92% and 47% renewable energy respectively, whereas NSW only produced 17%, and Queensland just under 7%.⁴⁴ This means that EVs in Tasmania and South Australia have lower emissions on average than those in NSW and Queensland, although it should be noted that consumers can ensure their EVs run on 100% renewables wherever they live, by purchasing Greenpower or charging their cars from solar panels.

Recently announced state-based renewable energy targets and policies could accelerate electricity decarbonisation dramatically, materially improving the emissions profile of Australian EVs. For example, the ACT Government's ambitious 100% by 2020 renewable energy policies will soon virtually eliminate all emissions from charging an EV anywhere in the ACT.

To maximise the environmental benefits of EVs, attention also needs to be paid to their manufacture and end-of-life impacts. Significant improvements in both battery manufacture and battery performance (in terms of lifetime capacity and energy density) are expected to reduce lifecycle emissions. Policy has a critical role in ensuring that batteries are appropriately reused and recycled.

The climate change case for EV uptake is strong now and will become increasingly compelling over time. While it would be assisted by quickening the pace of renewable energy growth, there is no justification for delaying EV uptake or making it contingent on electricity decarbonisation. This would lead to higher locked-in emissions and delay the benefits that come from creating large-scale markets.

⁴³ Tonachel, NRDC Study – Electric Vehicles can dramatically reduce pollution, 2015

⁴⁴ Department of Environment and Energy, 2017. Australian Energy Update 2017

Case Study:

AGL New Energy Business

AGL's New Energy business unit was formed in 2014 to embrace the major changes transforming the energy industry and to create new business models to meet customers' needs. It currently comprises rooftop solar, commercial energy services, energy storage, and Electric Vehicle (EV) services. EVs could represent 3% of electricity demand globally by 2030, and AGL is uniquely placed to capitalise on this from its position of incumbency.

Recent initiatives from the New Energy division include a \$1/day unlimited charging plan for EV owners, a trial of connected batteries in South Australian homes and businesses (the world's largest virtual power plant), and an investigation on how blockchain could enable households to trade or share excess electricity they generate. These initiatives also help set up the capability to identify and transact with EV owners, obtaining business insights for those customers who were previously sold energy under homogenous household contracts.

AGL also plays an active role through the industry as a board member for the Electric Vehicle Council, and advocates for supporting and enabling policies through all levels of government. The vision at AGL is to transform the business away from an old central energy distribution retailing model, towards a distributed energy world. AGL has committed to purchase 36 Mitsubishi Outlander Plug-In Hybrid Electric Vehicles (PHEVs) to help meet their goal of 10% of their business car fleet being electric by mid-2018.



Shared, On-demand

Ubiquitous connectivity, urbanisation, the embrace of mobile devices, social media and cashless payment systems have increased customer appetite for shared and on-demand mobility services⁴⁵. Provision of real-time data has empowered commuters to overcome barriers that might previously have deterred them from taking public transportation, sharing a ride, biking or walking to their destination⁴⁶.

As shown in Table 2, shared transport describes an on-demand vehicle-sharing arrangement, in which travellers self-drive and travel together (called ride-sharing), travel together with a driver (on-demand buses and taxi-pool), travel privately and with a driver (called ride sourcing), or travel privately and self-drive (called car or bike sharing), creating a hybrid between private vehicle use and public transport. Commercial applications are all powered by a digital platform that connects passengers and vehicle drivers via mobile apps. Some providers have their own vehicles fleet, others provide a digital platform to a vehicle operating company or government, and others use the lower cost model of using the existing fleet of the general public.

Table 2: Shared and On-demand transport

	Ride Sharing	Travel Together Self-drive	Consumer	
	On-demand Bus / Taxi Pool	Travel Together Driver	Operator	 
			Driver	
	Ride Sourcing	Travel Privately Driver	Driver	 
	Car Sharing	Travel Privately Self-drive	Operator	
			Consumer	
	Bike Sharing	Travel Privately Self-cycle	Operator (Docked)	
			Operator (Undocked)	

Car sharing and ride sharing are already well-developed services, growing rapidly in Australia and globally.

Users of shared transport gain on-demand transport without the inconvenience and costliness of owning a vehicle. Car owners can join the shared economy and become providers through renting their car to a car share scheme, sharing their commute in carpool schemes, or becoming a driver for a ride sourcing scheme.

⁴⁵ BCG, Building the Digital Car Company of the Future, 2017

⁴⁶ BCG, Building the Digital Car Company of the Future, 2017

Car sharing and ride sharing are already well-developed services, growing rapidly in Australia and globally. Car sharing currently supports over 140,000 users in Australia who have the ability to access 3,500 vehicles through providers such as Go-Get and Car Next Door⁴⁷. Car sharing is predicted to grow to 36 million shared users globally by 2025⁴⁸. There are over 2.7 million ride sourcing members in Australia, growing nearly three times since 2015⁴⁹. In 2016, ride sourcing companies drove 500,000 passengers per day in New York City alone. That was triple the number of passengers driven the previous year⁵⁰. Carpooling schemes are also taking off. In NSW, the Macquarie Park based Co-Hop carpooling scheme, which was introduced in 2015, grew 136% in FY2017 to 1,768 members and 30,000 pooling requests⁵¹.

Car and ride sharing already works towards sustainable mobility by taking cars off the road.

Car and ride sharing already works towards sustainable mobility by taking cars off the road, as shown in Figure 5. Shared AVs would increase this sustainability benefit greatly. Under some future scenarios of shared autonomous mobility, the car fleet size could potentially shrink to around 80%, reducing congestion, while meaning less income from vehicle registration fees and sale taxes, maintenance, insurance and parking⁵².

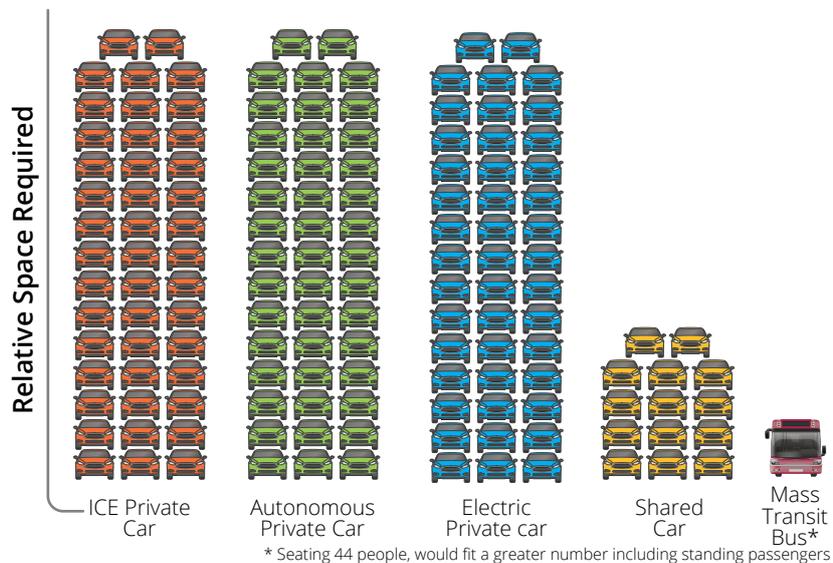


Figure 5: The case for shared transport - space required to transport 44 people

Governments and the private sector are also trialling on demand public transport in areas with low transport demand that might otherwise not be economically feasible to operate within, such as first mile / last mile transfer to transport hubs, and those areas located further from mass transit corridors. Such on-demand providers have a different business model to traditional public transport and are not dependent on fixed routes, infrastructure or fleets⁵³.

47 SMH, Car-ownership-the-norm-despite-the-rise-in-car-sharing, 2017

48 Frost & Sullivan, 2016

49 The West Australian, Uber outranks taxis in Perth's transport choices, 2017;

50 Business Insider, 1-million-australians-are-now-registered-with-uber, 2015

51 Connect Macquarie Park and North Ryde Annual Report FY17

52 The Conversation, Jobs-tax-and-politics-three-ways-electric-vehicles-will-change-our-world, 2017

53 UITP, Public Transport Trends 2017

Across Sydney, Keolis Downer is trialing an online bus system enabling commuters to book transport services from their homes or a nearby location to a local transport hub or point of interest. Bridj which has described itself as 'the world's first pop up mass transit system', is conducting trials in Wetherill Employment Precinct and surrounding major transport hubs, in Western Sydney, as part of a pilot with TfNSW.

The Future of Public Transport

Future transport may well depend on public transport as we know it⁵³. To remain the core of a city's mobility system, public transport has already started to evolve and take advantage of new technologies to meet customer demand and expectation. Moreover, future transport technology can be used to help cities meet their public transport policy goals: to broaden coverage, lower costs, offer door-to-door mobility and be safer and with less emissions⁵⁴.

