



Final
June 2023

Electrification of Transport in the City

Strategy and Action Plan

We acknowledge the Gadigal of the Eora Nation
as the Traditional Custodians of our local area.

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Modelling and technical analysis for the development of this strategy and action plan was undertaken by SGS Economics and Planning with Kinesis.

Electrification of Transport in the City Strategy and Action Plan Technical Report 2022.

This is available at www.cityofsydney.nsw.gov.au/consultations

1. Introduction

1.1 A strategy and action plan to reduce transport-related emissions by electrifying transport in the city

The Electrification of Transport in the City: Strategy and Action plan ('strategy and action plan') outlines the approach of the City of Sydney (the 'City') for electrification of transport fleets within our local government area ('local area', 'area').

This strategy and action plan identifies key areas of action to electrify vehicle (EV) fleets in the immediate to short term and that are within the City's control or that the City can aim to influence. The strategy aims at 2035, with the action plan for today and for the next five years.

Why we need this strategy and action plan

The City of Sydney is expected to grow – both in residents and in people that visit the city to work, study and play. Transport currently accounts for some 20 per cent of greenhouse gas emissions in the local area and is projected to increase as a proportion of overall emissions. Without intervention, we are not going to be able to sufficiently reduce our transport-related emissions.

Our community has told us they want to respond to climate change. They want a city with improved air quality, and reduced emissions including carbon dioxide (CO₂), NO_x and noise, especially in high density and high activity areas. They want fewer cars and less congestion – and for vehicles to be electric.¹ They want more public transport,

We are committed to being a net-zero city by 2035. Transformation to net-zero emissions within our area by 2035 will require a significant shift in transport to walking, cycling and public transport, as well as the electrification of vehicle fleets and greening of the grid.

walking and cycling. We have committed to this in *Sustainable Sydney 2030–2050 – Continuing the Vision* and in the *Community Strategic Plan – Delivering Sustainable Sydney 2030–2050*.

Vehicle electrification is only part of the solution

These commitments and the city's anticipated growth require a shift away from private vehicles, which have high emissions and require significant space for movement and for parking when not in use. The biggest impact we can have to reduce transport emissions is to facilitate a shift to walking, cycling and public transport.

However, not all trips can be taken this way. Some people are not able to walk, ride a bike or use public transport easily or for all trips. Much servicing and freight activity will continue to occur via vehicles. The electrification of vehicles, particularly high-impact fleets such as delivery and service (commercial), taxis, point-to-point (ride-share services) and car share vehicles, along with private vehicles, is necessary to reduce transport emissions. There are also additional benefits of reduced noise, localised air pollution and running costs. The average NSW driver will save about \$1,000 per year in running costs by switching to an electric vehicle.²

Electric vehicles have zero air quality pollution or greenhouse gas 'tailpipe' emissions in operation. However, greenhouse gas emissions are produced in the extraction, processing, and transport of resources to manufacture and power vehicles, known as 'well-to-wheel' or 'life cycle' emissions.

The energy and minerals used to make electric vehicles is often taken out of context. The International Energy Agency³ shows comparative life-cycle greenhouse gas emissions of a mid-size battery electric vehicle is less than half of an equivalent internal combustion engine vehicle.

An electric vehicle will be lower life-cycle emissions to a fuel alternative after around a year or two of driving⁴. The emissions associated with manufacturing and using electric vehicles will continue to decrease as more renewable electricity comes online. The Australian Government expects the national electricity grid to be 82% renewable by 2030.

There are also innovations underway in battery technologies that reduce or avoid the need for precious minerals, expand the energy density (which means smaller batteries with more power), and improve recyclability. The commonwealth, state governments, and the electric vehicle industry must ensure that recyclability and circular economy systems are central as markets expand.

Although the overall life-cycle emissions of electric vehicles may be less than internal combustion engine vehicles, the total environmental impact of car production and usage means that the uptake of electric vehicles should not be pursued above the City's ongoing goals to reduce car use and prioritise walking, cycling and public transport.

Private vehicles, electric or otherwise, are inefficient in space. Charging infrastructure for these vehicles cannot be at the detriment of the public realm.

Electric public transport and reducing emissions associated with public transport activities are an essential part of this transition.



Photographer: Mark Metcalfe / City of Sydney

The role of the City

This strategy and action plan supports the transition to electric vehicles in the immediate future, within the framework of the City's aspirations to be "a city for walking, cycling and public transport" (the strategic framework is outlined in Section 1.8).

The City needs to develop a balanced approach to any role in organising and supplying charging opportunities, infrastructure and power supply for the transport fleets in the local area. Historically, the City does not take responsibility for refuelling internal combustion engine transport fleets in our area. There is a role to facilitate charging given the City's strong support for electrification of transport – and to support our advocacy for it to happen well in advance of the aspirations of other levels of government in Australia – but the City must also consider the appropriate role of local government in the transition (Section 1.4) and the competing demands for the City's funds and resources.

To manage this balance, the City is facilitating and enabling the transition to electric vehicles in a way that respects local context, urban form, residents, visitors, businesses, and is embedded within the longer-term strategic vision and objectives for the city.

1.2 Aim of the strategy and action plan

We are aiming for all vehicles that operate in our local government area to be zero emissions (tailpipe and greenhouse gas) by 2035, as part of achieving net-zero emissions.

The City's research indicates the current biggest barriers to having an electric vehicle are availability and affordability, especially for commercial vehicles.

The NSW Government estimates that "currently, the average EV [Electric Vehicle] sold into the NSW market is about \$28,000 more expensive than the average petrol or diesel car."⁵ Potential factors for the price gap include the relatively small size of the Australian market compared to other markets such as Asia and Europe, and to the initial higher cost of new technology such as batteries. The cost of electric vehicles in the medium to longer term has the potential to be cheaper than petrol and diesel vehicles if: battery costs decrease with technology and scale; and capital costs decrease with increased scale of production particularly as electric vehicles are more standard and have significantly fewer parts. Maintenance and running costs are already lower for electric vehicles with fuel costing about a third of petrol/diesel vehicles.

With the City aiming for all vehicles and public transport operating in its area to be zero emissions by 2035, decisive action by the Australian Government is needed for 100 per cent of vehicle sales to be zero emissions by 2030. This will require the right Australian and NSW tax and policy frameworks to enable this to happen, much of which is outside of the City's control.

Fleet turnover will then take Australia towards a fully zero-emissions fleet in the next decade.

This strategy and action plan is necessary to identify areas where the City can facilitate this transition. The main way is to ensure sufficient charging opportunities – from various sources and for various fleets – to enable the transition to fleet electrification to proceed smoothly.

1.3 Principles for the equitable electrification of transport in the city

The transition to electric vehicles needs to be equitable and inclusive, supporting access to electric vehicle fleets for those who need them without entrenching the economic, social and place⁶ costs of private vehicles.

We have a responsibility and opportunity to shape and prepare future actions to support broader liveability, sustainability, productivity and inclusion outcomes, while being proactive and action focused.

We encourage the uptake of electrification in transport fleets but not at the detriment to inclusion, access and quality of place, and access to walking, cycling and public transport infrastructure.

Equity in the electrification of transport within the city includes equity of access to electric vehicles and to electric vehicle charging, as well as the broader aspects of equity of access to electric public transport and to public space. It also encompasses the equity aspects of imposing the ongoing costs of car ownership on residents, and of using public resources to support owners of electric cars. This strategy aims to balance these competing needs, with a focus on equitable solutions for the community, residents, businesses and visitors. The principles guiding this strategy and action plan are shown in Box 1.

Box 1: Principles for the electrification of transport in the city

We will be guided by the overall City strategy to encourage a shift in modes of transportation

The City's *Sustainable Sydney 2030–2050 – Continuing the Vision* and supporting plans and strategies outline the way we will work to reorganise the planning and operation of transport systems. This will reduce emissions by reducing the amount of driving and creating an improved baseline for electrification to take us to net zero.

Protect the public domain – public space is not the place for fuelling vehicles

The city's public places are vital to achieving our *Sustainable Sydney 2030–2050 – Continuing the Vision* goals. Public street space is too important to allocate for fuelling vehicles – with petrol or electricity.

