

A Business Perspective on Sydney's Mobility Challenge

The SBA Sustainable
Mobility Project

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sba
Sustainable Business Australia



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DAVID JONES



JACOBS





Rohan Lund

Group CEO of NRMA

The NRMA is fixed firmly in many minds as being all about cars, but our focus on mobility has been much wider ever since our founding in 1920. In fact, the very first order of business of the organisation was to advocate for better roads – that is, improved infrastructure for everybody regardless of their modes of transport. This broad perspective has been maintained over the decades and continues today. We have lobbied tirelessly for better options for public transport patrons, pedestrians and cyclists as part of a wider solution for motorists facing rising congestion and costs. We are now widening our view even further to embrace the potential of connected and autonomous technologies to relieve this burden, especially for motorists in Western Sydney who face the highest vehicle maintenance costs in Australia.

Our cities are relatively safe and accessible by global standards but journey times do not stack up so well. Emissions are a critical issue for human health and the environment. This is why the NRMA has taken a lead role in the SBA Sustainable Mobility Project. It is important that all stakeholders across society be part of the solution to the mobility challenge, but it is essential that businesses take the lead. Businesses have clear incentives to deliver solutions in this space and are also possessed of the ability to do so in a timely and cost-effective manner. As a transport-focused mutual organisation that also operates as a business delivering 'profit for purpose', I believe the NRMA is perfectly placed to continue to be an agent of lasting change in the field of mobility – and I am committed to delivering on that potential on behalf of our staff and members as a partner in this initiative.

A handwritten signature in black ink, appearing to read 'Rohan Lund'.

Rohan Lund,

Sydney, November 2016

Our cities are relatively safe and accessible by global standards but journey times do not stack up so well.



Andrew Petersen

CEO of SBA

Sustainable mobility means better traffic flow, pedestrian access, air quality, transport choices and liveability for cities. The SBA Sustainable Mobility Project is a data-driven, multi-stakeholder approach that helps accelerate progress towards multimodal, inclusive and low-environmental impact mobility. The ultimate goal of this project is to accelerate and extend access to safe, reliable and comfortable mobility for all, whilst aiming for affordability, zero traffic accidents, low environmental impacts, and reduced demands on energy and time.

The SBA Member companies are working under the leadership of NRMA in this project to analyze Sydney's mobility situation in relation to criteria such as environmental compatibility, economic efficiency and quality of life. Based on this analysis, SBA will then develop recommendations on how business can be instrumental to improve sustainability in Sydney's transportation system. All member companies engaged in the SMP are highly committed to tackling the challenge of sustainable urban mobility. Our aim is to help cities, starting with Sydney, and strengthen their role as innovative mobility centres.

This report highlights a number of priority areas for further investigation and action by business, including: synergistic urban transformation; low-carbon energy supplies; improved modal and system efficiencies; defragmented and shortened supply chains; and investments in adaptation.

A handwritten signature in black ink, consisting of a stylized 'A' followed by a long horizontal line that ends in a small flourish.

Andrew Petersen

Sydney, November 2016

Our aim is to help cities, starting with Sydney, and strengthen their role as innovative mobility centres.

Executive Summary

Mobility is critical to a sustainable world and the achievement of many of the Sustainable Development Goals. Mobility advances development, linking people, connecting communities to jobs, education and each other, building markets and facilitating trade. In turn sustainable mobility can advance sustainable development.

The SBA Sustainable Mobility Project is a cross-sector collaboration to lead an Australian business response to the challenges and opportunities of meeting Sydney's mobility needs more sustainably. The project's aim is to explore what sustainable mobility means for Sydney and how business can bring forward solutions that can shape mobility; through collaborative engagement, innovation and new business models.

This report is the output of Stage 1 of the SBA Sustainable Mobility Project. Using WBCSD methodology and globally benchmarked mobility monitoring and evaluation framework, a baseline of Sydney's sustainable mobility performance has been established.

Sydney has a Hybrid mobility system with a mix of characteristics - an efficient mass transit system in places, but also vast urban sprawl, resulting in too heavy reliance and inefficient use of private vehicles.

- Sydney's lowest scoring indicator was for the Emissions of Greenhouse Gases at 2.7 out of 10. A low community survey satisfaction score of 23% satisfaction reflects an acute awareness of the poor carbon performance of our mobility system.
- Sydneysiders are spending an average of 66 minutes travelling to and from work, resulting in a poor score of 2.9 out of 10.
- Long commutes are exacerbated by congestion with the the lowest levels of community satisfaction (9%) relating to congestion.
- Sydney achieved a low score for Economic Opportunity from our transport system; only 34% of surveyed respondents felt satisfied that transport options are available for them to reach job opportunities, due to long, complicated and expensive commutes.

Business is both directly and indirectly impacted by these findings. Long commutes and congestion impact economic productivity, limit job growth and disrupt supply chains. Sydney's low score for the Economic Opportunity Indicator is not only impacting Sydneysiders' quality of life, but it is also having a negative impact on business talent attraction and retention, and ultimately business growth.

The impacts of climate change on business are well understood. Following the 2015 Paris Agreement, all sectors have agreed to a roadmap of concerted action through mitigation and adaptation. With transport responsible for 16% of Australia's carbon emissions, all stakeholders must be part of the imperative to decarbonise the mobility system. Business is no exception.

What is Sustainable Mobility?

Mobility is about access, connecting people to opportunities - goods, services, activities and destinations. It focuses on people, their quality of life and the advancement of economic and social development, rather than the traditional transport focus on vehicles and infrastructure. Avoided or reduced need for travel are as important as modes of travel. Sustainable mobility is then defined as the ability to meet society's mobility needs in a manner that is safe, affordable, accessible, efficient, and resilient, while minimizing carbon and other emissions and environmental impacts.