Connected technology has enabled the development of on-demand buses. In the near future these are likely to expand in their network coverage and become fully autonomous, possibly the first vehicle type to commercially do so at a large scale. Automated public transport is nothing new with some 37 cities globally already operating automated metro lines⁵⁴.

Shared and autonomous bus shuttles likely will be far cheaper than regular bus services. Multiple studies conducted by the International Transport Forum (ITF) suggest the introduction of ride sharing and small on-demand buses will decrease fares by half, and congestion and emissions by a third. The ITF modelling showed that these on-demand modes work particularly effectively both as neighbourhood transit systems and also in tandem with a high capacity core public transport network, such as rail and bus rapid transit, for which they can act as feeders⁵⁵.

Such 'buses' may blur the boundary between private and public transport with smaller vehicles and private operators entering the market. For this to work efficiently and sustainably, shared transport, including bikes, and on-demand buses must be fully integrated with public transport and not in competition⁵⁴. Eventually this may well become a public transport MaaS model, with both private and public operators working on a common operational and policy platform.

Shared autonomous fleets will likely significantly enhance public transport, but, as they stand, on their own they are not a substitute for mass public transit as they lack the capacity to cater for the volumes required in densely utilised cities⁵⁴. How will future transport technology affect these high-volume city transport modes? Increased levels of autonomous trains, trams and buses, fully electric bus networks and dynamically adaptive timetables seem likely. Going further, autonomous vehicles may eventually evolve to "pods" that can platoon together to form mass transit on designated roadways or break apart to form smaller scale local and even private transit.

54 UTIP, Autonomous vehicles, a potential game changer for public transport, 2017

55 ITF, Shared mobility simulations for Helsinki, Lisbon and Auckland, 2017

Case Study:

IAG Research Centre

The IAG Research Centre, originally founded in 1989 to focus on car safety research, is increasingly working on emerging transport technologies. IAG is actively considering how autonomous vehicles will redefine liability and impact insurance risk.

IAG and its Research Centre has partnered with Australia's leading universities and researchers through the iMOVE Cooperative Research Centre to explore the potential of connected and autonomous vehicle technologies in the Australian context. The iMOVE CRC is Australia's leading industry, government and academic mobility innovation collaboration, funded for a decade from 2017. IAG has created a new role of Academic Director in partnership with UNSW to strengthen collaboration with the research sector and is a core partner of the Australian and New Zealand Driverless Vehicle Initiative (ADVI).

In considering the future of insurance, IAG has also engaged with collaborative consumption models through new insurance products (ShareCover) for Airbnb and Stayz hosts, as well as working to reduce driver distraction through the Safer Journeys app.



Mobility as a Service

Taking this digital disruption one step further, and the most radical of all future mobility, is mobility as a service (MaaS), a personalised, door to door travel management service digitally unifying trip creation, purchase and delivery across all modes and providing a level of service equivalent to or higher than current car-ownership models, without the need to own a vehicle. It provides integration across public transport, on demand, and shared transport modes so that the end user can be truly mode agnostic with the most appropriate mode deployed per time of day and geographic context. It is anticipated that at its maturity MaaS will develop alongside and utilise AE-V technology, due to its significant economic advantage, using fleets of vehicles that are in use almost constantly⁵⁶.

Some are predicting that by 2030, within 10 years of regulatory approval of fully AVs, 95% of all U.S. passenger miles will be served by MaaS⁵⁶. The cost differential between car ownership and MaaS will override all other factors that affect consumer choice and ensure that MaaS will be adopted wherever and whenever it is available.

The cost differential between car ownership and MaaS will override all other factors that affect consumer choice...

A MaaS disruption of this scale would result in huge changes to many sectors. Demand for new cars would plummet. It is likely that those competing to be MaaS service providers will be led by partnerships and individual enterprises from ride sourcing platforms such as Uber (which could be considered a pre MaaS technology), other technology companies, car manufacturers and other existing transport providers, providing the hardware and software that MaaS will use⁵⁷. MaaS will also likely result in new mobility related markets, from consumers demanding new services associated with their mobility needs, including entertainment, advertising, monetisation of data, and retail.

Several trials are underway or have already taken place in a range of European cities to market test some of these advanced mobility models. MaaS-Global has launched Whim, a MaaS app, in Helsinki, Finland, and soon to be rolled out in Birmingham, UK this year. MaaS has also been rolled out in Turku, Finland, where passenger journeys increased by 20%, and 98% of surveyed customers said the attractiveness of public transport had improved⁵⁸. The system also engaged new customers, with 9% of customers on regional lines reporting they had previously not considered themselves to be public transport users.

Ford, through its Smart Mobility subsidiary—a partnership with various Silicon Valley start-ups has also ventured into the mobility services market, including market testing consumer preferences on more than thirty different mobility ecosystems piloted around the world, with the view of transitioning the company into “both an auto and a mobility company”⁵⁹.

56 Arbib & Seba, Rethinking Transportation 2020-2030, 2017

57 Transport Systems Catapult, 2016

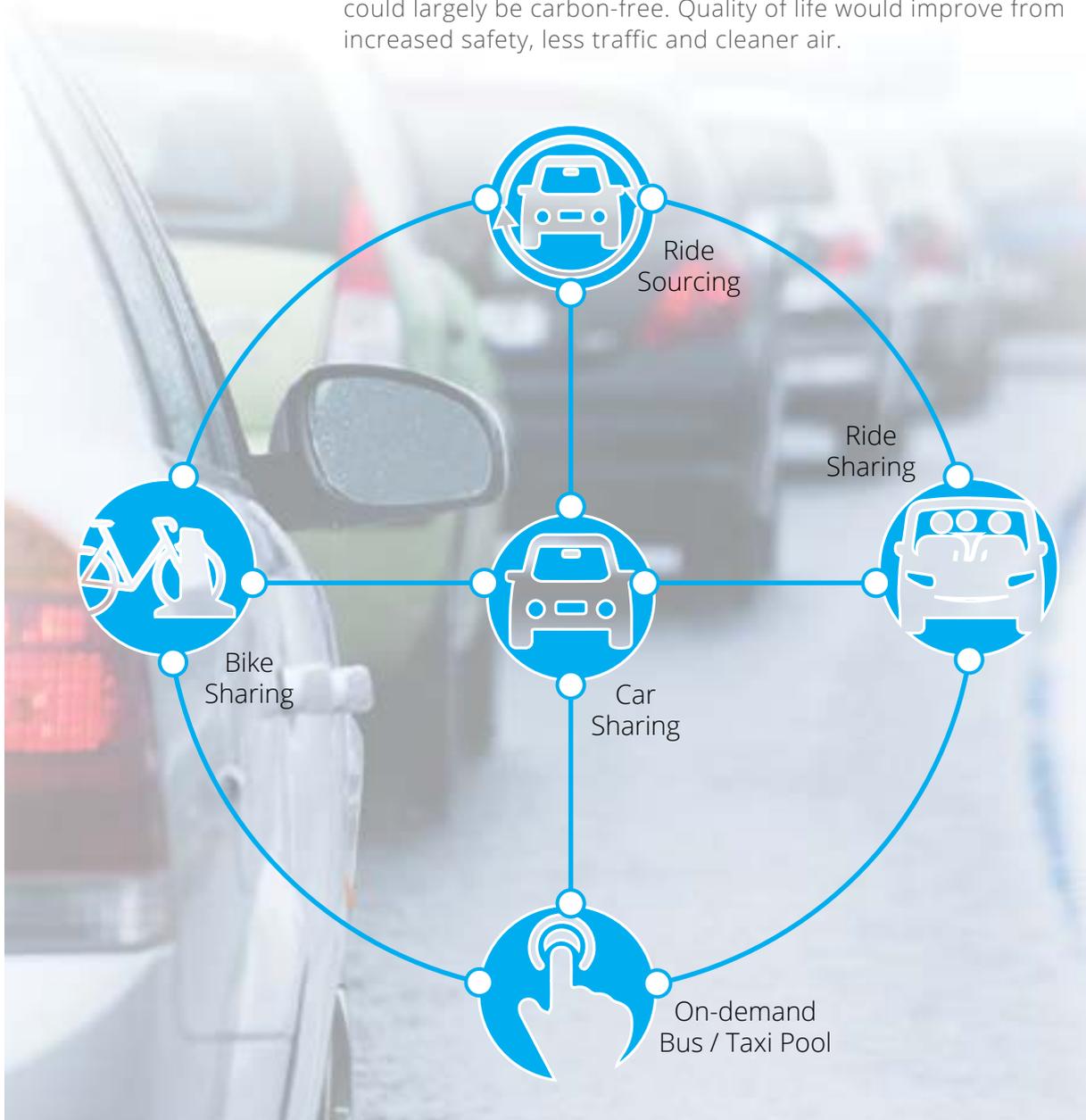
58 Intelligent Transport, City of Turku leads the way towards public transport digitalisation and MaaS in Finland, 2016

59 Ford Smart Mobility, 2016

All businesses will be able to take advantage of MaaS benefits both from the increased level of service and the much lower cost per kilometre travelled. This could include mobility employment and customer packages, low cost high speed deliveries and even new types of entirely mobile businesses, for example in retail and services.