Go early, but take the community with us

The City has a strong commitment to net-zero emissions by 2035. We want to get there in ways that the community will support and remain committed to informing and engaging our community.

Strong leadership

The City's aim has always been to lead, serve and govern well. True leadership in this area involves understanding complex issues and making decisions based on the evidence. It also means identifying opportunities and using all levers, including advocacy, to influence the Australian electric vehicle policy framework.

Focus on high-exposure fleet

People on the city's busy streets are exposed to emissions, noise and pollution. Large fleets like buses and point-to-point vehicles account for a high proportion of vehicle kilometres travelled in our area and are responsible for a large amount of emissions; they also have the scale and commercial opportunity to transition to zero emissions quickly.

Ensure new development is ready for electric vehicles

Combining parking and vehicle charging makes sense. Many new commercial and residential buildings are being developed. It makes sense to use the planning system so building parking is "EV ready" from day one.

Be inclusive, no special access for electric vehicles except for charging

As electric vehicles are currently very expensive, more affluent people will be the ones who drive most of them. Until costs become more reasonable, we will not worsen inequity by preferencing electric vehicles on roads or at the kerbside, except to provide access to the limited amount of public charging.

Expect the market to do the heavy lifting – vehicle refuelling is not a community obligation

Providing fuel to private vehicles has always been a commercial undertaking. Providing electricity for charging should be the same, a new market opportunity rather than an obligation of any level of government.

Aspire for multiple options to protect choice, build resilience and redundancy

The future of charging is difficult to predict, with commercial approaches and technology evolving rapidly. The system will develop with the most choice – and the most resilience and capacity – if multiple options for publicly accessible off-street charging exist.

1.4 Roles and responsibilities in the electrification of transport fleets

The City does not control many aspects related to the electrification of transport fleets, including transport sector emissions, fleet turnover and low-emission vehicle availability and uptake.

We do have roles in the planning and development in our area; working with and providing guidance to residents and businesses; implementing changes to our streets and roads (working with the NSW Government); and in managing and enforcing kerbside arrangements such as parking.

We also have a leadership role and in influencing and working proactively with the Australian and NSW Governments.

The Australian Government is responsible for developing a national plan for zero-emission vehicles. It controls industry development and import systems, vehicle standards, research and development, and taxation. It is responsible for the framework for national approaches to electric vehicle charging, including direct investment in the national highways. It is responsible for national resilience, on issues such as fuel security and would have a lead role in introducing vehicle fuel efficiency standards. The Australian Government has announced forthcoming policies to support the uptake of electric vehicles in Australia. These are in development and evolving as this strategy and action plan is being adopted. Announcements include the development of a national electric vehicle strategy, policies to make electric vehicles more affordable by reducing tax, a fast-charging network with chargers every 150 kilometres on highways, the conversion of the Commonwealth's fleet to 75 per cent no-emission vehicles by 2025, and a plan to support low-emission freight vehicles. In early 2023 the Australian Government released a consultation paper on fuel efficiency standards with the aim of introducing standards for new cars by the end of 2023. The City will continue to advocate for broader emissions standards, including for last mile delivery vehicles. Complimentary targets and incentives on par with the USA and Europe are also required to reduce emissions from transport.

The National Electric Vehicle Strategy released in 2023 also outlines that the Australian Government is consulting to consider the case for mandatory Acoustic Vehicle Alerting Systems for light electric vehicles in Australia, to reduce potential pedestrian collisions.

The NSW Government is responsible for road pricing and public transport and has the majority of control of traffic management. It is responsible for developing a network for vehicle charging stations in NSW. They have committed to net-zero emissions by 2050 and are developing programs to accelerate the uptake of zero-emission technologies, including providing electric vehicle charging at destinations and in areas with limited off-street parking. They have committed to co-fund 500 kerbside charge points to provide on-street charging in residential streets where private off-street parking is limited and to co-fund electrical upgrades in some 125 apartment buildings with more than 100 car parking. They are proving grants for fast charging to accelerate the rollout of charging stations and for providing more charging in high-density areas with the aim of having around 500 fast EV charging bays (at 250 stations) across NSW. The first grant round (of three) was awarded in late 2022 for 86 stations, including two stations in our area (Alexandria and Eveleigh)⁷. Each station will have between 4 and 15 bays, with a minimum of two ultra-fast charging bays and two fast charging bays. The NSW Government is also committed to electrify its buses and fleet vehicles – contributing to an important second-hand market.

The NSW Government enacted electric vehicle charging provisions in *State Environmental Planning Policy (Transport and Infrastructure) 2021* in early 2023. One of the features is to enable residents without off-street parking to install their own charging infrastructure in the public domain, outside their homes, with a development application. The City is exploring the planning and development issues resulting from this. Such charging infrastructure will be subject to the City's current approach to on-street parking, and the City will not reserve kerbside parking for private vehicle chargers.

The City is partnering with the NSW Government to build a bicycle network and reallocate road and kerbside road space for walking, cycling and public transport. We will continue to advocate for public transport powered by renewable energy and to support public domain improvements around public transport stations and stops.

1.5 A strategy and action plan embedded in our local context

This strategy and action plan is designed to suit our local context. The city has a mix of housing and land-use types; good walking, cycling and public transport networks; an extensive car share network; and relatively low private car ownership.

The plan also reflects the distinctive village areas that make up the city. The availability of different charging types to facilitate the uptake of electric vehicle fleets will be different for different fleets and in different parts of the city.

Contexts and needs within our area for electric vehicle charging

This strategy identifies the following primary contexts and needs within our area for EV charging:

1. *Charging for public transport (buses).* This will occur at depots, largely outside the local area, and is the responsibility of the NSW Government. This will require coordination between the bus operators and the grid operators.
2. *Charging for commercial vehicles.* This will occur at depots and other origins, largely outside the local area, or in the southern industrial and urban services lands within the local area. There may be some need for destination or 'on-route' charging. This should occur off-street such as in publicly accessible charging facilities and destination parking.
3. *Charging for taxis, car share and point-to-point vehicles.* The operators of these fleets are responsible for the charging of these fleets. Indications are that they will transition swiftly, when electric vehicles become more available, due to the savings in running costs.⁸ The City has a role to facilitate this.
4. *Charging for private vehicles, residents and visitors:*
 - Publicly accessible charging off-street. This is already occurring in our area, such as charging at retail destinations and hotels, within car parks (including two City of Sydney car parks) and at charging facilities such as those provided by the NSW Government grants and in the near future at service stations.
 - Private charging off-street. This is already occurring in residential and commercial facilities. There is a large role for the City to play in using planning controls to make sure that new developments are "EV ready", and in assisting existing developments to electrify their buildings and provide charging as appropriate. Many of our residents have access to on-site parking, either a garage, driveway or dedicated parking space, and will charge there for the reasons outlined in Section 1.3. Commercial facilities such as offices are providing electric vehicle charging for employees. This can be facilitated through the planning system to ensure new office buildings provide charging facilities in any car parking provided.
 - Charging for residents without on-site parking, or easy access to off-street parking or publicly accessible off-street charging. The City has a role to play in facilitating these residents to transition to electric vehicles and can play a short-term, leadership role, including by focussing initiatives such as the trial of pole-based charging to these areas.

Different types, speeds and charging times of current charging technology are provided in Section 4.3.

Modelling of use and uptake of electric vehicles in our area demonstrated that most people will be able to charge off-street at their homes (in their driveway, garage or in a dedicated parking bay), at work, at a depot or at another off-street charging location such as a publicly accessible charging facility.

Current and planned electric vehicle charging in the local area

In June 2022, there were around 120 publicly accessible electric vehicle chargers in our area. The availability and type of chargers are rapidly increasing.