Sustainable mobility is a driver of sustainable development

Mobility is critical to a sustainable world and the achievement of many of the Sustainable Development Goals¹. Mobility advances development, linking people, connecting communities to jobs, education and each other, building markets and facilitating trade. In turn sustainable mobility can advance sustainable development².

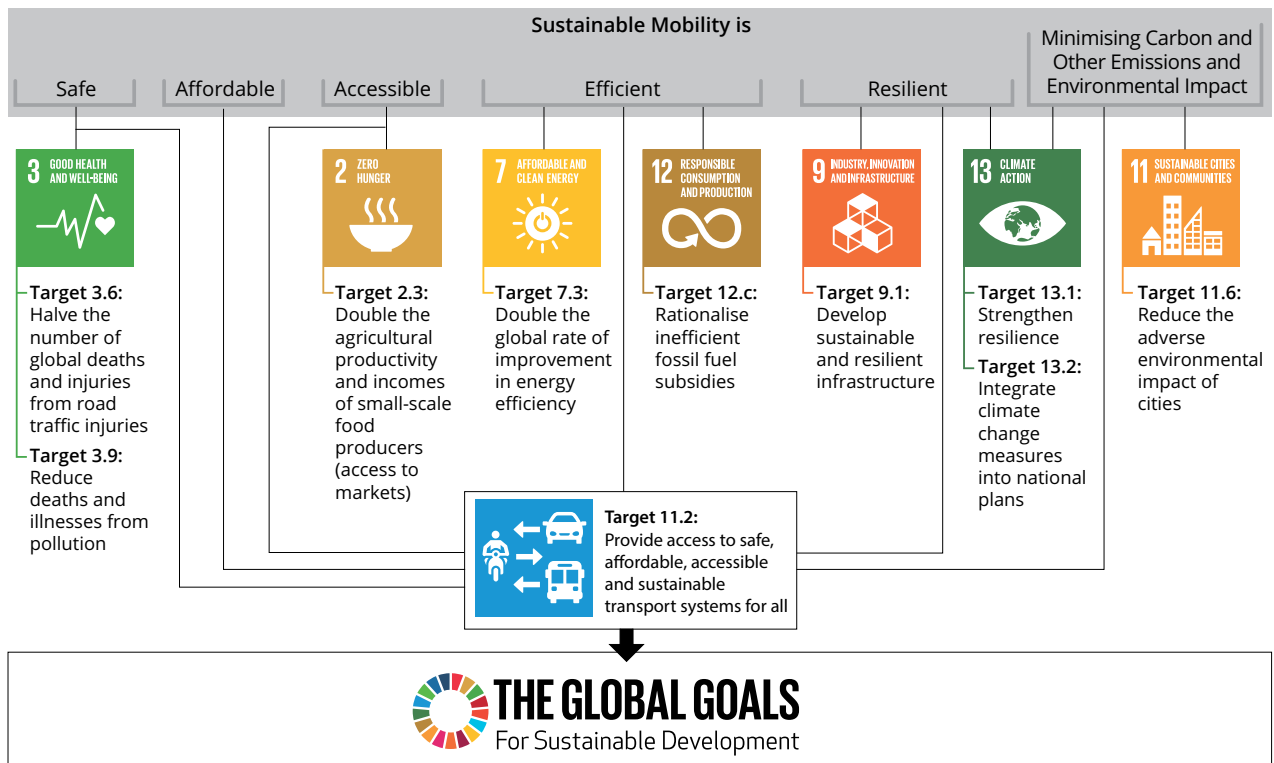


Figure 1: Sustainable mobility impacts on achieving the SDGs, showing connections with SDG11, adapted from UN Sustainable Transport Report¹

The mobility landscape is changing rapidly.

Urbanisation, demographic change, global supply chains, big data, digital connectivity, advances in propulsion technology, as well as the climate change imperative put an unprecedented array of challenges and opportunities in the achievement of sustainable mobility, both in Sydney and globally.

In 2015, traffic congestion cost the Australian economy around \$16.5B, 1% of GDP, resulting from lost time and fuel, the increased cost of doing business and health impacts of air pollution³. These figures do not include the societal and economic cost associated with greenhouse gas emissions and our increasingly sedentary lifestyles.

1 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/>

2 Mobilizing Sustainable Transport for Development: Analysis and Policy Recommendations from the United Nations Secretary-General's High-Level Advisory Group on Sustainable Transport, October 2016.

3 BITRE, Traffic and congestion cost trends for Australian capital cities, Information Sheet 74, BITRE, Canberra, 2015

Urban sprawl has resulted in greater distances between home, work, schools, shops and services, increasing our nation's car dependency; today 70% of Sydney-siders will reach their destinations using private vehicles⁴. Australia's car fleet lags much of the world on fuel economy and our import bill on fuel and oil exceeds \$20B per annum⁵.