Quality of life would improve from increased safety, less traffic and cleaner air.

An A-EV MaaS based transport system could be the holy grail of a sustainable future mobility: Transport costs would dramatically lower, potentially to 10 times less than that of today; Access to jobs, education and health care would significantly improve, especially for the elderly and disabled; Productivity gains will boost the US GDP by an additional US\$1 trillion because of faster commutes and reclaimed driving hours; Energy demand could be reduced by 80% and tailpipe emissions by over 90%⁵⁶. Assuming a concurrent disruption of the electricity infrastructure by solar and wind, road transportation (excluding lifecycle emissions) could largely be carbon-free. Quality of life would improve from increased safety, less traffic and cleaner air.



Case Study:

NRMA expansion into Transport and Tourism

The way people travel is changing. While the automobile remains king of the Australian road, the nature of the automotive industry is changing. To respond to these changes, the NRMA has adopted a new strategy to deliver services across the transport and tourism sectors.

The NRMA has expanded its offering in transport, including investments in trials of connected, autonomous and sharing technology as well as entering operations of electric vehicle charging and public transport.

In doing so, the NRMA is aiming to facilitate the transformation of the way NRMA Members travel. This includes:

- Investment into Manly Fast Ferries which enables both commuter trips and tourism journeys.
- The roll-out of 40 super charging EV network across NSW and ACT to enable EV journeys and support regional tourism. In addition, the NRMA has been at the forefront of EV advocacy with the aim of increasing take-up to lower personal transportation costs, significantly cut emissions, and improve health and environmental standards.
- Investment into Divvy, the smart parking platform to provide greater access and value for money for those seeking secure parking.
- Technological products focused on safety, driver performance, vehicle health and optimised fuel efficiency.
- The launch of autonomous shuttle trials, in partnership with NSW Government, HMI Technologies, IAG, Sydney Olympic Park and Telstra, to be conducted over two years at Sydney Olympic Park. In addition, NRMA has been leading the charge for amendments to the NSW road transport legislation to facilitate the safe and legal trial of AVs in NSW.



Conclusions and Recommendations

Future mobility technology, such as AVs, EVs and connected transport as well as new business models including shared, on demand and MaaS, is likely to radically change the way we move around...

Future mobility technology, such as AVs, EVs and connected transport as well as new business models including shared, on demand and MaaS, is likely to radically change the way we move around and, if shared and electric, could result in tangible benefits to sustainability outcomes. This will create substantial new business opportunities for innovative products, services, and business models, as well as substantial risk and disruption.

Recommendation:

Review business models to hedge against future disruption and take advantage of emerging markets

Future mobility is happening now and already causing disruption across multiple sectors. This is enabling substantial opportunity for business model innovation, not just in the transport sector itself but also for those with close ties to the transport system such as energy, insurance and transport services, as shown in the three case studies in this chapter. Companies are starting to hedge against future disruption and take advantage of emerging markets. Going forward this disruption is likely to spread to increasing numbers of sectors as technology and business models continue to advance and full scale and impact of future mobility become more accepted and apparent.

Business should review its own business models and service delivery and determine if they are ready:

- What will future mobility mean for overall business strategy, product and service development, asset value, as well as for customers and other stakeholders?
- What will be changing and how can the business proactively leverage this change?



Image: Bosch

Transporting the Future: A Business Perspective on Future Mobility

BARO
V34
H-67/46
6.X12

Chapter 3: Evolution – Workplaces, Customers and Logistics

BARO
V34
H-67/46
6.X12



Chapter 3: Evolution - Workplaces, Customers and Logistics

Historically, the role of corporate mobility programs (often referred to as corporate mobility management (CMM)), targeted employee journey-to-work, but are now encompassing broader mobility opportunities for customers and supply chains. Why? Because business is in a unique position to influence (often directly) travel demand to benefit the organisation, their internal and external stakeholders as well as the broader community. Business owns half of all registered vehicles on the road⁶⁰ and as such has significant potential to influence markets and behaviour. Forward-thinking businesses are capitalising on emerging transport technologies to deliver workplaces of choice for employees, customers, suppliers and other stakeholders.

Journey to Work and Travel Planning

Forward-thinking businesses are capitalising on emerging transport technologies to deliver workplaces of choice for employees, customers, suppliers and other stakeholders.

International evidence shows that the vast majority of companies that implement CMM are motivated by two factors: External regulations (e.g. local or state transport requirements linked to site development and approval); or high transport-related costs – and in particular, parking costs. While there are other motivations such as improving staff travel options, sustainability motivations, or image, these generally play a lesser role⁶¹.

Despite limited motivation, once business does decide to implement CMM, it often experiences much broader and deeper benefits that go beyond direct cost savings, which in themselves can be more than expected⁶¹. Frequently, the most reported significant benefit is improved employee well-being and productivity. Employees find it easier and often cheaper to get to work, more chose an active transport mode like walking or cycling, and the quality of their work-day improves, which results in the business becoming a workplace of choice.

A community can also reap the benefit of CMM. Corporate mobility initiatives decrease single occupancy car journeys resulting in benefits that go much further than the business. In Silicon Valley, for instance, the introduction of bus shuttle services has resulted a reduction of 327,000 sole occupancy vehicle return journeys per year from the San Francisco Bay Area⁶². In Canberra, the introduction of paid parking coupled with additional bus services in the Parliamentary Triangle has resulted in 30% growth in bus patronage⁶³.

60 <https://www.theclimategroup.org/project/ev100>

61 OECD, Effective Transport Policies for Corporate Mobility Management, 2010

62 Cosgrove, Private commuter buses: Rogue operation or new model? 2010

63 Wong, Action network review: A comparative study of Network 12 and Network 14, 2014

Travel Plans have been designed and implemented across the world and are widely considered to be an essential tool in delivering better, more sustainable, planning and development outcomes.

CMM is usually structured into a Travel Plan, which is characterised in the form of a long-term management strategy, tailored to an organisation and site, that facilitates and encourages travel by sustainable modes of transport. They can deliver benefits for developers, tenants, local authorities, and the ultimate users of the site. Travel Plans have been designed and implemented across the world and are widely considered to be an essential tool in delivering better, more sustainable, planning and development outcomes. They are at their most effective when designed and implemented as part of new land use developments, so as to embed use of sustainable modes from the outset. The types of measure used in Travel Plans are found in Table 3.



Image: Bosch

Table 3: Measures included in travel plans, with potential future measures in blue

Focus	Infrastructure	Incentives	Information
Public Transport, other bus services	Direct easy access; company or precinct bus service; on demand bus service, shuttle-bus service to main public transport stops (especially at night); advocate to public transport (PT) provider for better access	On-site ticket sale, guaranteed ride home; PT subsidies.	Real time information via booths, screens, apps; printed timetables, travel clinics
Parking	Restrictions; EV charge points	Parking charges, lower for EVs; equitable parking space allocation system; parking charge or cash out; revenue from parking ring-fenced to fund CMM	Campaigns
Ride Share	Precinct or company app platform; dedicated parking spaces	Reduced parking charges	Campaigns and action days
MaaS	A-EV Fleet purposed for MaaS in future	MaaS staff benefits	Campaigns and action days
Fleet	EV fleet, connected fleet, A-EV fleet in future; reduce ICE fleet; EV charge points	EV Targets now, A-EV targets in future, connected technology to measure and incentivise safe driving behaviour	Campaigns
Bike	Cycle access points; signage; pool bikes; bike stands; lockers; showers and change facilities; laundry provision; advocate to Council for better cycle paths	Cycling subsidies on bike expenses and purchase; on-site bike repair service; provision of rain gear; "bike with a buddy" scheme	Route information, cycle path maps
Walk	Pedestrian access points; signage; change facilities; laundry provision; Advocate to Council for better footpaths	"Walk with a buddy" scheme; pool umbrellas	Route information, footpath maps
Flexible Working	Remote co-working spaces; provision of mobile tech to enable remote working; provision of teleconferencing from home and work; reduce need to travel – onsite child care, gym, dry cleaning service, convenience store	Flexible work tool kits	Encourage travel outside peak periods

Within Australia, there are many existing examples of the planning system delivering sustainable transport outcomes. For example, The Optus Sustainable Transport Strategy (see case study) was initially developed in response to stringent Development Approval conditions for the Optus campus in Macquarie Park, a State Significant Development, in Sydney⁶⁴. Lend Lease developed a Transport Plan for its new headquarters in Barangaroo, Sydney. This includes their Bike Buddies program and end of trip facilities. The program tracks riders' journeys to develop a "Bike Buddy Map" - when new staff express interest, they are paired up with an existing rider close to their location, so they feel safer and know the best route to work.