The NSW Government has committed to fund and co-fund publicly accessible charging, particularly in areas with lower amounts of off-street parking, at destinations and along key routes.⁹ They announced two charging stations in our area (Alexandria and Eveleigh) as part of the first funding round in late 2022.¹⁰ The NSW Government's target is "to add approximately 250 fast and ultra-fast charging stations in total across NSW, ensuring chargers are no more than 5km apart in metropolitan areas and no more than 100km apart on major roads and highways across NSW."¹¹ Retail locations, public car parks and companies such as NRMA and other private organisations are already providing charging.¹² Service stations are starting to provide electric vehicle charging. The NSW Government and Plug Share both provide maps of publicly accessible chargers.¹³



Photographer: Asad Rajbhoy / City of Sydney

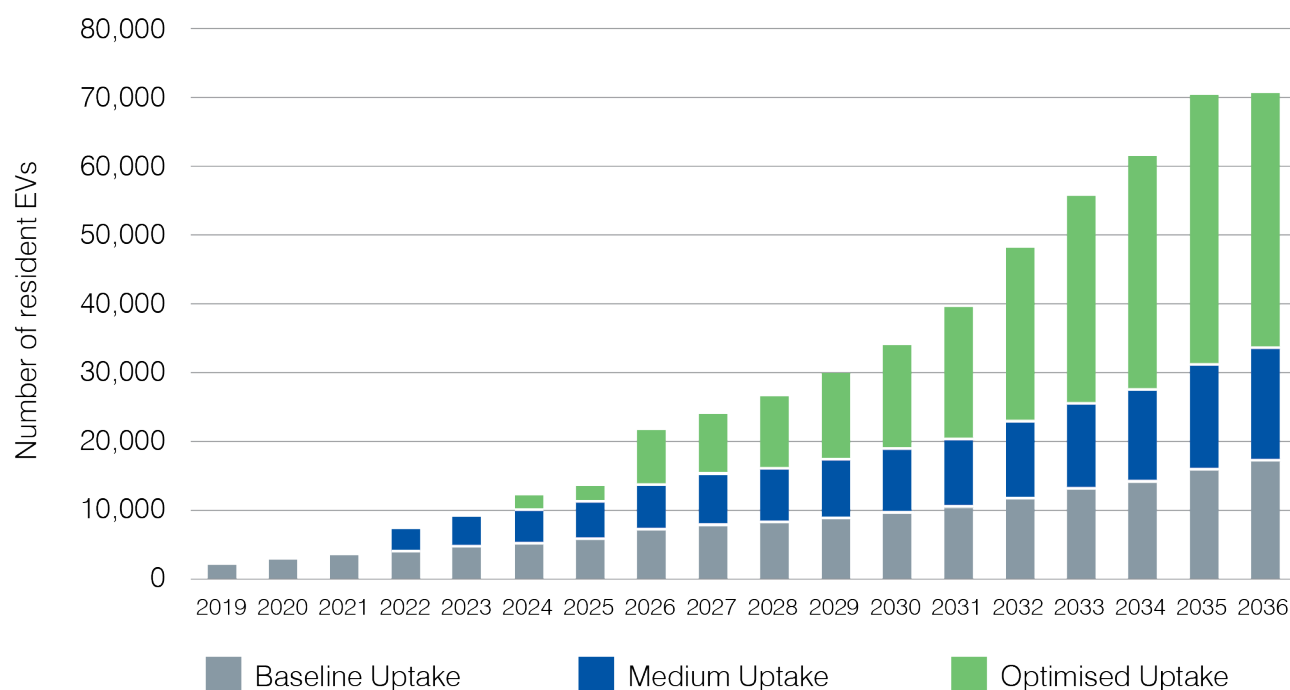
What residential electric vehicle use are we planning for?

Box 2 provides a summary of the modelling undertaken by SGS Economics and Planning with Kinesis to support the development of this strategy and action plan.

There are relatively low levels of car ownership in our area; around 65,000 vehicles for around 246,300 residents in 2019.

About 37 per cent of households in the 2021 Census reported not owning a car. The proportion of residents that do not own a car in our area is increasing. While gross vehicle ownership is growing due to the growth in residents and jobs, it is not predicted to grow at the same rate as residential and commercial growth. This is due to the established nature of our city, our dense urban form of around 9,000 people per square kilometre,¹⁴ walkable streets, access to public transport and our planning controls and parking policies. This liveable, dense and relatively connected urban form is suitable for car sharing for many households.

Figure 1. Residential electric vehicle uptake forecasts



Source: SGS Economics and Planning with Kinesis (2022)
Electrification of Transport in the City Strategy and Action Plan Technical Report¹⁵

Based on recent patterns in car ownership from 2016 to 2021 and on the projected growth in dwellings, residential car ownership in our area is predicted to grow from 65,000 vehicles in 2019 to around 71,000 vehicles in 2035. For the predicted 44 per cent increase in dwellings, there is only predicted to be an 8 per cent increase in private vehicles.

City residents currently drive on average around 9 to 10 kilometres per day. Increasing densification, mixed-use development and improvements to public transport, walking and cycling infrastructure and networks will result in this figure reducing over time.

In 2022, 5 per cent of vehicles in the local area are electric. Under natural uptake, based on current government settings, this will grow to around 45 per cent of vehicles by 2035. Figure 1 provides the

projected uptake of electric vehicles using the NSW Government policy and strategies as a baseline, the uptake under the NSW Government's and Federal Government's policies and an optimised uptake of 100 per cent of vehicles being electric.

This strategy and action plan aims to avoid any restrictions to City residents owning electric vehicles because of access to charging. This will require a flexible approach to respond to the rapidly evolving technology, availability and public policy environment.

We are planning for, and facilitating, a rapid uptake: aiming for 100 per cent of vehicles in our area to be electric by 2035.

Most electric vehicles can drive at least 200 kilometres before needing to charge. Ranges are rapidly increasing, with newer models able to travel 400 kilometres on a single charge. The NSW Government provides a database on the range and charging needs of various available electric vehicles.¹⁶

Most private vehicle drivers in the local area will need to charge once every two to four weeks, assuming an “empty to full” charge.

Many residents will charge at home at an off-street parking space. Car ownership and use varies across the City’s villages, and so does the availability of on-site parking at homes, including driveways, garages and dedicated parking spots.

Figure 2 provides the levels of residential car ownership and availability of residential off-street parking in the local area. Figure 3 demonstrates the variance in car ownership and off-street parking access across the city, with some areas having more off-street parking than vehicles and some areas having higher vehicle ownership than off-street parking (see Box 3).

For those that charge at home, this would add around 10 per cent to the average household electricity consumption, equivalent to \$100 per year in electricity costs.

Box 2. Key findings from the technical analysis and modelling.

SGS Economics and Planning with Kinesis undertook best practice research, technical analysis and strategic insights to support the development of this strategy and action plan.

The technical analysis and modelling considered and forecast the uptake of electric vehicles for all vehicle fleets operating in the city for three different uptake scenarios: baseline (current policy settings), medium (more supportive policy settings based on the announced but not implemented Federal Government policy, noting that the 2022 Federal election occurred during the modelling) and optimised (‘100 percent’) uptake. For the three scenarios, by 2035:

- Baseline uptake: around 17,000 resident electric vehicles
- Medium uptake: around 31,000 resident electric vehicles
- Optimised uptake: around 71,000 resident electric vehicles.

Vehicle ownership and parking arrangements vary across the City of Sydney villages. Most residents will be able to charge at home at a dedicated parking spot, or at work. Some residents do not have access to a dedicated

parking spot and will need to use publicly available charging to fuel their vehicle. Visitors and commercial vehicles may need to charge on route while they are in the city.