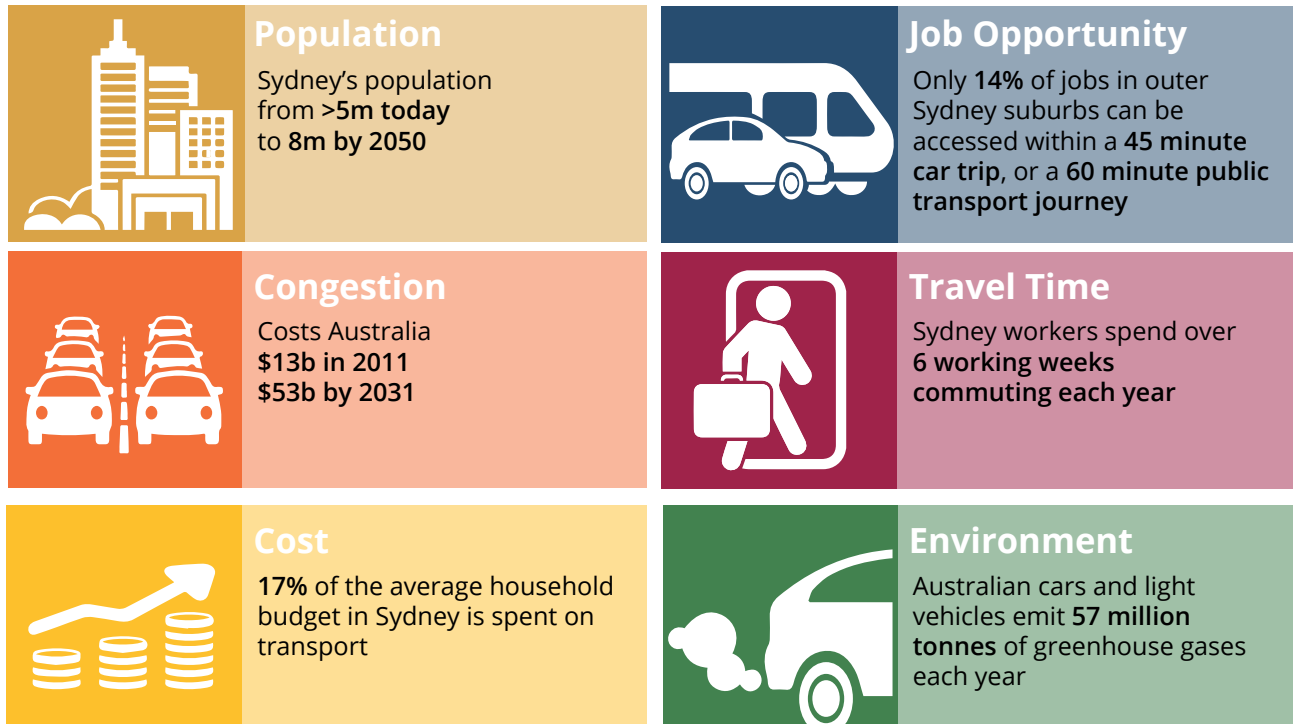


Figure 2 : Sydney's mobility challenge. Data from: McKell Institute, 2016; ACOLA, 2015; Australian Automobile Association 2016; SBA SMP Analysis; The Conversation, 2015; Climate Change Authority 2014

Yet new, more sustainable, mobility solutions are rapidly emerging globally. Car-sharing, ride-hailing, driverless vehicles, electric vehicles, micro-transit, on-demand buses, collaborative freight and many other developments are promising an unprecedented array of mobility options. So, with Sydney's population likely to grow by over 50% to 2050, from almost 5m today to over 7.8m, what kind of future do we want for Sydney's mobility system?

Business involvement in the mobility challenge

A sustainable mobility future for Sydney requires a bold shift from the status quo, one which includes multi-sector collaboration between and within the public and private sectors. Why? Because business can play a significant and purposive role to realise such a change. Smart and multi-stakeholder policy development, innovation, technological improvement, developing and scaling up new business models and leading behavioural change will be integral components.

The SBA Sustainable Mobility Project

To work such a future, the SBA Sustainable Mobility Project is a cross-sector collaboration to lead an Australian business response to the challenges and opportunities of meeting Sydney's mobility needs more sustainably. The project's aim is to explore what sustainable mobility means for Sydney and how business can bring forward solutions that can shape mobility; through collaborative engagement, innovation and new business models.

The Project is chaired by SBA Member, NRMA and the Work Group includes SBA Members, AGL, David Jones, Energetics, Jacobs, IAG, KPMG, the National Australia Bank, Presync and Unilever. The project also received financial and data support from Transport for NSW.

⁴ TfNSW Household Travel Survey 2015

⁵ ABS, 5302.0 - Balance of Payments and International Investment Position, Australia, 2016

Our Vision

- To accelerate and extend access to safe, reliable and comfortable mobility for all
- Whilst aiming for affordability, zero traffic accidents, low environmental impacts, and reduced demands on energy and time

Our Goal

- Lead an Australian business response to the challenges and opportunities of meeting Sydney's mobility needs more sustainably

Our Objectives

- Understand how business can shape mobility
- Identify mobility business solutions that will create societal value

SBA, as the Australian global partner with the World Business Council on Sustainable Development (WBCSD), is inter-connected in the WBCSD's global sustainable mobility project methodology, creating it within the Australian context. The WBCSD global mobility project is a data-driven, multi-stakeholder approach that helps cities accelerate progress towards multimodal, inclusive and low-environmental impact mobility. Now tested in nine cities around the world over the past three years, the WBCSD methodology has already led to the development of Sustainable Urban Mobility Plans in Europe, India, China and Brazil.

Report structure

This report is the output of Stage 1 of the SBA Sustainable Mobility Project. Using WBCSD methodology and internationally recognised mobility monitoring and evaluation framework, a baseline of Sydney's sustainable mobility performance has been established.

Subsequent analysis by the SBA Sustainable Mobility Project will concentrate on business solutions to the mobility challenge and how those solutions can be scaled and implemented.

The chapters in this report are:

- **Sydney's mobility challenge in the global context:** A comparison of Sydney and international cities using a mobility categorisation model based on characterisation of their mobility systems.
- **Setting a baseline – how well does Sydney perform?** The results of Sydney's urban mobility performance against a series of indicators. In addition, the chapter presents the results of a survey to determine the level of community satisfaction against each of the indicators.
- **Business and the mobility challenge:** Under the context of the conclusions of this study, how business fits into solving the mobility challenge.



Sydney's Mobility Challenge in the Global Context

A city's character and its mobility system are intertwined. The dominant transport modes heavily influence the density and plan of a city. With time mobility systems become a complex mix of modes that reflect the historical development of a city.

City mobility cluster analysis

The WBCSD global mobility project has utilised a city mobility cluster analysis, developed by international mobility expert Professor Jeff Kenworthy⁶, that characterizes cities based on the performance of their mobility system. The analysis uses 59 descriptors covering transport supply and impact, mobility and investment as well as general city descriptors. It has compared cities according to their level of economic development and population density and has identified six clusters with common mobility features as shown in Figure 4.