While it is now not uncommon to find requirements for Travel Plans in the Development Control Plans of local councils across Sydney, anecdotal evidence suggests there are varying degrees of success from these predominantly local efforts in terms of delivering sustainable travel mode shares at new developments.

64 Mackay, Parker, Dillon and Taylor, Reflecting on ten years of the Optus Sustainable Transport Strategy, 2017

Future Mobility and CMM

The vast array of opportunities presented by future mobility, as well as shifts in urbanisation patterns, presents an opportunity for the motivations of CMM to shift – primarily for businesses to rethink how mobility impacts them across their value chain and how they can gain benefits and influence the outcomes of future mobility solutions. Businesses collective buying power through fleet investment as well as influence on their employees and customers can both significantly enhance mass demand and behavioural acceptance to favour more sustainable future mobility models including high levels of EVs, shared and public transport.

The vast array of opportunities presented by future mobility, as well as shifts in urbanisation patterns, presents an opportunity for the motivations of CMM to shift.

Globally, business owns over half of all registered vehicles on the road⁶⁵. In 2016, business was the largest purchaser of non-Tesla electric vehicles in Australia⁶⁶ (albeit at a low base). Several major companies have already made policy commitments to convert their fleets to electric vehicles and also provide EV charging infrastructure, for example through the global EV100 Initiative⁶⁷ and New Zealand's EV Partnership Program (see case study in next chapter). Such public commitments not only demonstrate how the organisation will achieve emissions reductions but also provide a strong market signal for EV demand. The UK based telecommunications giant BT, which started trialling electric vans in 2010, has pledged to phase out pure petrol and diesel vehicles from its 30,000 fleet to electric or hybrid vehicles by 2030 to meet its science-based climate change targets⁶⁸. Businesses have also started to implement shared mobility schemes such as Tesco's Guaranteed Ride Home initiative where 38% of the 5000 staff in its UK head office are signed up to the scheme.

In the not too distant future, CMM could also involve converting to connected A-EV fleets, which in turn could become MaaS vehicles, using collective buying power to gain good MaaS deals for employees and using these as a staff benefit like healthcare. Coupled with the demographic shift to decentralised urbanisation, such as the Sydney three cities plan⁶⁹, business will be likely to have multiple headquarters across a greater city region and a far greater incentive for sustainable and seamless transportation of employees, customers and goods between these.

65 <https://www.theclimategroup.org/project/ev100>

66 ClimateWorks, Electric Vehicles Council, The State of Electric Vehicles in Australia, 2017

67 <https://www.theclimategroup.org/project/ev100>

68 <https://www.businessgreen.com/bg/news/3017085/reports-bt-to-phase-out-pure-fossil-fuel-vehicles-from-its-fleet>

69 <https://www.greater.sydney/draft-greater-sydney-region-plan-vision-2056>

Decentralised cities, business and mobility

Urbanisation is both growing and becoming more decentralised. Increasingly sprawling cities and long commutes that affect quality of life have spurred an urban policy shift to plan cities where residents can access employment, education, retail, recreation and all other facets of life within a sustainable commute distance of 30 minutes. The concept of '30-minute cities' have been embraced by the Australian Federal Smart Cities Plan, the Sydney three cities plan and Melbourne's even more ambitious 20-minute neighbourhood plan .

Business will need to adapt, and many already have, locating multiple headquarters across a greater city region. Business will need to strategically consider its locations and co-locations with other businesses, transport hubs and other place-making factors to ensure access to customers, supply chains and that it remains an employer of choice.

Such a model will result in a far greater incentive for business to embrace mobility management, proactively identifying and managing sustainable and seamless transportation of employees and other stakeholders both to and between its various locations.

Customer Mobility

Mobility initiatives targeting customers and visitors are often similar to those aimed at employee journey-to-work, with provision of infrastructure, incentives and information delivered through a Travel Plan⁷⁰. In addition, the retail sector also has a very strong focus on site location and customer catchment.

Research shows that customers who access shopping centres by active modes or public transport visit more often than car drivers, while retailers often overestimate the importance of car drivers and parking provision on shopping centre profits⁷¹. Indirect impacts from customer transport can also be significant. Scope 3 greenhouse gas emissions from customer transport is a substantial source of indirect emissions for retailers. For example, customer transport to IKEA stores in 2010 produced more than three times the energy emissions of all IKEA buildings⁷².

70 OECD, Effective transport policies for corporate mobility management, 2010

71 Woodruff and Hui, Integrated planning in activity centres: Influencing change across all travel purposes, 2010

72 WWF/IKEA, An Opportunities Guide for Retailers and Shopping Centers, 2011

Despite this, customer mobility initiatives are limited in Australia.

Knox City Shopping Centre in Melbourne and Rouse Hill Town Centre in Sydney have both developed comprehensive Travel Plans^{71,73}. Such plans include a mix of strategies and incentives to reduce single occupancy trips and involve co-operation and inclusion of the developer, centre owner and manager, tenants, local council and transport agencies. Surveys with Rouse Hill residents have shown decreased car ownership, increased use of bus services and increased walking as a mode of transport in the Rouse Hill catchment compared to surrounding areas⁷³. Several hospitals across Australia, such as Royal North Shore and Liverpool hospitals, as well as Universities, such as Macquarie University and UTS, have also developed travel plans for all visitors to manage access to their sites.

Ikea has identified the gap in customer mobility initiatives as an opportunity for leadership, trendsetting, and building brand position. The company has proposed eight ways for retailers to contribute to sustainable transportation: Store location and co-location (which is identified as the single most important factor regarding carbon footprint), smart shopping (encouraging online browsing before visiting the store), online shopping, multiple shops/stops per trip, improved long-haul logistics efficiency, availability of mass transit and alternative transportation, efficient home delivery and encouraging low emission customer vehicles⁷². By following these methods, IKEA Brooklyn has achieved 29% of the store's weekday visitors using alternate means of transportation, rising to up to 50% at weekends. As part of its partnership with WWF, Ikea also issued a step-by-step guide to assist other retail businesses to start managing customer transport⁷².

Going forward,
future
mobility will
provide new
opportunities
for customers.

Going forward, future mobility will provide new opportunities for customers. MaaS may significantly diminish the need for retail and other consumer car parking. In addition, to the disruption to property companies and others invested in car parking, this may also change the location dynamic for retail, potentially shifting it away from out of town and big-box development and back to more urban-village environments. Shopping in bricks and mortar stores may have a renaissance as travel and parking would no longer be a stress-point for consumers.

73 Wiblin et al., Precinct wide travel plans: learnings from Rouse Hill Town Centre, 2012

Case Study:

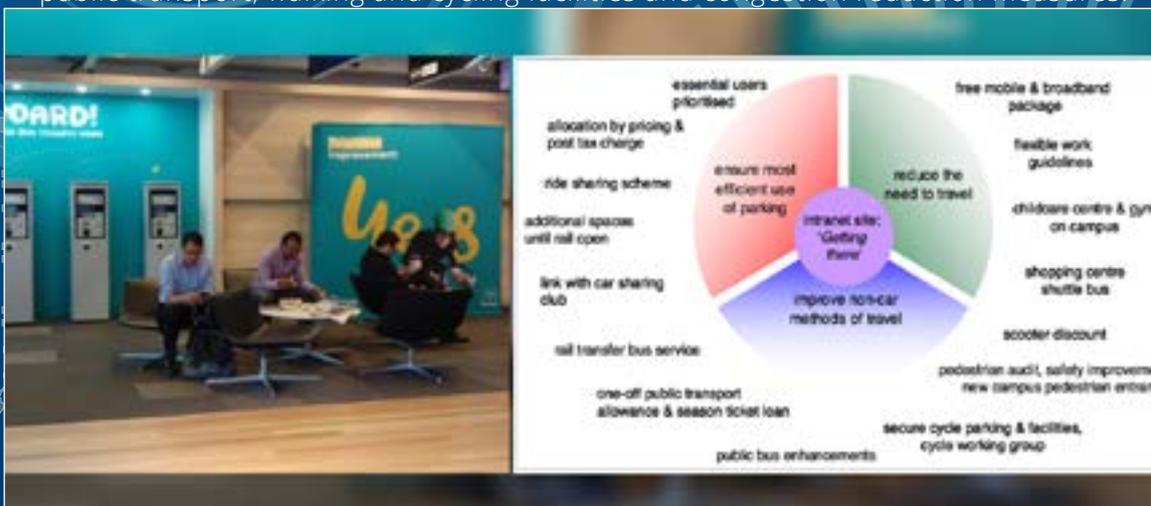
Telecommunications Company Sustainable Transport Strategy

The Sustainable Transport Strategy developed for Optus Centre Sydney in Macquarie Park is the largest workplace Travel Plan in Australia. Originally designed to address travel and transport issues associated with the (then) largest corporate relocation in the southern hemisphere, it addressed the key risks of the relocation, the reality and perception of transport accessibility, and is now business as usual for the organisation. The strategy is self-funded, with revenue from the car parking charge used to pay for sustainable transport measures.