Based on the modelling, in 2035, the following publicly accessible chargers may be required:

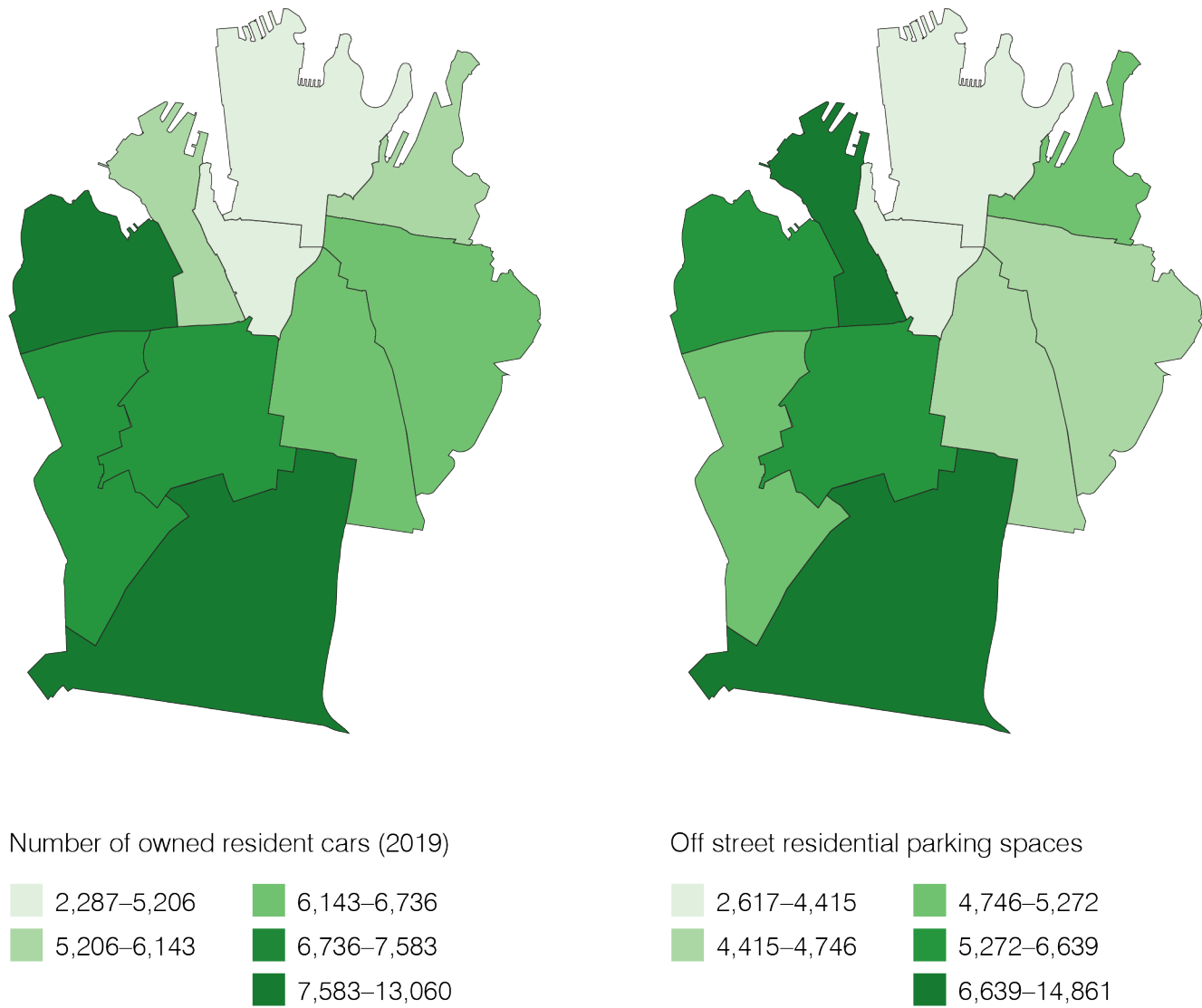
- Baseline uptake: 50-100 publicly accessible chargers
- Medium uptake: 100-150 publicly accessible chargers
- Optimised uptake: 200-350 publicly accessible chargers.

These numbers are an estimate only. They are not a cap, and there may be additional provision as commercial operators seek market share. The City will monitor the availability of public charging over the life of the Strategy and Action Plan to assess if further action is required to support the Net Zero transition.

In July 2022, there were around 120 publicly accessible chargers in the city, although they are not evenly distributed with most currently clustered in the central area.

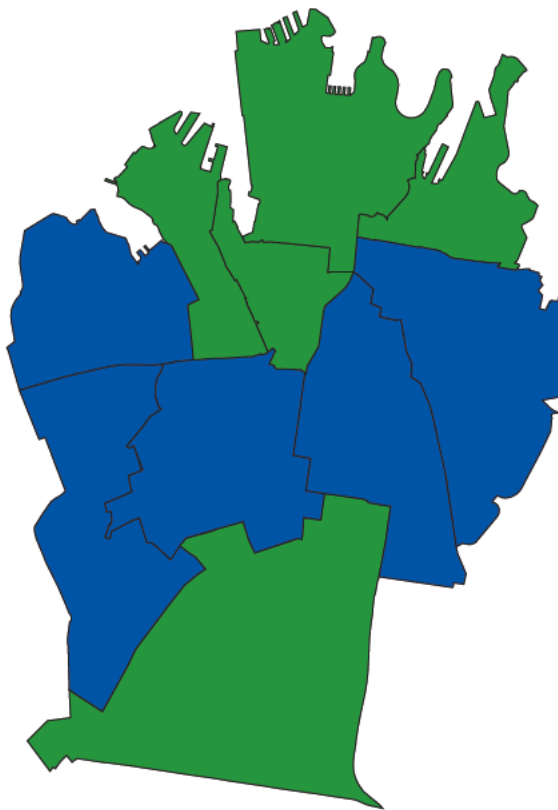
The technical report is available [\[Link\]](#).

Figure 2. Residential car ownership (left) and residential off-street car parking (right)



Source: SGS Economics and Planning with Kinesis (2022)
Electrification of Transport in the City Strategy and Action Plan Technical Report

Figure 3. Off-street parking available compared to vehicle ownership¹⁷



Difference between owned resident cars and off-street parking spaces

- More cars than off-street parking
- More off-street parking than cars

Box 3. Residential parking in the city

There are around 61,000 off-street residential car parking spaces across the city. However, availability and access to off-street parking is not evenly distributed across the local area due to different types of development. Some areas, such as Pyrmont and Green Square, have greater amounts of off-street parking than some areas with more terrace housing, such as Surry Hills, Glebe and Millers Point.

There are more than 45,000 on-street parking spaces across our local area, with a range of access including restricted, non-restricted, permit and non-permit. We issue some 13,400 residential permits for residents to access on-street parking. This equates to around 20 to 40 per cent of residents needing to park on the street in some areas such as Macleay Street and Woolloomooloo Village, Newtown and parts of Glebe and Surry Hills. However, not all residents that need to park on the street need a permit to do so as kerbside parking restrictions vary across the city, for example someone who drives to work outside of the City of Sydney could park over night on their street if parking restrictions ended at 6pm and didn't start until 8am the next morning.