The city clusters are identified as Non-motorised, Paratransit, Traffic saturated, Auto-dominated, Hybrid and Transit. In general, as cities develop they move along an arc in Figure 4, beginning in the top left quadrant (Non-motorised) and widening as it curves to the right (to Transit or Hybrid). Transit cities are seen to have the greatest level of sustainability maturity⁷.

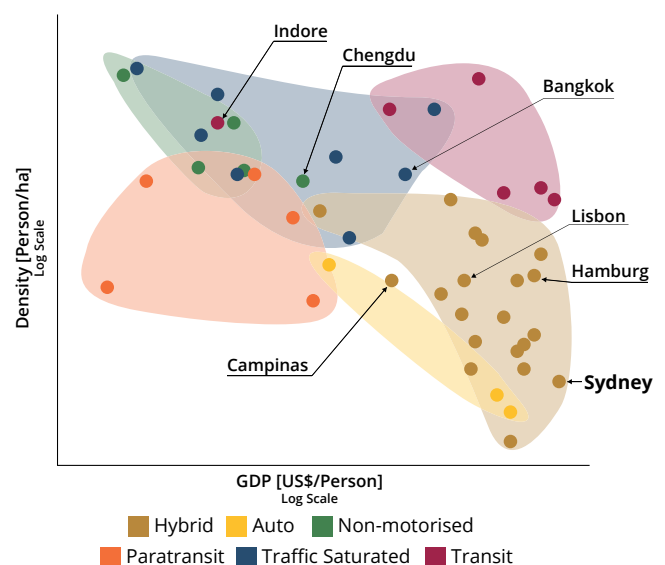


Figure 4: City clusters plotted against GDP per capita and urban density. Adapted from *Integrated Sustainable Mobility in Cities – A Practical Guide*, WBCSD, 2016

⁶ Mobility cultures in megacities, Technische Universität München on behalf of Institute for Mobility Research (ifmo), 2010

⁷ *Integrated Sustainable Mobility in Cities – A Practical Guide*, WBCSD, 2016

Sydney is a Hybrid city

Sydney is characterised as a Hybrid city. Hybrid cities have a consolidated, dense urban core extending to the inner suburban areas, with good infrastructure and significant usage of public transport and non-motorised modes. However, they are surrounded by a vast and sprawling suburban area, which is largely car-dependent.

The SBA Sustainable Mobility Project gathered data for Sydney to enable comparison between Sydney and the six city clusters across the following five mobility and sustainability characteristics:

- Energy use for passenger transport;
- Transport Speed;
- Modal split - by both distance and by trip;
- Air polluting emissions specific to transport; and
- Distance travelled.

The comparison between Sydney and the city cluster analysis is shown in Figure 5.



Figure 5: Comparison of key mobility characteristics between Sydney and the City Cluster Analysis



Sydney aligns with the indicator results for Hybrid cities for the majority of the measured characteristics including high transport related energy use and a car dominated modal split.

Sydney's energy use per passenger per year is slightly less than the Hybrid city average. However, whilst it is significantly less than that for Auto-dominated cities such as Houston, it is three times that of the average for the Transit cities cluster, such as Hong Kong. This is due to Sydney's reliance of more energy intensive transport modes, lower numbers of passengers per vehicle and greater distances travelled in Sydney compared to Transit cities.

This corresponds with the modal split by distance graph, which shows that Sydney's proportion of kilometres travelled by private vehicles is slightly less than the average for the Hybrid city cluster and significantly less than the average for Auto-dominated cities. However, Sydney is still very reliant on cars with usage rates approximately twice that for Transit cities.

Where Sydney deviates from the Hybrid cluster is in air pollutant emissions, with Sydney achieving lower levels of the transport derived pollutants measured that are more similar to a Transit city. This is consistent with other studies on Sydney air quality trends and likely to be attributed to Sydney's relative isolation compared to other global cities^{8,9}.

Shared challenges with other Hybrid cities

The City Cluster Analysis highlights four shared challenges to improving sustainability in Hybrid cities⁵:

- High emissions of greenhouse gases due to the dependence on fossil fuels;
- Poor reliability of supply chains due to long journey times and congestion;
- Inefficient investment in mobility infrastructure due to complexity of mobility system; and
- Poor social and cultural integration associated with inequity of access to the mobility system.

Sydney's specific mobility performance that contribute to these characteristics are investigated in more detail in the next chapter.

8 Air Quality Trends in Sydney, Office of Environment and Heritage, 2014

9 Barter, P., Kenworthy, J. and Laube, F. Lessons from Asia on Sustainable Urban Transport, in Low, N.P. and Gleeson, B.J. (eds.) Making Urban Transport Sustainable (Basingstoke UK: Palgrave- Macmillan), 2003

Setting a Baseline – How does Sydney's Mobility System Perform?

The first step in responding to Sydney's mobility challenge is to understand the specific characteristics of Sydney's mobility system and establish a baseline of mobility performance.

Indicator methodology

The SBA Sustainable Mobility Project used the monitoring and evaluation framework from the WBCSD's global mobility project. It is a data-driven assessment, using a comprehensive set of 19 urban mobility indicators to evaluate a city's mobility system objectively and identify the priority areas to focus mobility improvements.

The urban mobility indicators are presented in Figure 6. The indicators are a result of a collaboration between the members of WBCSD's global mobility project, the Ghent University, the Organisation for Economic Cooperation and Development (OECD) and the International Transport Forum (ITF)⁶. They have been endorsed for use by the European Commission¹⁰.