Measures include employee express bus services, supported by high quality end-of-trip facilities including a waiting lounge and passenger information displays for both Optus bus services and trains from Macquarie Park station. A transport kiosk provides information including printed route maps and timetables. There are also directions for the best route to the airport at that time. A mobile app and bus alert service provide real time passenger information for employees.

Ride sharing has been a key element of the strategy, critical to make the best use of the available car parking spaces on site. Engagement in 2005 indicated people were resistant to sharing, but since the relocation ride sharing has become a mode of choice for employees with approximately 10% using the service.

Subsidies encourage ridesharing (through parking discounts) and there are extensive cycling facilities located on the campus. These include 300 bicycle lockers and 300 bicycle racks, shower and laundry facilities and vending machines for bicycle maintenance. Managed by a dedicated Sustainable Transport Team, their work also includes regular engagement with the local Transport Management Association and advocating to local and state Government for improvements to public transport, walking and cycling facilities and congestion reduction measures.



Freight

IoT and connected technology, autonomous and electric trucking and drones are set to revolutionise freight and urban deliveries, reducing costs and increasing productivity and causing large disruption in the sector⁷⁴.

IoT and connected technology, autonomous and electric trucking and drones are set to revolutionise freight and urban deliveries, reducing costs and increasing productivity and causing large disruption in the sector⁷⁴.

In particular, IoT within the supply-chain is helping manufacturers, logistics companies and retailers be smarter and more sustainable with accurate and real-time tracking of orders, traffic, vehicles, and goods. The World Economic Forum has estimated that by 2025, digital logistics and supply chain platforms could create \$1.5 trillion in additional economic value for the freight industry and up to \$600 billion in additional profits for retailers⁷⁵. Just-in time logistics, enabled by IoT, cuts inventory costs and the number of kilometres that products travel. It also allows manufacturing efficiency to better reflect demand (called just-in-time production). Emerging technological developments like three-dimensional printing will continue to shape supply chains in ways previously not thought possible⁷⁶.

The sharing economy has resulted in UberCARGO in Hong Kong, Dolly in the U.S. and Freight Exchange in Australia, the latter of which enables freight companies to share capacity, eliminating wasted space in truck, trains and ships⁷⁷. Seattle-based Flexe has billed itself the 'Airbnb for warehouse space' and offers on-demand warehousing by matching available space in a location with requests for expedited warehouse facilities. Free floating, contractual services are also emerging, the freight versions of an Amazon e-marketplace. In this situation, an app-based software platform will be able to coordinate entire routes for shipments by choosing among carriers, hubs, depots, and warehouses to find the most efficient use of capacity, allowing the owner of a single truck to compete head-to-head with companies owning hundreds of vehicles⁷⁴.

Autonomous trucks are also imminent and many anticipate that they may outpace the uptake of autonomous cars⁷⁸. US Xpress, one of the US's large largest trucking companies with a fleet of 7,000-plus trucks, has installed autonomous braking and collision-avoidance systems across its fleet. Embark, a Silicon Valley start-up, recently announced that it has been testing its self-driving technology as part of a partnership with the truck-leasing company Ryder and the appliance giant Electrolux⁷⁴.

In the first instance, autonomous trucking technology would concentrate on open highway driving with first and last mile logistics completed by drivers who collect the vehicles in out of town truck parks to navigate complex urban routes⁷⁶. However,

74 PWC, 2017 Commercial Transportation Trends, 2017

75 Business Insider, Transportation-shipping-logistics-market-reports, 2017

76 DHL, Logistics Trends 2016

77 NRMA, Start-up pioneers peer-to-peer logistics business model, 2017

78 New York Times, Self-Driving Trucks may be Closer than they Appear, 2017

self-driving trucks for the much more challenging urban environments are in development. Such trucks would collect anecdotal data about instinctual human driver behaviour and communicate and share learnings with one another enabling them to become better and safer drivers than any individual human operator.

Going forward robotics and drone delivery is likely to future disrupt logistics⁷⁶: UPS, DHL, and FedEx are experimenting with robotic loading of parcels. Advanced robotics, with greater mobility enabled by gyroscopes and mapping technologies, will soon be able to recognize specific shipments by size and description and move them to appropriate locations for picking and packing in loading docks and warehouses. Amazon has announced Prime Air, where packages will be delivered via drone within 30 minutes of placing their order.

Ensuring Future Freight is Sustainable



below50 is a cross-sector global business collaboration that brings together the entire value-chain for more sustainable fuels that produce at least 50% less carbon emissions than conventional fossil fuels.

Demand and decreased costs from new technologies are predicted to increase freight levels, potentially tripling by 2050⁷⁹. The new technologies described above cannot curb the trend of growing freight emissions. Instead higher fuel efficiency and alternative fuels can reduce freight carbon emissions by 40%. Electrification of fleets will reduce emissions further. Truck sharing, route optimisation, relaxing of delivery windows and more operational efficiency will also work to reduce emissions, the International Transport Forum (ITF) predicts that these techniques alone could hold 2050 emissions at 2015 levels.

EV trucks are starting to enter the market. Tesla recently announced it will launch an EV truck in late 2018⁸⁰. The new electric Ford Transit van is currently in trials in London and due for production in 2019. The van can operate using a one litre petrol engine alongside an electric range extender, giving the vehicles a zero-emission range of 50km on a full charge⁸¹.

Business is already taking action to reduce emissions with existing fleets. below50 is a cross-sector global business collaboration that brings together the entire value-chain for more sustainable fuels that produce at least 50% less carbon emissions than conventional fossil fuels. The program aims to drive growth and commercialisation of sustainable technologies for low carbon transportation fuels with investors and policy-makers. To date below50 companies have invested over US\$1 billion and have procured over 100 million litres of low carbon fuels⁸².

79 ITF, Transport Outlook 2017

80 Yahoo, Tesla's Musk announces plans for semi-truck launch, 2017

81 <https://www.businessgreen.com/bg/news/3017085/reports-bt-to-phase-out-pure-fossil-fuel-vehicles-from-its-fleet>

82 Below50.org

Business is also seeing value in industry and supplier collaboration. PepsiCo, Nestlé, STEF, BABM and TRI-VIZOR worked together on the fast-moving consumer goods collaborative freight project to synergise distribution flows, consolidate truck movements and eliminate empty running to reduce both carbon emissions and transportation costs between manufacturing sites and retail distribution centres⁸³.

Regulators are working with business to beat congestion in urban environments. Transport for NSW, has established a Courier Hub in the Sydney CBD, partnering with city businesses to optimise vehicle sizes. Deliveries arrive in spatially efficient large trucks which are then distributed onto smaller vans and bike couriers to beat congestion. Transport for London has reduced the number of freight vehicles entering the city and ensures that all available capacity in those trucks are adequately used. Specific initiatives include micro-consolidation centres closer to delivery points and last mile solutions like cargo bikes and small electric vans.

Conclusions and Recommendations

There are many opportunities for business to capitalise on mobility relating to their employees, customers and movement of goods...

There are many opportunities for business to capitalise on mobility relating to their employees, customers and movement of goods which can result in significant improvements to both transport constraints and overall sustainability outcomes. Traditionally the motivation for business to influence the mobility of their employees and customers has relied primarily on regulation. Future mobility presents an opportunity for business motivations to broaden – primarily for business to rethink how mobility impacts it across its value chain and how it can gain benefits and influence the outcomes of future mobility solutions including supporting sustainable outcomes.

83 This scheme was subsequently awarded the CO3 Award for Best European Horizontal Collaboration Project

Recommendations are as follows:

Business should undertake a review to determine what future mobility means for business operations

Business should determine whether it is both future proofed and able to take advantage of future mobility opportunities. It especially should ask how future mobility could progress business sustainability goals. This should include review of processes, policies and procedures relating to:

- **Assets** – value and utilisation of existing and future assets, including car parking, EV charging, support of active and shared transport, asset location and co-location.
- **Fleets** – changing to connected, autonomous and/or electric fleets, as well as pooled and shared fleets or, in the future, outsourcing to MaaS, and what these mean for size of fleet, operations and productivity, operating, leasing and purchasing costs and emissions.
- **Logistics** – the impact of IoT and connected technology, digital logistics and supply chain technology, on-demand and shared warehousing and freight provision, autonomous trucks and robotic packing, low carbon fuels and electric fleets as well as supplier collaboration and what this means for the scale of logistics operations, contracts and their management, costs and emissions.
- **Procurement** – the impact of changing technology, business service models and the associated legislative changes that will likely take place over the next few years;
- **Sustainability** - especially those regarding people, health and safety, diversity, talent attraction and retention and emissions.
- **Flexible working** – support and impact on productivity, diversity, talent attraction and retention.
- **Customer journeys** - how will your customers find and visit you in the future?