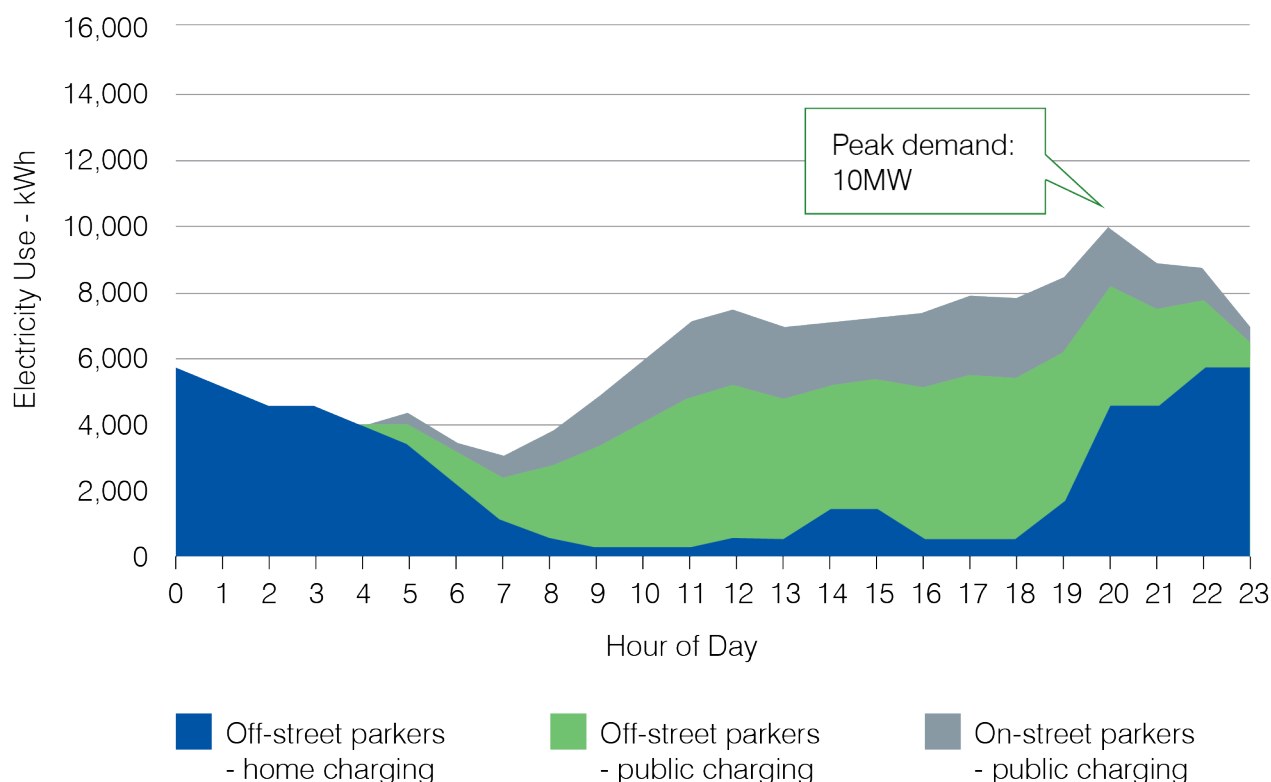
What visitor electric vehicle use are we planning for?

In 2019, there were some 92,000 vehicle trips to work per day to the city. This is expected to grow to about 100,000 by 2035. Significant investments in public transport and cycling infrastructure are assisting this relatively low expected growth.

11 per cent of people drive to work in the city centre, however this varies across the local area, e.g. 57 per cent in the Green Square and City South village area. Most commuting-related vehicle trips are in the range of 5 to 10 kilometres. About 10 per cent of journey to work trips are attributed to local residents.

While there will be an additional 200,000 jobs in our area by 2036, the share of work related transport trips taken by driving to work is not predicted to increase accordingly, due to the above-mentioned investment in public transport, walking and cycling.¹⁸ Most driving visitors to our area in electric vehicles will charge at their origin or during their trip, as they do currently. There is likely a need for some limited 'top-up' charging at their work or end destination. Most people visiting the city by car for work or recreation park their vehicle at a public parking station, their work or another commercial car park, such as a retail destination. There are about 25,000 off-street commercial office car parking spaces across the city, 1,600 off-street retail car parking spaces and 25,000 public car parking spaces. Off-street commercial and public parking are not evenly distributed across our local area.

Figure 4. Predicted electricity use based on 100 per cent of residential vehicles being electric and the mix of charging requirements for residents



Source: SGS Economics and Planning with Kinesis (2022)
Electrification of Transport in the City Strategy and Action Plan Technical Report

Predicted energy impacts

Based on current Australian and NSW Government policies (Scenarios 1 and 2 in Figure 1), we estimate electric vehicles will add 16 per cent to the total annual residential electricity demand of our area in 2035. Under a 100 per cent take up, electric vehicles would increase residential electricity demand by 36 per cent. To put this into perspective, new residential buildings are expected to increase the current residential electricity demand by 40 per cent in 2035. At the same time, the grid is expected to green rapidly, meaning that emissions will be significantly reduced despite increasing demand for electricity.

Most residential charging occurs at home, overnight. Publicly accessible charging has a different profile, with users charging through the day. Figure 4 illustrates a mix of charging profiles based on assumptions of publicly available charging use and at-home charging.¹⁹ The indicative increase to peak demand across our area would therefore be minimal; however, there would be variances across substations and charging technology.

Larger electricity-use fleets, such as buses, will charge at depots. There are 30 to 40 bus depots across Greater Sydney. The electrification of bus depots is the responsibility of the NSW Government and the electricity authority, including any upgrades to the grid required.

1.6 Timeframe of the strategy and action plan

A strategy for 2035, an action plan for today and the next five years.

Electrification of transport, both in fleet uptake, availability and charging technology is rapidly evolving. This strategy and action plan will enable us to adapt to the rapidly changing environment in the short term, with a longer-term view of the next 10 to 15 years with the growth of electric vehicle use and the associated infrastructure.

The availability and affordability of electric vehicles along with fleet turnover means that this is a time of transition. The average vehicle has a useful life of 15 years. People purchasing a vehicle now are unlikely to purchase a new vehicle for a few years. Some fleets are anticipated to turnover much quicker, such as car share, taxis and uber-type vehicles, referred to as point-to-point. Operational cost savings will drive this transition, especially as upfront price parity between electric and internal combustion models is reached.

This strategy and action plan is to provide support for the transition at this crucial point in time. The City assumes this strategy and action plan will need to be reviewed after five years to determine whether any new actions are necessitated by the rapid evolution. Eventually electric vehicles will become business as usual and a continuous strategy to support electric vehicle uptake should not be needed.

1.7 Exclusions

This strategy and action plan does not cover the technology of charging, type of chargers or business models for providing charging.



Photographer: Nyasha Nyakuengama
/ City of Sydney

1.8 Strategic framework

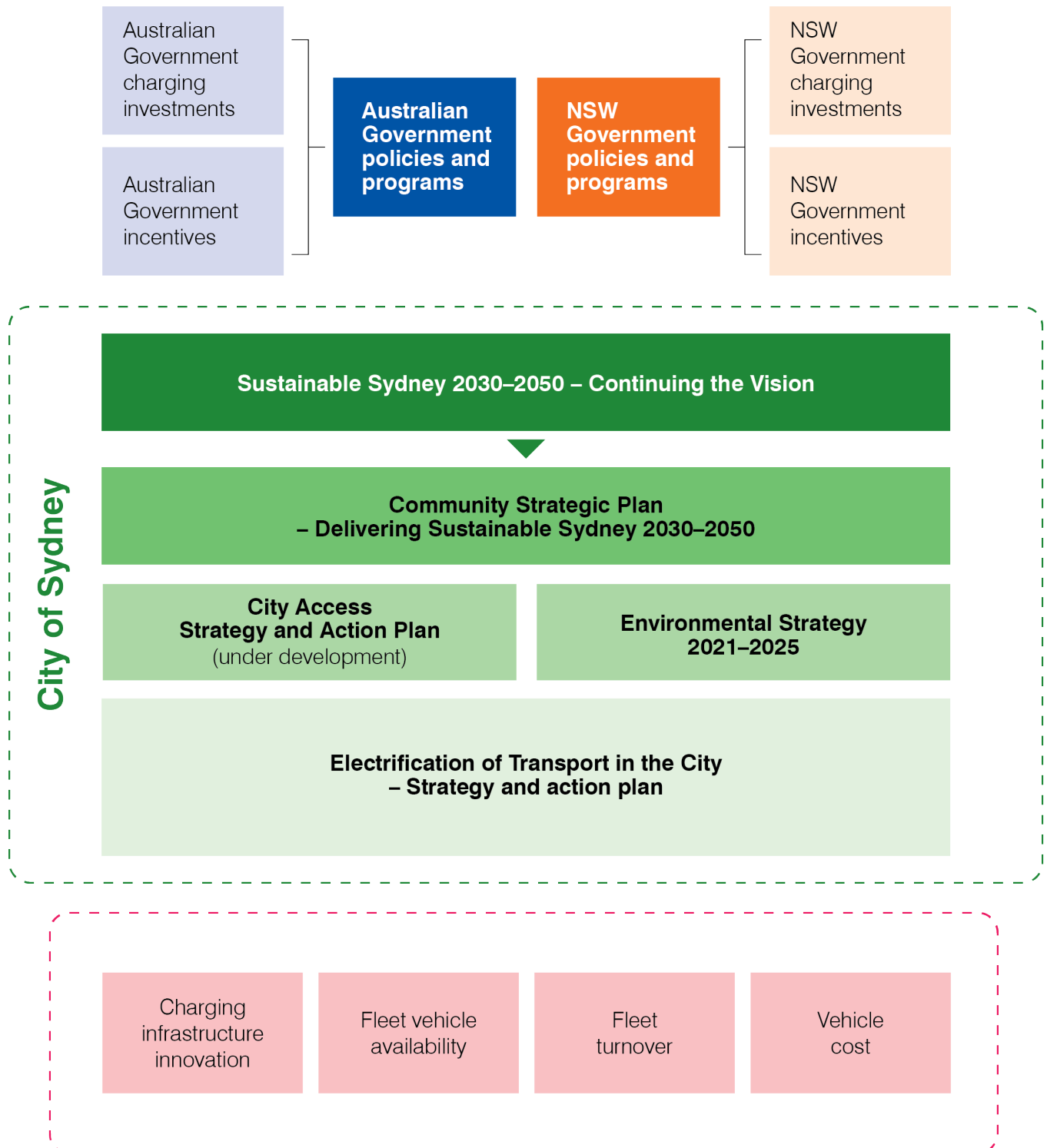
Sustainable Sydney 2030–2050 – Continuing the Vision sets the community’s vision for a city for walking, cycling and public transport, with more public transport and zero-carbon vehicles and more people choosing to walk and ride bikes. The city is greener and calmer with more space for people on the streets.