	Indicator name	Description
Economic success	Commuting travel time	Commute time to work
	Economic opportunity	Transport options available to reach work / education opportunities
	Net public finance	Sustainable revenue generation from transport
	Urban functional diversity	Proximity of shops and facilities
	Mobility space usage	Amount of land used by transport infrastructure
Global environment	Emissions of greenhouse gases	Well to wheels emissions from transport
	Energy efficiency	Availability of energy efficient transport options
	Congestion and delay	Delays at peak compared to free flow conditions
	Opportunity for active mobility	Availability of footpaths and bike lanes

	Indicator name	Description
Mobility system	Comfort and pleasure	On public transport
	Security	On public transport
	Intermodal integration	Ability to link between multiple transport modes
Quality of Life	Affordability	Of public transport for the poorest group
	Accessibility	For mobility-impaired groups
	Air polluting emissions	From transport
	Noise hindrance	From transport
	Fatalities	From transport
	Access to mobility services	Distance to public transport
	Quality of public area	Presence of enjoyable public space

Figure 6: Urban mobility indicators

The indicators span four dimensions: quality of life, economic issues, global environment and mobility system performance. They are derived from a vision of sustainable mobility rather than short term demands, they provide balanced coverage of mobility performance and are neutral to transport mode and technology.

Each indicator is calculated according to clearly defined formulae, using data from existing government transport information sources, GIS analysis and citizen surveys. The methodology is open source and found at the WBCSD/ mobility website¹¹.

The indicators were calculated for the greater Sydney metropolitan area and a list of all data sources used in their calculation is found in the Appendix.

The SBA Sustainable Mobility Project was able to source data for all indicators with the exception of Opportunity for Active Mobility. This indicator is assessed through spatial measurement of GIS data and the project was unable to source a complete GIS set of all footpath data for greater Sydney metropolitan area in the available timeframes. This will be further investigated as the project progresses and it is anticipated that the indicator will be able to be presented in future project reports.

10 <http://www.wbcd.org/Projects/Sustainable-Mobility-Project-2.0/News/The-European-Commission-endorses-WBCSD-set-of-indicators-to-help-cities-advance-sustainable-mobility>

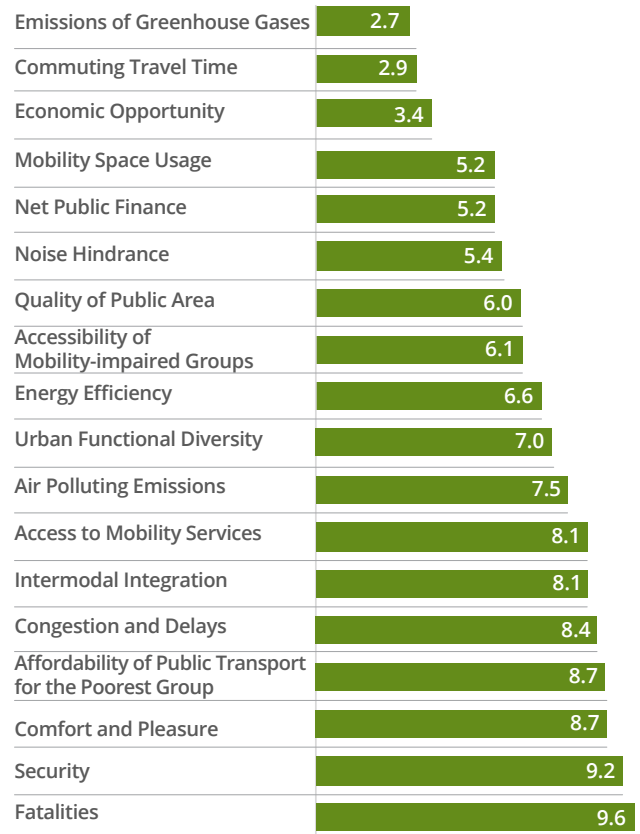
11 SMP2.0 Sustainable Mobility Indicators – 2nd Edition, WBCSD, 2016

Indicator analysis results for Sydney

The results of the indicator analysis for Sydney are presented in Figure 7. The results of each indicator are presented on a scale of 0 to 10, where 10 represents best practice from a sustainability point of view. Sydney performs well for a number of the indicators with over 9 scoring at least 7 out of 10 or more.

The best performance was recorded in the Fatalities category, with a score 9.6 out of 10. This reflects a significant reduction in the number of transport-related fatalities in Sydney over the last 20 years, but it should be remembered that the scores are calculated in a global context and that every city should be striving for a 10. It is also noted that the project used data from 2015 and that the rate of transport-related deaths in Sydney has risen during 2016.

Security, Comfort and Pleasure and Intermodal Integration all achieved high scores due to high levels of satisfaction on these issues in the Transport for NSW surveys that were used in their calculation. Affordability also scored high, calculated as the cost of 60 public transport trips of one fare zone as a proportion of the average monthly household income of the poorest population quartile.



Indicator Analysis Score 0-10, Low -High

Figure 7: Urban mobility indicator analysis results for Sydney

Sydney also achieved a relatively high score for Congestion and Delays. Measuring congestion is not straight forward with no single internationally accepted method. The WBCSD methodology measures congestion as a ratio of peakperiod travel time to free-flowing travel time for major commuting routes weighted by volume of passengers. Using data from Google Traffic, the Project measured peak time commutes as an average of approximately 160% of free flowing traffic conditions. Using the methodology, this percentage increase is not considered to be high on a global scale. However, it should be noted that the methodology does not take overall commuting travel time into consideration in the calculation of this indicator.

Sydney also scores very poorly for several of the indicators. Commuting Travel Time, Emissions of Greenhouse Gases and Economic Opportunity all achieved scores under 3.5 out of 10 and these are discussed in more detail on the next page.



Community survey on indicator satisfaction levels

The SBA Sustainable Mobility Project also ran a survey with NRMA on community perceptions of levels of satisfaction and importance of each of the indicators. NRMA sent the survey to 10,000 of its members in the greater Sydney metropolitan area and received over 1000 responses. The results of the satisfaction survey are presented in Figure 8. The results of the indicator analysis are also repeated in Figure 8 for easy comparison with the survey results.