Figure 6: Future mobility impact on business operations

Sustainable transport planning should be integrated into new development planning with a Travel Plan recommended as the primary method for delivering sustainable transport outcomes

Whilst several States' planning legislations acknowledges the role of sustainable transport planning measures in delivering sustainable development, this doesn't consistently translate into delivery of practical and effective sustainable transport plans for all new developments. State Governments should further their existing commitment and establish a robust legislative framework to support sustainable transport for new developments, including specific requirement for the development, monitoring and evaluation of Travel Plans for all new developments of a certain size or impact.

Such inclusions should support a partnership approach to delivery of sustainable mobility, a collaborative response with shared responsibility between the public and the private sector and a transparent framework for equitable transfer of responsibility from developer to tenant. Travel Plans, provide the incentive for an innovative and flexible private sector response including technological improvement, developing and scaling up new business models, and leading behavioural change⁸⁴.

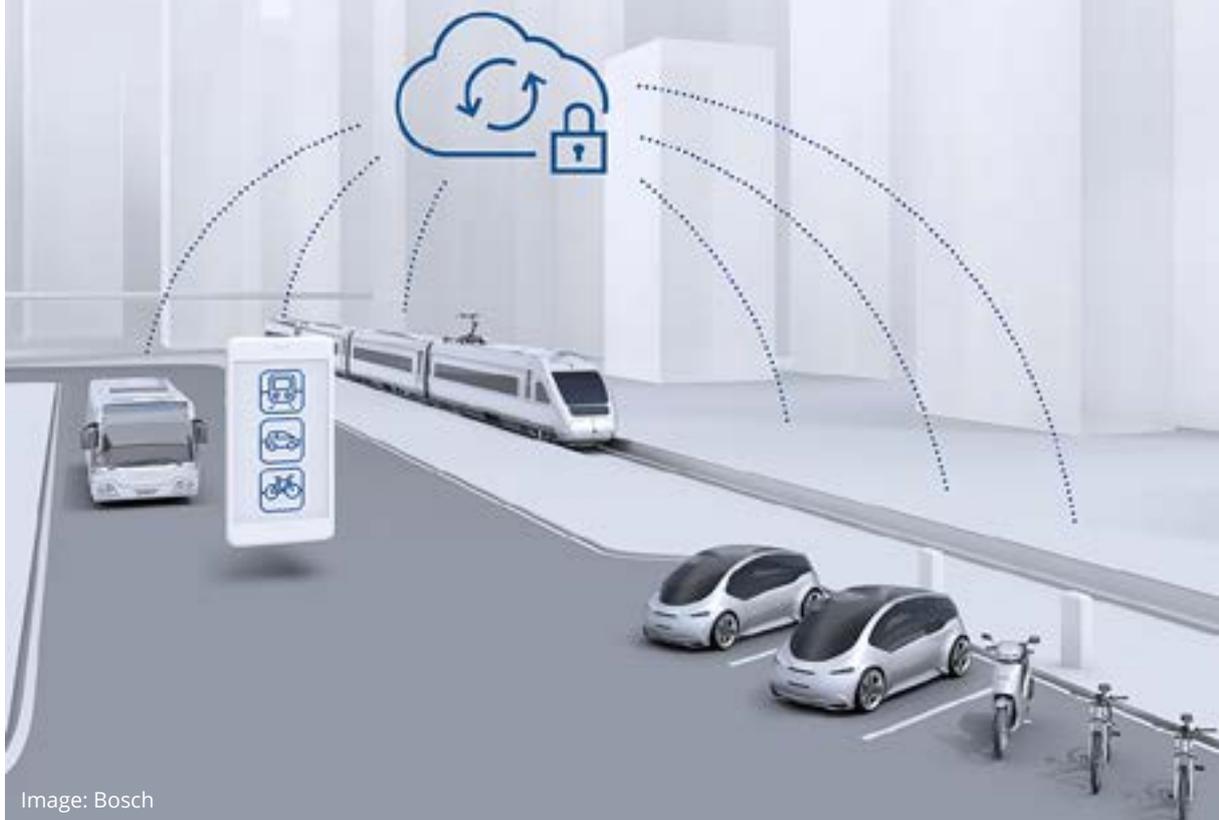


Image: Bosch

84 See SBA Submission on Amendments to EP&A Act 1979: http://planspolicies.planning.nsw.gov.au/?action=view_submission&job_id=8188&submission_id=197106

Federal Government should undertake a review of fiscal policy options for future mobility and use the results to introduce incentives for sustainable forms of transport to deliver clear signals to business and consumers.

Currently there are many fiscal incentives for Australians to drive alone to work and not many to commute more sustainably. The provision of generous tax concessions that allows employees to write-off cars and parking expenses from their income tax has been identified as the greatest challenge to more sustainable commuting in Australia⁸⁵. Moreover, many companies provide company cars and free car parks at work. Very few drivers are choosing electric – Australia has one of the lowest take-ups of electric vehicles in a developed nation, which is in part due to their expense.

The Federal Government should undertake a review of all existing fiscal policy options that influence transport choice for business and commuters. This should include consideration of introduction of incentives that encourage uptake of sustainable mobility including car sharing, pooled fleets, electric cars, biking and public transport as commuting methods to encourage mass adoption. Any introduction of road user charging should include subsidies / concessions for those travelling by sustainable methods, including electric vehicles.



85 OECD, Effective transport policies for corporate mobility management, 2010

Transporting the Future: A Business Perspective on Future Mobility

Chapter 4: Collaboration

BARO
V34
H-67/46
6.X12

BARO
V34
H-67/46
6.X12



Chapter 4: Collaboration

A sustainable transport future for Australia requires a deliberative and ambitious shift from the status quo along a defined policy agenda. To ensure opportunities and benefits are maximised this shift should include multi-sector collaboration between and within the public and private sectors. This can and should work across a variety of scales including business inclusion in transport planning, and government catalysing business action through innovation hubs and transport management programs.

Precinct Level Management

Despite the business and community benefits demonstrated by CMM, businesses often are not motivated to change the status quo without involvement from public authorities. As an alternate to regulation, public authorities can also encourage companies to implement CMM initiatives through provision of support such as catalysing the development of transport management associations (TMAs)⁸⁶.

TMAs are non-profit, member-controlled organisations dedicated to solving mobility concerns within a particular area, such as a commercial precinct, shopping centre or education hub. They are generally public-private partnerships, consisting primarily of area businesses with local and/or regional government support. TMAs usually focus on the travel needs of large employers and are often created to give businesses a voice in local government transportation planning, to advocate enhanced mobility, and to reduce employer costs of implementing individual worksite transportation programs through economies of scale⁸⁷.