This strategy and action plan facilitates the ambitions of *Sustainable Sydney 2030–2050 – Continuing the Vision* and provides actions to achieve the aims of the City’s *Community Strategic Plan – Delivering Sustainable Sydney 2030–2050*, *Environmental Strategy 2021–2025*²⁰ and *City Access Strategy and Action Plan* (under development). It also reflects the Australian and NSW Governments’ policies and directions, including publicly accessible electric vehicle charging to facilitate electric vehicle uptake, along with market forces such as electric vehicle availability, electric vehicle affordability, the market-based provision of electric vehicle charging, evolving and emerging technologies, and fleet turnover (Figure 5).

Sustainable Sydney 2030–2050 – Continuing the Vision sets overarching targets that this strategy facilitates:

- By 2035, we will achieve net-zero emissions in the City of Sydney local area.
- By 2050, there will be a minimum overall green cover of 40 per cent, including 27 per cent tree canopy cover.
- By 2050, people will use public transport, walk or cycle to travel to and from work. This includes 9 out of 10 people working in the city centre and 2 out of 3 people working in the rest of the local area.
- By 2030, every resident will be around a 10-minute walk to what they need for daily life.

Figure 5. Strategic context of the strategy and action plan



2. Strategy and Actions

2.1 Creating a city for walking, cycling and public transport

Reducing driving is the best way to address carbon emissions from transport

Approach

To achieve our net zero by 2035 target, significant changes will be required to the transport system in our city. These changes involve reducing and eliminating tailpipe emissions, speeding up the shift from private cars to walking, cycling and public transport, transitioning public transport and private vehicle fleets to zero-emissions fuel sources and supporting off-street charging for electric vehicles.

Facilitating a reduction in transport emissions through supporting a mode shift to walking, cycling and public transport is the most effective way to respond to the climate emergency and to support our community to transition to net zero.

Motor vehicles will continue to be an important access option, including for servicing, trades and deliveries, as well as for older people and people with disability. These vehicles will need to be electric in a net zero future. Reducing non-tailpipe emissions²¹ will require continued prioritisation of shared forms of motor vehicle use wherever possible, including car share, taxis and point-to-point services. These fleets will also need to be electric.

Justification

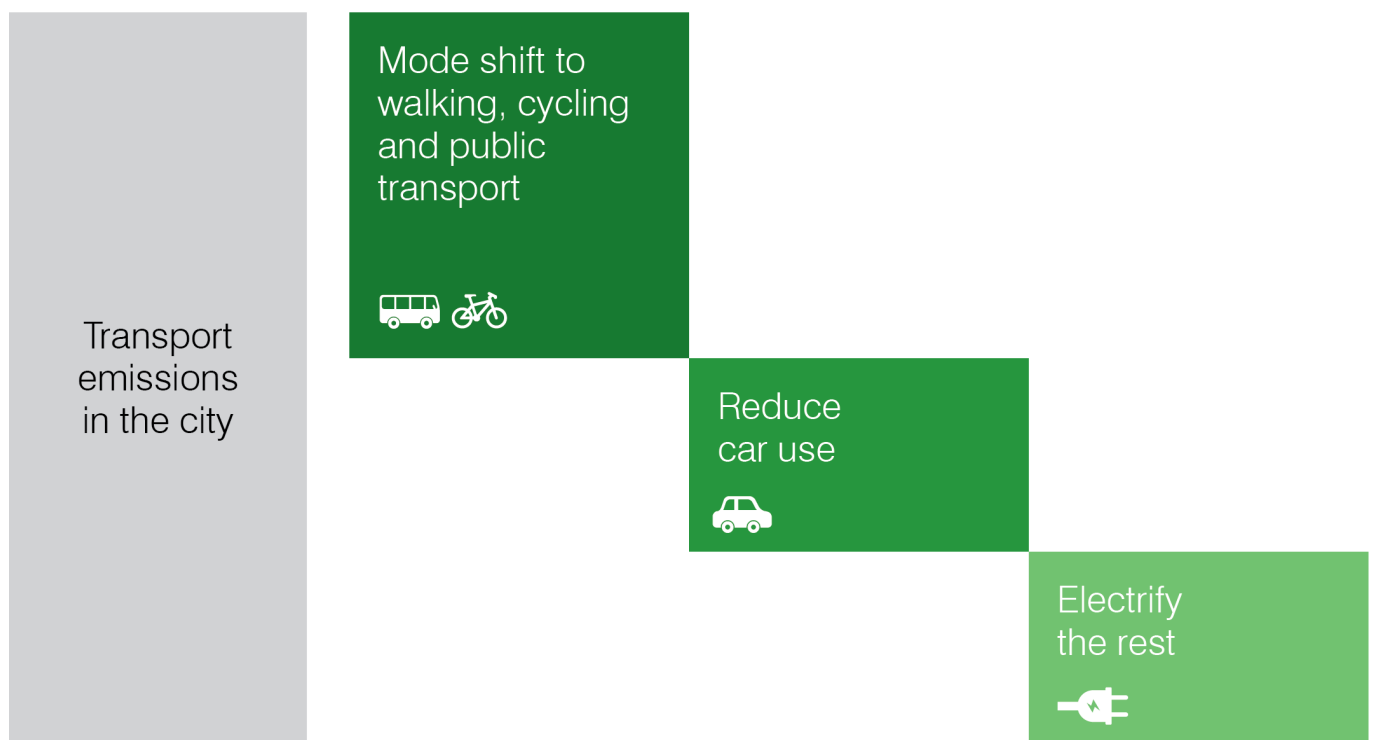
The biggest reduction in transport emissions will be through a shift to walking, cycling and public transport. The electrification of all residential transport in the city would reduce residential carbon emissions by 7 per cent. By comparison, a mode shift away from car usage based on current programs and policies will reduce emissions by 23 per cent and will bring additional improvements to access, equity and safety.

Public, shared and active transport modes reduce emissions, while having other benefits such as reducing congestion and competition for scarce parking spaces for people who need them, and improving people's health and the city's economy. Walking and cycling are the least carbon intensive transport modes, so they are integral to a sustainable city. Public transport, while still involving some level of carbon emissions, is efficient at serving many people, reducing individual carbon footprints. These modes also are the most efficient users of the city's limited space.

Electric cars are as space inefficient as other cars. The City does not support providing priority access on roads or to kerbside parking, including for charging. This is especially the case in Central Sydney and surrounding areas. For the limited amount of public on-street charging the City envisages, we will reserve the kerbside for charging only (not for parking only). We will not reserve the kerb for charging that is not available to the public.

The principal action the City will take to reduce transport-related emissions is to continue facilitating and enabling reduced vehicle use through safe and attractive walking and cycling infrastructure and supporting public transport and car sharing.