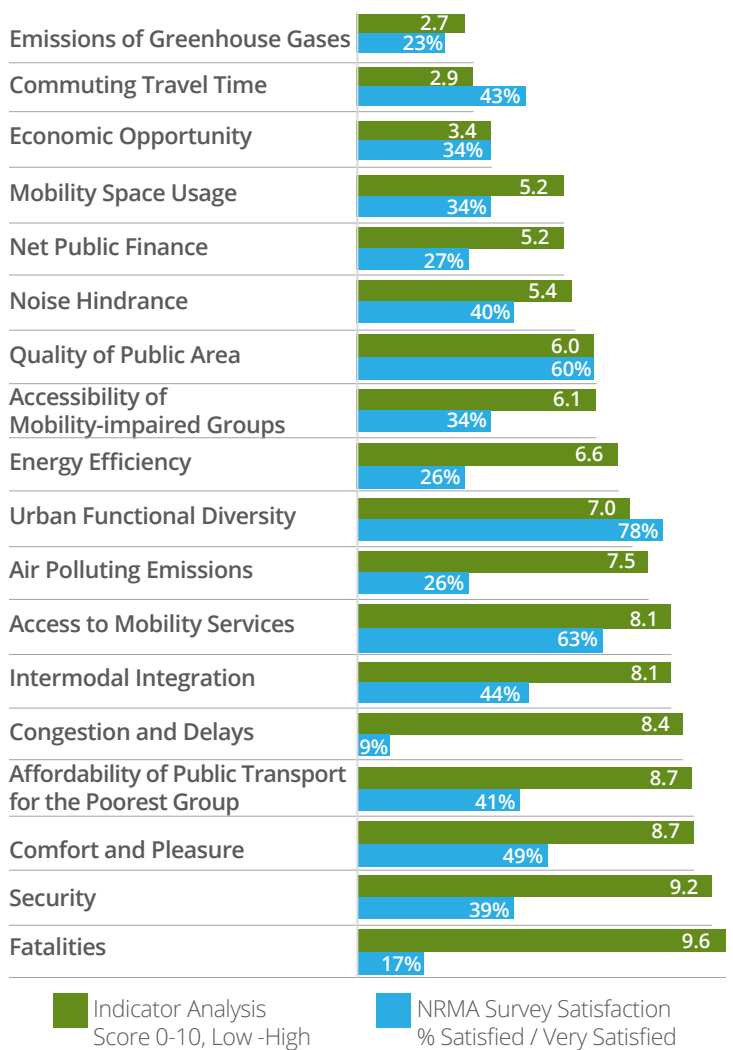


Figure 8: NRMA member survey results compared with the mobility indicator results for Sydney

Community satisfaction levels show congruence with several of the indicator analysis scores; with low scores in all analysis undertaken for Commuting Travel Time, Emissions of Greenhouse Gases and Economic Opportunity; and mid scores for Noise Hindrance, Quality of Public Area and Urban Functional Diversity.

However, there are also several indicators where perception differs significantly from performance, including Fatalities, Security, Comfort and Pleasure, Affordability, Air Pollution and Energy Efficiency. In part this is likely to reflect high community expectations around these areas compared to global performance averages.

Priority Indicators

Using both the indicator analysis results and the NRMA survey results we have identified five priority indicators for Sydney as identified in the box below.

Sydney's Priority Indicators

Greenhouse Gas Emissions

Motorised transport accounts for 16% of Australia's greenhouse gas emissionsⁱ. In Sydney, the high proportion of trips taken by car, combined with poor vehicle efficiency, mean that cars are responsible for 65% of transport greenhouse gas emissions and are the largest contributor to our high overall per-capita mobility-related greenhouse gas emissions of 2.8 tonnes/yearⁱⁱ. As such, the very low score of 2.7 out of 10 achieved for this indicator is no surprise and the low NRMA survey satisfaction score of 23% reflects an acute awareness of the poor carbon performance of our mobility system.

Commuting Travel Time

Sydneyiders are spending an average of 66 minutes travelling to and from work, noting that many people having a much longer commuteⁱⁱ. This has resulted in a very low score for this indicator of 2.9 out of 10. Satisfaction levels in the NRMA survey were also low for commuting, averaging at 43% satisfaction across Sydney and decreasing to 31% in upper north and north-west Sydney.

Economic Opportunity

Economic Opportunity, the perception of potential difficulties in accessing the job and/or education opportunities due to the mobility network, achieved a very low score of 3.4 out of 10. Survey respondents provided further detail on why they were dissatisfied with this indicator as described in Figure 9, showing that long commutes were a significant issue contributing to this low score. This performance of this indicator has the potential to significantly affect business through talent attraction and retention impacts.

Congestion and Delays

On average, during peak travel periods Sydney commuters experience delays that add an additional 60% travel time compared to free-flowing conditionsⁱⁱ. Whilst not severe by international standards, it significantly contributes to Sydney's already long commuting times. In addition, the NRMA survey showed very low levels of community satisfaction relating to congestion with only 9% satisfaction with Sydney's congestion levels, decreasing to 4% in upper north and north-west Sydney. Through lost productivity, congestion results in a direct significant cost to both GDP and individual businesses and, as such, it has been identified as a priority indicator.