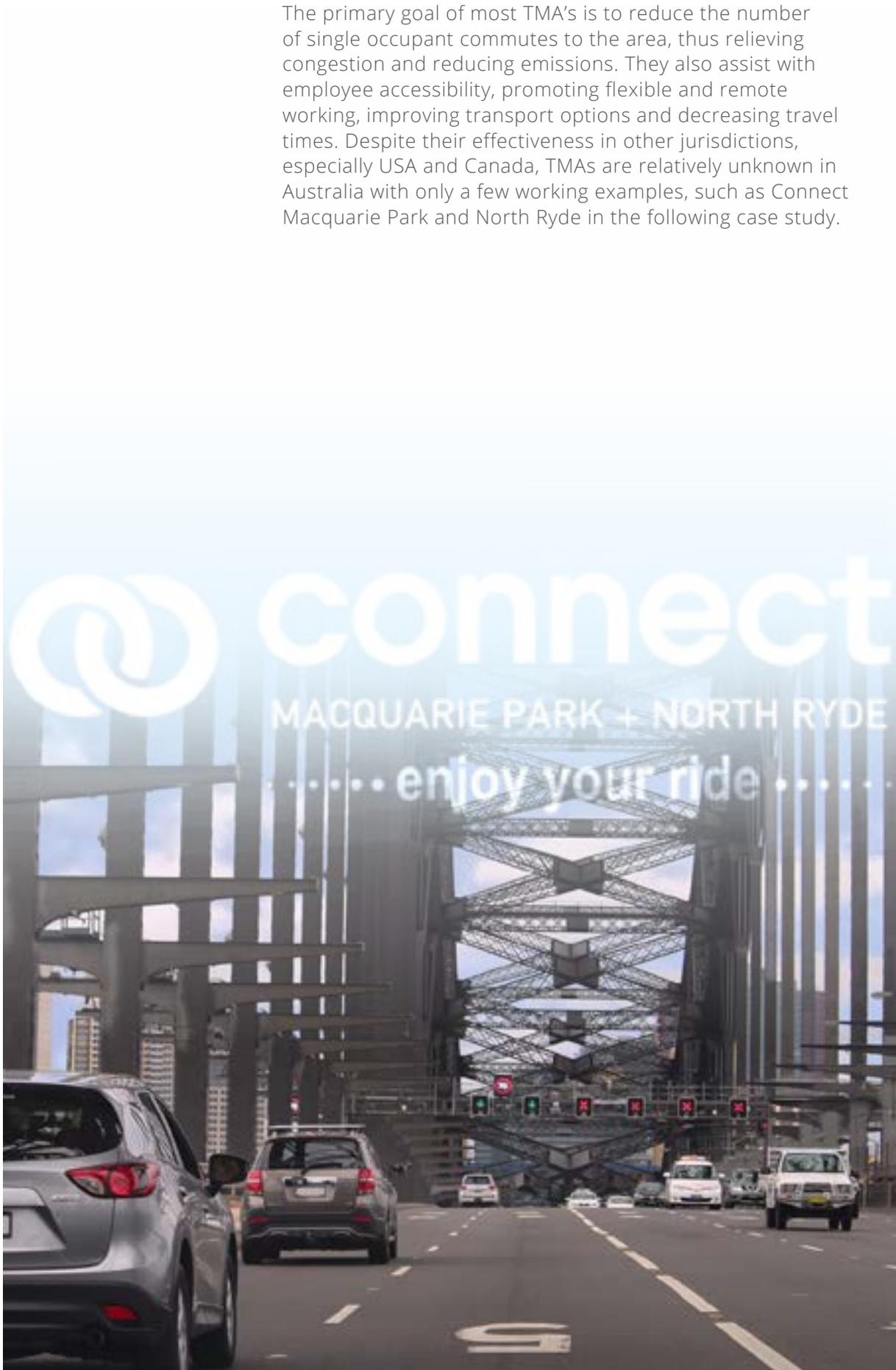
The primary goal of most TMA's is to reduce the number of single occupant commutes to the area, thus relieving congestion and reducing emissions.

TMAs are usually funded by membership fees with start-up costs seeded by governments and larger member organisations who have the most to gain. TMAs provide their members a pooled expert resource providing similar benefits to individual CMM programs but at a much cheaper cost and with further reach. This includes business specific assessments, plans, targets and monitoring, as well as solutions including infrastructure and demand management, incentive programs and information. They allow smaller sized organisations to benefit from mobility solutions that only work at scale, such as ride share schemes, EV charging infrastructure, remote working hubs and on demand buses. They also can serve as a combined voice representing their community on transport related issues to government and private transport providers and authorities.

86 OECD, *Effective transport policies for corporate mobility management*, 2010

87 Kevin Luten and David Meiklejohn, *UrbanTrans ANZ, Collaborative action for sustainable transport outcomes: transport management associations in Australia and New Zealand*, 2010

The primary goal of most TMA's is to reduce the number of single occupant commutes to the area, thus relieving congestion and reducing emissions. They also assist with employee accessibility, promoting flexible and remote working, improving transport options and decreasing travel times. Despite their effectiveness in other jurisdictions, especially USA and Canada, TMAs are relatively unknown in Australia with only a few working examples, such as Connect Macquarie Park and North Ryde in the following case study.



Case Study:

Connect Macquarie Park and North Ryde

Connect Macquarie Park + North Ryde (Connect) is the first TMA in NSW and only the second in Australia. The organisation was formed in 2013 out of a recognition that transport issues were capping productivity and the Gross Domestic Product (GDP) output of the precinct. Initially driven by Optus, BOC and Johnson & Johnson, Connect has grown into a unique public-private partnership jointly funded by membership fees from member companies, as well as grants from the City of Ryde and TfNSW. Together the Connect team now services the needs of over 63,982 commuters - representing 62% of travellers to the Park.

Connect aims to encourage commuters of Macquarie Park and North Ryde to change their travel behaviour in order to increase the efficiency of transport, reduce traffic congestion and decrease drive-alone vehicle travel for the journey to and from work. Connect collaborates with major employers on sustainable and flexible transport options, making commutes easier and improving employee productivity and retention. Connect businesses also share ideas, have a combined voice on advocacy issues, and work collaboratively on solutions to transportation challenges.

A large part of Connect's work is its member services - surveying employee journey-to-work, helping devise communication plans and assisting employees in understanding the transport options available. Whilst the focus is not primarily on hard infrastructure (barring end-of-trip facilities), Connect seeks to understand and change travel behaviour through demand management initiatives. This is heavily driven by data, collected and shared with member organisations, as well as with government agencies, allowing benchmarking between both member and non-member companies. Some recent initiatives which have come out of this include the Co-Hop carpooling platform, with nearly 2,000 members, establishment of remote co-working hubs and on-site transport kiosks. Behavioural change and wayfinding campaigns also help guide commuters onto more sustainable transport options.

The organisation has had great success. In 2016, 48% of Connect employees drove alone compared to 69% of park-wide employees driving alone. This saves 23,464 tonnes of CO₂ each year, the equivalent of taking 4,992 cars off the road.



Transport Planning and Business Involvement

For Australia to arrive at a sustainable mobility future, it needs forward looking integrated sustainable mobility plans that work across all levels of Government.

SBA and WBCSD Global Mobility Project

For Australia to arrive at a sustainable mobility future, it needs forward looking integrated sustainable mobility plans that work across all levels of Government – health, planning, social services, environment and transport departments to deliver liveable, sustainable cities in the short, medium and long term.

Governments need to involve business in both the development and execution of these plans - business is well placed to deliver much of future mobility, while government reinforces its positive role as policy driver, incubator and regulator. By collaborating from the outset, government can then enable business to do what it does best; to be entrepreneurial, innovative, be agile and invest in customer focused solutions that reinforce government's purpose to deliver its policy targets within a common framework and clearly understood goals and outcomes.

Active collaboration will help reap all the benefits and avoid the pitfalls of future mobility. For example, working together, business and government can set up a system that maximises the benefit of a seamless autonomous shared mobility system, especially in first and last mile transport, without subsuming mass transit within public transport corridors. Business can work with government to ensure new technologies are accessible to all and not just focused in more profitable areas, for example equitable location of electric vehicle charging infrastructure. Business and government can work together to form joint procurement plans that increase buying power and advance national markets for new mobility technology (see New Zealand EV Partnerships Program case study).

The Sustainable Mobility Project, of which this report is a part of, aims to do exactly that. It is a global program where business and public authorities work together to implement planning outcomes that put the city's mobility at the forefront of innovation and best practice. This collaboration works at range of scales. Globally the project framework and tools were developed through a collaboration of six pilot cities, expert mobility institutions and large transport-based businesses. At the local level, businesses and some 60 cities are using these tools to implement a coordinated planning approach to sustainable mobility, with each city learning from solutions tested and implemented in other cities. In Hamburg, engagement with the project allowed the development of fact-based, data-driven sustainable urban mobility plans based on citizens' requirements and using the expertise and solutions-based approach of local business. This included off-peak delivery systems, smart parking, dynamic traffic management, integrated bicycle plans, implementation of vehicle to infrastructure communication (V2I), green arteries and bus rapid transit⁸⁸.

88 <http://www.wbcds.org/Projects/smp2>

Case Study:

New Zealand Sustainable Business Council's EV Partnership Program

New Zealand Sustainable Business Council (SBC), the New Zealand global network partner of WBCSD, has been instrumental in the establishment of New Zealand's successful EV Partnership Program. As such, SBC's members were amongst the first businesses in New Zealand to order electric vehicles (EVs) through a pilot joint procurement scheme, launched mid-2017. SBC worked with the All of Government procurement team at the Ministry for Business, Innovation and Employment to develop the scheme, which allows the public and private sector to consolidate buying power and purchase EVs together.

The scheme is part of the EV Partnership Program, developed over three years by SBC members and government officials. It includes a national target to put 64,000 EVs on New Zealand roads by 2022 (2% of national car stock). There are now more than 5,500 EVs registered in New Zealand, smashing the incremental 2017 target of 4,000 vehicles. A leadership group of CEO's, government officials, industry groups as well as SBC meet quarterly to ensure work continues to meet the target.

The joint procurement model was needed to aggregate demand to attract new models to market. Both the public and private sectors had identified cost and the limited number of fit-for-purpose models as significant barriers to uptake in New Zealand.

85% of New Zealand's electricity is generated from renewable resources, strengthening the case for EVs. They are seen as a great way to reduce transport emissions and leverage value from this clean electricity supply. As part of the program, 30 of New Zealand's top businesses have already committed to converting 30% or more of their fleet to EVs by the end of 2019. They are prioritising emissions reduction initiatives from transport, because this area makes up a large percentage of their carbon footprint.