Figure 6. Reducing transport emissions in the city – illustrative only



Further details on the City's approach to creating the City for walking, cycling and public transport are outlined in *Sustainable Sydney 2030–2050 – Continuing the Vision* and *City Access Strategy and Action Plan* (under development).

Action 1: Work with the NSW Government to reduce vehicle kilometres travelled (VKT) by all vehicle fleets by creating a city for walking, cycling and public transport to reduce transport-related emissions.

2.2 Government pricing and policy that prioritises electric vehicles over internal combustion engine vehicles

Advocate for policies that prioritise electric vehicles over internal combustion engine vehicles

Approach

We will advocate for more stringent fuel and emissions standards for vehicles to facilitate the increased availability, affordability and diversity of electric vehicles in Australia. The Australian Government's 2023 Discussion Paper and intention to introduce improved standards is an overdue but welcome move.

Advocating for a transition plan for all new vehicles in Australia to be electric by 2030 requires the rapid adoption of emission standards to increase the availability, diversity and affordability of electric cars. This would facilitate an earlier transition of key fleets, such as car share, taxis and loading and service vehicles (see Section 2.3).

Justification

The lack of more stringent emissions standards has been noted by major car manufacturers and has been identified as a reason to not bring newer electric vehicle models to Australia sooner, acting as a disincentive for their availability in Australia. Many other countries are transitioning much faster than we are. Europe has three times more electric vehicle models available to buy than Australia. All new vehicle sales need to be electric by about 2030 in order for the fleet to be electric by 2035. Targets and incentives should be considered.

Action 2: Advocate that the Australian Government immediately raise fuel and emissions standards to make electric vehicles more attractive, and to avoid Australia receiving vehicles not saleable elsewhere.

Action 3: Advocate that the Australian Government develops a transition plan for new vehicles to be zero emissions by 2030 and powered by a fully renewable electricity grid by 2035.

Advocate for pricing signals that prioritise electric vehicles over internal combustion engine vehicles

Approach

Any subsidies or incentives should, as a priority, support people to not use cars ahead of facilitating uptake of electric vehicles.

Any road pricing mechanisms (such as road user charges) should make electric vehicles more attractive than internal combustion vehicles – especially for vehicles that spend the most time on the road network.

A Low Emissions Zone in the city centre, where many taxis and service vehicles travel could incentivise operators to transition fleets to electric to reduce operating costs and assist in the City achieving net zero by 2035.

Justification

There has been significant increase in electric bike sales and use, potentially in response to the Covid-19 pandemic. Any government subsidies to encourage fleet electrification should also apply to electric bicycles, and other forms of electric micromobility.



Photographer: Katherine Griffiths / City of Sydney

There is an opportunity for broader road pricing, incorporating motorway tolls into a more comprehensive system that focuses on distance travelled, congestion and emissions. It could encompass various parking charges, such as the Parking Space Levy, to ensure a more coherent focus on travel demand management.

Changes to road user charges for electric vehicles were announced by the NSW Government but commencement deferred. As revenue from fuel excise declines, revenue streams created by pricing all vehicles (including electric vehicles) become more important. A Low Emissions Zone in the city centre could create a springboard for a city-wide system.

Action 4: Advocate that the NSW Government investigates pricing mechanisms to incentivise the transition to electric vehicles in the city centre, including a low-emissions zone, parking levies and kerbside charging.

Action 5: Advocate that subsidies for electric vehicles (including for charging) proposed by the Australian and NSW Governments reflect the City's fleet transition hierarchy (i.e. e-bikes and other micromobility and public transport first then commercial, and finally private vehicles)

2.3 A transition for electrification that focuses on high-impact transport fleets

Prioritise electrification of different fleets based on impact

Approach

Vehicles are important to the economic functioning of our city. Delivery and service vehicles are vital for productivity, buses provide efficient transport for many people, point-to-point and taxis provide valuable transport over short distances such as the 'last mile',²² and many residents and visitors are reliant on vehicles to meet their mobility needs.

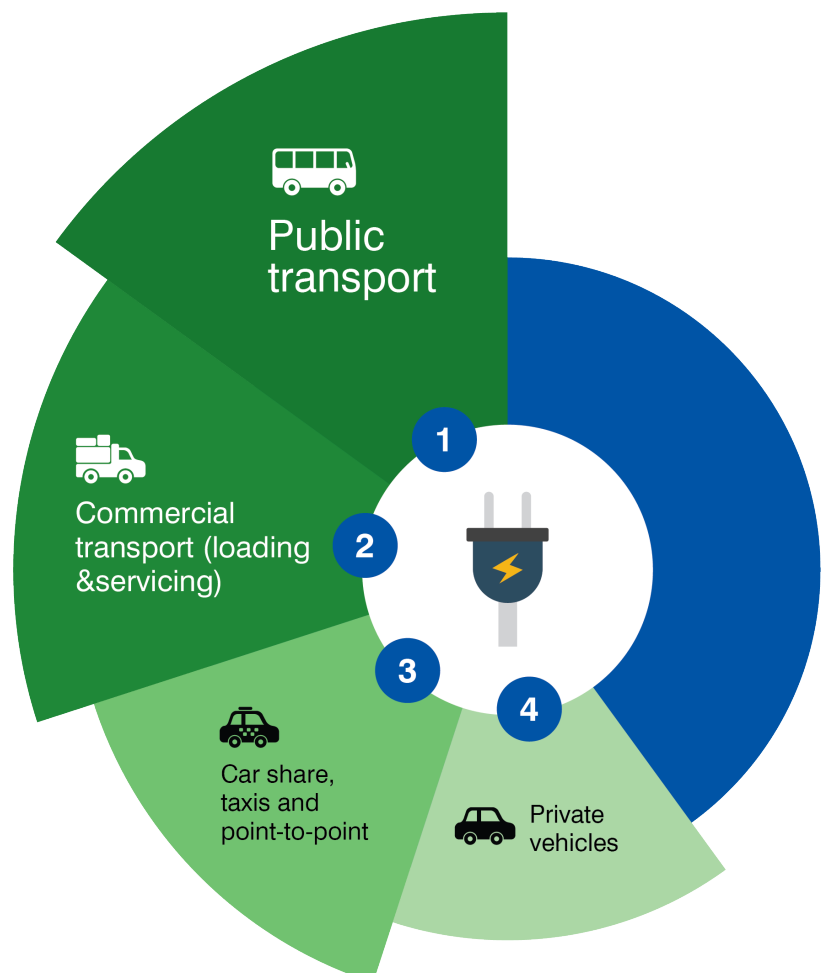
This strategy and action plan supports a city for walking and cycling first and foremost while facilitating and encouraging the environmental

benefits of electric transport, particularly in public transport and commercial fleets, which will also reap operational benefits. It describes the opportunities and challenges for electrification across the various transport fleets operating in the city, advocating for the priority electrification of fleets which have the most impact, in terms of kilometres travelled, moving people, emissions and impacts to the public domain such as noise (Figure 7).

Justification

Most transport-related emissions, around 60 per cent in our area, come from non-residential transport. While the transition to private electric vehicles is very important, the greatest impacts for reducing emissions, noise and air pollution will come from electrifying the bus, commercial vehicle, taxi and point-to-point fleets. These are also the fleets that people in the City of Sydney are most exposed to, especially in the city centre.

Figure 7. Priorities based on impact for the electrification of transport in the city fleets



Electrification of the City's vehicle fleet

Approach

The City will manage and analyse low- and zero-emissions options for the City's light and heavy vehicle fleets and use fleet analytics to encourage low-emission driving behaviour and reduce carbon emissions.

Our fleet is diverse, reflecting the different operational functions of the City. We are confident that our passenger fleet will continue to transition.

However, unlike the passenger electric vehicle market, the electric truck and other plant industry is still reasonably immature. Availability and cost of suitable vehicles is a key consideration, but other factors the City needs to consider include:

- risk relating to reliability and maintenance, which diminishes as the market becomes more mature
- operational suitability
- charging requirements, including in City depots (which are also the charging bases for the City's passenger fleet).