i National Greenhouse Gas Inventory ii From indicator analysis

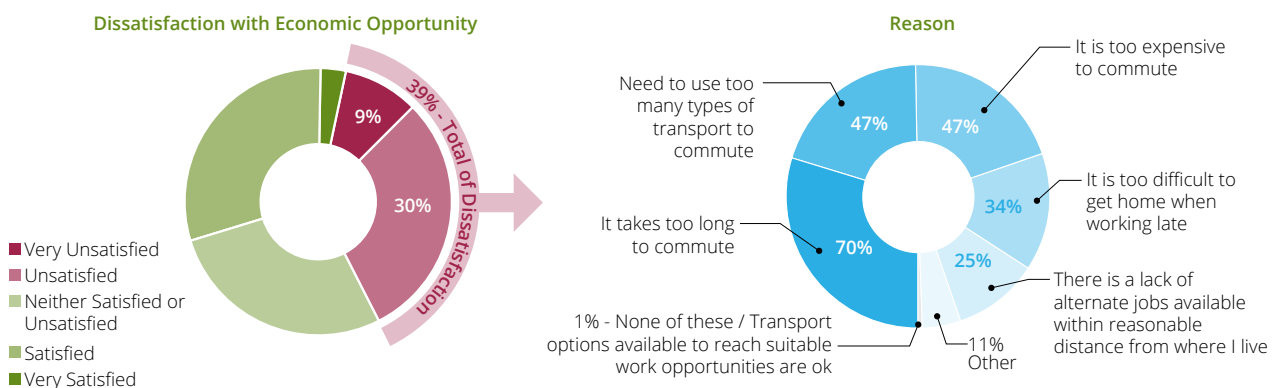


Figure 9: Surveyed reasons for dissatisfaction with economic opportunity

Collaboration is seen as key to effect the inevitable industry-wide changes that are needed to enable Sydney's mobility future to be sustainable.

Conclusions of analysis

Sydney has a Hybrid mobility system with a mix of characteristics - an efficient mass transit system in places but also its sprawling nature has also resulted in heavy reliance on private vehicles, with cars accounting for 69% of all trips.

The results of the work undertaken in this Project show that Sydney's mobility system has many sustainability challenges that are typical of its Hybrid city characterisation:

- High reliance and inefficient use of private vehicles have resulted in a carbon intensive mobility system with Sydney achieving its lowest scoring indicator for the Emissions of Greenhouse Gases.
- Long journey to work times that are exacerbated by congestion are likely to impact economic productivity and have resulted in a low proportion of Sydneysiders feeling satisfied that they are able to access job opportunities.

Business is both directly and indirectly impacted by these findings. Long commutes and congestion impact economic productivity, limit job growth and disrupt supply chains¹². Sydney's low score for the Economic Opportunity Indicator is not only impacting Sydney-siders' quality of life, but it is also having a negative impact on business talent attraction and retention, and ultimately business growth.

The impacts of climate change on business are well understood¹³. Following the 2015 Paris Agreement, all sectors have agreed to a roadmap of concerted action through mitigation and adaptation. With transport responsible for 16% of Australia's carbon emissions, all stakeholders must be part of the imperative to decarbonise the mobility system. Business is no exception.

¹² Traffic Congestion's Economic Impacts: Evidence from US Metropolitan Regions, Urban Studies, 2014

¹³ <http://www.wemeanbusinesscoalition.org/reports>

Business and the Mobility Challenge

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 economy¹⁴. Whilst all stakeholders — government, business, civil society and the community — must be part of the transition to solve the mobility challenge, the SBA Sustainable Mobility Project makes the case that business can and should take a leadership position.

Moreover, Australian businesses agree with us; the Project has started an extensive and comprehensive stakeholder dialogue with business to listen to business mobility needs, challenges, opportunities and risks and understand how business can unite to affect change. Project engagement is being undertaken through surveys, interviews, a series of roundtables as well as ongoing discussions with our corporate Project WorkGroup¹⁵.

In this first stage of engagement, we asked business what their most important needs and challenges were relating to mobility and how they would like to be involved in business solutions to the mobility challenge. Selected results are presented below.

The businesses and business sectors we engaged recognised the need for a strategic commercial response in a fast moving mobility environment. This applies to all sectors, not just those directly involved in transport. It also extends through the supply-chain with a need to review and optimise how and where goods and services are delivered from source to customers.



Figure 10: Business engagement results: Business mobility needs and challenges

Almost all the businesses we talked to said that employee commutes and travel within business hours were one of the most important aspects of mobility to their business. Whilst increasing flexibility in work hours and arrangements is seen as an inevitable and positive contribution to sustainable mobility from reduced journeys to work and smoothing out peak travel times, it was recognised that it needs to be accompanied by supporting operational and technological changes.

To gain executive engagement and investment in such changes, business needs to understand its return on investment both on flexible working and other mobility initiatives. The cost of congestion to the economy is understood but what does it cost an individual business? What is the financial impact on a business of either long journeys to work or a community perception of low economic opportunity?

Next Steps – Identifying business-led mobility solutions

The Project has set a baseline of sustainable mobility indicators that can be used to shape future mobility solutions and track progress. Taking account of Sydney's baseline performance, and in particular the identified priority indicators, the next stage of the SBA Mobility Project focuses on identifying business-led solutions to the mobility challenge as well as the steps needed to implement these within an Action Plan. Beyond this, the Project will promote rolling out and scaling up of

14 Deloitte, The Future of Mobility, 2015

15 A list of all stakeholders included in Project engagement is included in the Appendix.

these solutions, creating links to existing Australian mobility initiatives and corporate programs and accelerating policy to Government to address business and societal mobility needs.

Business solutions to the mobility challenge	In Own Value Chain	Engage with employees, customers, community and other stakeholders on their mobility needs, incentivise to change behaviour
	In Collaboration	Collaboration is key to identifying solutions, address historical corporate approach to competitiveness and risk to achieve this
	Advocating to Government	Business can lead, aggregate a voice on mobility, provide clarity and articulate industry wide problems

Figure 11: Business engagement results: Business involvement in mobility solutions

Business wants to get involved. Collaboration is seen as key to effect the inevitable industry-wide changes that are needed to enable Sydney's mobility future to be sustainable.

Feedback

The SBA Sustainable Mobility Project is interested in any feedback regarding this report, the project in general or any requests to get involved in the process. Please contact us at sba@sba.asn.au.