New Zealand now has a new government with a stronger ambition to transition to a low emissions economy. SBC will continue to work closely with government officials to ensure solutions, including EVs, will help members maintain competitiveness.



Collaborative Innovation / Accelerator Hubs

Business accelerator hubs bring together technology and expertise from complementary government, research institutions, local and global businesses, and entrepreneurs.

Business accelerator hubs bring together technology and expertise from complementary government, research institutions, local and global businesses, and entrepreneurs to identify problems and develop innovative solutions in emerging and disruptive industries. They are designed to enable synergy of the collaborative team's resources, technology, expertise and equipment that would be difficult to achieve by each organisation alone; both accelerating the pace and breadth of solutions and reducing risk.

There are several public-private partnership accelerator hubs around the world currently tackling the urban mobility challenges of congestion, emissions and accessibility through commercialisation of new technologies, including MaaS, last mile logistics and autonomy⁸⁹. Newcastle City Council has established a Smart Move Newcastle project with a consortium of technology business, including Keolis Downer and additional funding from the Federal Government. The project will include an electric vehicle hub, a driver-less bus, connected bus stops and infrastructure and a city-wide data analytics program to help people make decisions such as on when to travel or when foot traffic is high enough to warrant opening a street facing business.

In Adelaide, the state government has established a \$10 million Future Mobility Lab Fund to stimulate developments and attract economic growth in connected and autonomous vehicles and help the city with its overarching Smart City goal. Several projects have already been announced and funded including a partnership between Flinders University and eight partners to develop an autonomous student shuttle and developing a former Mitsubishi site at Clovelly Park as a trial site for a driverless cargo pod, with the aim being market-ready within a year⁹⁰.

89 For example: <http://futurecities.catapult.org.uk/urban-mobility-2/>

90 <http://driverlessvehicles.sa.gov.au>

91 <https://opendata.transport.nsw.gov.au/innovation-challenges>

Case Study:

Carpooling Innovation Challenge

Transport for New South Wales (TfNSW) has been running a series of Innovation Challenges to encourage business to work collaboratively and innovatively with the wealth of data the government agency holds, as part of their Open Data Program⁹¹.

In mid 2017 SBA hosted the Carpooling Innovation Challenge in partnership with TfNSW. The aim of the challenge is to use government data and prompt innovative thinking around digital products that could provide customers with an easy way to carpool and encourage changes in travel behaviour.

This event allowed five finalists to pitch their ideas for a carpooling application system that would promote a more sustainable transport option for NSW. A panel of judges selected the best idea that represented an intuitive, user-friendly smartphone application (app) designed to boost the increased use of carpooling. Five finalists pitched a variety of business models and target markets including commuters, business and school parents. The concept of trust as a barrier to carpooling was a common issue focused upon by many of the teams.

The challenge winner, Liftango, the ride share and on-demand bus company that markets to corporates and other organisations looking for sustainable transport solutions, received endorsement as a TfNSW preferred product.



Conclusions and Recommendations

Business is uniquely placed to be a co-collaborator in the delivery of Australia's sustainable mobility future. Perhaps without realising its influencing power, it is a conduit between government and individuals to shape the travel behaviour of employees, customers, and suppliers, as well as the public at large through the products and services that it brings to market. To take full advantage of the benefits of future mobility, the public and private sectors need to work together to catalyse business action, and ensure the right enabling environment to deliver solutions promoting a sustainable future mobility.

Recommendations are as follows:

Roll-out Transport Management Associations to collaboratively and sustainably manage travel demand at larger business precincts with transport challenges

Business parks and precincts with poor or overworked transport links can significantly impact congestion levels, journey to work times and economic opportunity for their business tenants, employees and prospective employees. This in turn can significantly impact asset values, productivity, talent attraction and retention as well as health and well-being.

State and local Government and business should work together to determine a strategy to identify and develop collaborative precinct-based travel demand management strategies, such as Transport Management Associations. This should include identifying priority precincts that have a significant transport impact, provision of start-up funding mechanisms and a governance, management and membership framework based on the successful Connect Macquarie Park and North Ryde TMA. Such a scheme should be designed to ensure the TMA is self-funded through membership fees within a defined period, such as five years.

Such priority precincts could include areas such as Sydney's Olympic Park or Norwest Business Park and Frankston or Box Hill in Melbourne.

Develop a Collaborative Corporate EV Program for Australia

Business investment and influence on their employees and customers can both significantly enhance mass demand and behavioural acceptance for electric vehicles, as shown in the New Zealand EV Partnerships Program case study. Business owns over half of all registered vehicles on the road⁹².

92 <https://www.theclimategroup.org/project/ev100>

However, there are currently many barriers to the corporate uptake of EVs in Australia, including high purchase price, limited range of available models as well as limited charging infrastructure and range anxiety. Moreover, Australia represents a small proportion of EV sales globally and as such it is very hard for a single organisation to influence car manufacturers' supply priorities. This situation is only likely to get worse for Australia as EV markets grow globally – without a clear signal that there is a significant market in Australia, larger jurisdictions will likely continue to get priority.

Governments and companies across Australia should work together to demonstrate leadership in the transition to sustainable, zero emissions road transport by setting up a collaborative EV program that includes working together, and with car manufacturers on joint procurement models and making commitments for fleet targets for electric vehicle integration for both heavy and light vehicles. By transparently setting out their future EV purchasing requirements on an ambitious timescale, companies can drive mass roll-out and make electric cars more rapidly affordable for everyone.

Establish a multi-sector business & government taskforce to ensure Australia's transition to connected, automated and electric vehicles deliver sustainable outcomes.

State Governments are starting to develop strategic planning on future mobility, such as the NSW Future Transport Strategy 2056. These should provide an integrated vision across government levels and departments outlining investments, plans and strategies, and aligning with the Sustainable Development Goals, to deliver livable, sustainable cities, in the short, medium and long term.

These plans need to involve business, both in their development and implementation. Whilst government is the policy driver and regulator, business is well placed to deliver much of future mobility. By working together from the outset, government can then rely on business to do what it does best; to be innovative, be agile and come up with customer focused solutions that helps the government deliver its policy targets within a common framework and clearly understood regulatory environment, incentives, goals and outcomes.

Government should establish a business taskforce to co-design strategic mobility plans and their implementation in order enable the sustainable transition to connected, autonomous and electric vehicles that enables the maximum safety, accessibility and productivity gains, as well as a pathway to zero carbon and other emissions. Business, both those involved in transport provision and usage, must then engage with this process, including meeting regularly over the lifetime of the strategic plans to regularly review and update agreed pathways.

Appendix

References for Figure 1:

- i Arbib & Seba, Rethinking transportation 2020-2030, 2017
- ii NRMA, Transforming mobility, 2017
- iii KPMG, Global automotive executive survey 2017
- iv Bloomberg, One in six new cars in the world will be electric by 2025, 2017
- v McKinsey and Bloomberg, An integrated perspective on the future of mobility, 2016
- vi Bloomberg, China's Fossil Fuel Deadline Shifts Focus to Electric Car Race, 2017
- vii The Guardian, All Volvo cars to be electric or hybrid from 2019, 2017
- viii The Verge, GM will make an autonomous car without steering wheel or pedals by 2019, 2018
- ix FT, Jaguar revs up electric car race with pledge to customers, 2017
- x Ford, Ford targets fully autonomous vehicles for ride sharing in 2021, 2016
- xi Car Advice, Netherlands, Norway, India looking to ban combustion-engined cars, 2016
- xii Forbes, Germany's Bundesrat resolves end of internal combustion engine, 2016
- xii Motortrend, California considers a ban on internal combustion engines, 2017
- xiii Fortune, Volkswagen to 'Electrify' All 300 of Its Cars and SUVs by 2030, 2017
- xiv The Guardian, Britain to ban sale of all diesel and petrol cars and vans from 2040, 2017

Acknowledgements

SBA would like to thank the World Business Council for Sustainable Development for their ongoing support and guidance, AGL, IAG, NRMA, Sustainable Business Council New Zealand and Connect Macquarie Park and North Ryde for their case studies, Energetics for its commentary and Kate Mackay for her advice. Finally, SBA would like to thank the Project WorkGroup for their engagement and participation in providing direction, review and guidance.

Project Lead



Report authors: Rebecca Edwards (SBA), Nick Jack (SBA), Yale Wong (PhD candidate, Institute of Transport Logistics Studies, University of Sydney Business School)

Sustainable Business Australia | wbcSD global network partner
36A Hickson Road, Millers Point (Barangaroo), NSW, 2000, Australia
+61 2 8005 0780 sba@sba.asn.au www.sba.asn.au