Appendix

Source Data for the City Characterisation

	Graph	Source
Sydney	City Cluster Overview	Australian Bureau of Statistics (2014)
	Energy Use for Passenger Transport	End Use Energy Intensity In Australia, Office of the Chief Economist, 2015
	Transport Speed	NSW Bureau of Transport Statistics, 2015
	Modal Split by Trips	TfNSW Household Travel Survey 2012-2015
	Modal Split by Distance	TfNSW Household Travel Survey 2012-2015
	Distance Travelled by Capita and GDP	TfNSW Household Travel Survey 2012-2015 Australian Bureau of Statistics (2014)
	Air Pollutant Emissions	Div. I Transport, Postal and Warehousing, Carbon Dioxide Emissions, Kyoto - Economic Sector Accounting, Department of Environment and Energy, 2013 Survey of Motor Vehicle Use, Australian Bureau of Statistics (2014) National Pollutant Inventory
Clusters	All graphs	Mobility cultures in megacities, Technische Universität München on behalf of Institute for Mobility Research (ifmo), 2010

Source Data for the Indicator Analysis

	Indicator name	Parameter	Data Input	Source
Economic success	Commuting travel time	Average duration of the combined outward journey and return journey to work or an educational establishment expressed in minutes per person per day	Average work trip duration	TfNSW (HTS, 2013)
	Economic opportunity	Citizens' perception of potential difficulties in accessing the job market due to mobility network	Survey	NRMA (2016)
	Net public finance	Net government and other public authorities' revenues from transport-related taxes and charges minus operational and other costs per GDP; investments are excluded from the parameter calculation	Sydney GDP	SGS (Australian Cities Accounts, 2014)
			Sydney transport costs/revenue	New South Wales Auditor-General's Report (2014)
	Urban functional diversity	Average presence of 10 spatial functions related to daily activities except for work in grids	Functional diversity	Manual Count, Google Maps (2016)
			Population density	Australian Bureau of Statistics (2011)
	Mobility space usage	Square meters of direct and indirect mobility space usage per capita	Population	Australian Bureau of Statistics (2014)
			Land use	NSW Government Spatial Services

	Indicator name	Parameter	Data Input	Source
Global Environment	Emissions of greenhouse gases	Tonne CO2 equivalent well-to-wheel emissions by urban transport per annum per capita	Population	Australian Bureau of Statistics (2016)
			Vehicle distance travelled	ABS, Survey of Motor Vehicle Use (2014)
			Sydney transport passenger task	BITRE (2013)
			Ferry emissions	IPART (2014)
			GHG emission factors	Australian National Greenhouse Accounts (2015)
	Energy efficiency	Total energy use by urban transport per passenger km and tonne km (annual average over all modes)	Vehicle distance travelled	ABS, Survey of Motor Vehicle Use (2014)
			Passenger distance travelled	BITRE (2013)
			Urban road freight	BITRE (2013)
			Fuel consumption factors	Australian National Greenhouse Accounts (2015)
	Congestion and delay	Weighted average per trip of the ratio of peak period travel times to free-flowing travel times and travel time adherence of public transport during peak hours on up to 10 major corridors for both transport modes	Traffic volume	Roads and Maritime Service (2016)
			Trip time	Google Live Traffic (2016)
			Train performance	Sydney Trains (2016)
			Bus performance	Sydney Buses (2015)
Total motorised passenger task (i.e. modal split)			BITRE (2013)	
Mobility System	Comfort and pleasure	Average reported satisfaction about comfort of city transport and of pleasure of moving in the city area	Survey	TfNSW (2015)
	Security	Reported perception about crime-related security in the city transport system	Survey	TfNSW (2015)
	Intermodal integration	Reported quality of interchange facilities between different transport modes referring to integration of organization of the subsystems and the physical quality of the interchange facilities	Survey	TfNSW (2015)

	Indicator name	Parameter	Data Input	Source
Quality of Life	Affordability of public transport for the poorest group	Affordability index public transport for the poorest population quartile based on the relation between the cost for 60 relevant public transport trips and the average monthly household income	Modal split	TfNSW (HTS, 2015)
			Cost of fare	NSW Transport (2016)
			Average income of lowest quartile	Australian Bureau of Statistics, 2011 Census (indexed to 2016)
	Accessibility for mobility impaired groups	Average reported convenience of city transport for target groups	Survey	NRMA (2016)
			Survey	TfNSW (2015)
	Air polluting emissions	Total tailpipe harmful emission harm equivalent per year per capita (NOx and PM10)	Vehicle distance travelled 1	Australian Bureau of Statistics (2014)
			Emission factors	Australian National Greenhouse Accounts (2015)
			Modal energy intensity	Toyota Motor Corporation and Mizuho Information & Research Institute, Inc. (2004)
			Pollution equivalence factor	EMEP/EEA (2014)
			Ferry emissions	IPART (2014)
	Noise hindrance	Percentage of population hindered by city transport noise based on hindrance factors for noise level Lden measurements	Noise	All publicly available TfNSW and RMS projects noise impact assessments
			Population density	Australian Bureau of Statistics
	Fatalities	Number of deaths within 30 days after the traffic accident as a corollary of the event per annum caused by urban transport per 100,000 inhabitants	Road fatalities	Transport for NSW (2014)
			Rail fatalities	Office of the National Rail Safety Regulator (2014)
			Population	Australian Bureau of Statistics (2014)
	Access to mobility services	Percentage of population living within walking distance of public transport (stop or station) or shared mobility (car or bike) system	Access to bus service	Transport for NSW (2008)
Population of bus contract regions			Bureau of Transport Statistics (2014)	
Access to train service			NSW Department of Planning (2006)	
Quality of public area	Reported social usage of streets and squares and subjective appreciation of the public area quality	Survey	NRMA (2016)	

Organisations Included in Project Engagement

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