The City therefore adopts a risk-based step-change approach. This is designed to ensure we maximise the electrification of the fleet without incurring significant and potentially unmanageable risk, and always seek value for money with our use of the community's funds.

Within that approach, we will continue to maximise the transition of our heavy vehicle fleet as they become available. We are aiming to have at least one electric vehicle of each type as soon as possible, so we can assess their effectiveness. The City can then proceed to broader procurement based on the results of that assessment. We anticipate the full transition of the non-passenger fleet may take 10 years, but we will be well-positioned to accelerate if possible.

We will also explore appropriate procurement approaches for contracted services, such as waste collection.

When we upgrade our depots, we will plan for electric vehicle charging for our fleets. We will advocate to the State and Federal Government that grants to encourage fleet electrification include local government depots to facilitate and encourage local governments to transition their fleets.

Justification

The City was one of the first organisations to start converting its fleet of vehicles to hybrid and electric, including a commercial electric vehicle. About 8 per cent of the City's fleet (19 vehicles and 1 truck) are fully electric and we have 73 hybrid cars and trucks. The City acquired its first electric truck in 2021 as a trial, a diesel truck which was converted to electric.

Governments, such as the City, have a role to encourage the uptake of more affordable electric vehicles by creating a second-hand market as fleet vehicles are sold.

Action 6: The City will maximise electrification of its light fleet by 2030 and heavy fleet as soon as possible.

Action 7: The City will encourage the uptake of electric vehicles to be used in our contracted services through our procurement processes (including waste collection, cleansing and maintenance).

Action 8: Advocate to the State and Federal Government that grants to encourage fleet electrification include local government depots to facilitate and encourage local governments to transition their fleets.



Image: Transport for NSW / City of Sydney

Electrification of public transport fleet

Approach

The City will advocate for the prioritisation of electric bus fleets by routes that have the most impact on residents, public amenity and health. This includes high-frequency bus routes, routes that traverse our high streets and areas with large residential populations. These are the areas that will benefit the most from reduced noise and air pollution (Figure 8).

Justification

Buses create a lot of noise and air pollution; 78 per cent of Transport for NSW's emissions are from buses.²³ A trial by the NSW Government found that a transition of the full fleet of buses to electric buses could achieve between \$1.1 and \$1.9 billion in environmental cost savings.²⁴

There are 4,090 buses operating in the Greater Sydney area; about 50 to 100 of these are in operation in the city at any time. About 90 per cent of these are standard buses. There are only 70 electric buses operating in the Greater Sydney network. The NSW Government has a target to transition the Greater Sydney bus fleet to electric by 2035,²⁵ accelerating the pace from 2023 onwards.

Bus fleets will be charged at the depot. These are spread across Greater Sydney. The City will advocate that depots serving densely populated and active streets such as the city centre and major gateway avenues should be priorities for electrification, and transitioned by 2030 at the latest.

Action 9: Advocate that the NSW Government accelerates the electrification of the bus fleet serving the City of Sydney, prioritised by depot and corridor, to reduce noise, localised pollution and carbon emissions by 2030.

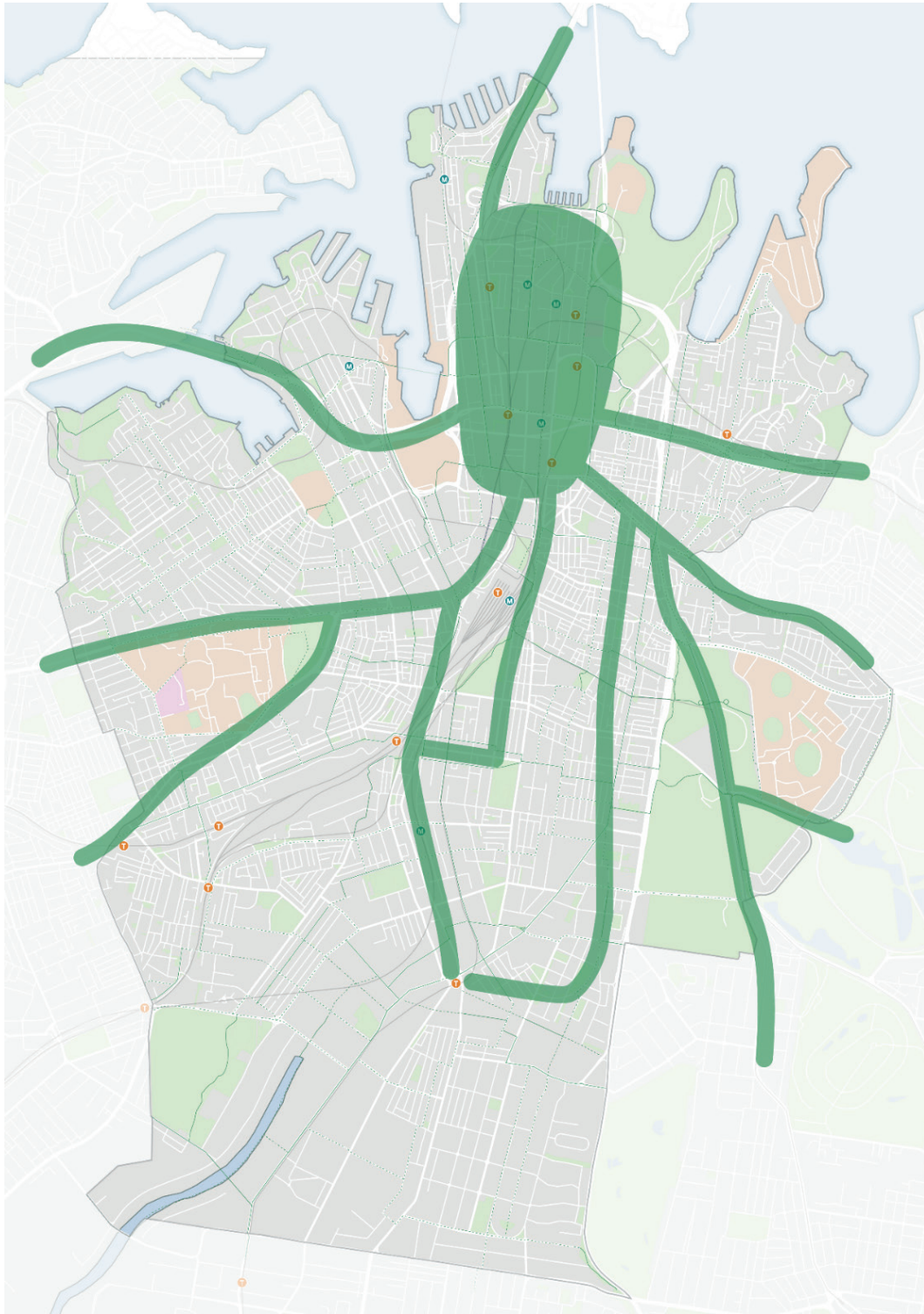


Figure 8. Key bus corridors through the city – illustrative only

Source: SGS Economics and Planning with Kinesis (2022)
Electrification of Transport in the City Strategy and Action Plan Technical Report

Electrification of service vehicle

Approach

Service vehicles, while important to the necessary function of the city, have a major impact on emissions and the public domain in terms of space and noise. We will advocate for the rapid transition of commercial vehicles, including for relevant subsidies and incentives available for work-related vehicles. Moreover, a low emissions zone could help promote fleets' uptake of electric vehicles, as discussed in Section 2.2.

There is an opportunity, in conjunction with shared and public loading facilities (hubs), to facilitate micromobility fleet options for last mile delivery. The City in partnership with Transport for NSW provides a courier hub at the Goulburn Street car park, where deliveries can be transferred from a van to a bike or walked to the final destination.

Increasing efficiencies in freight and servicing vehicles, for example through consolidated procurement and loads to reduce empty running, shared and public loading hubs, and lockers and other storage for deliveries, will reduce the emissions associated with these vehicles, as well as improve congestion and productivity.

Justification

The electric and low-emission commercial vehicle market in Australia is immature in comparison to the electric car market, with long lead times. Both new and used electric truck retail markets need to further develop and expand to enable prices to be more competitive and represent better value for money. Further significant developments via Original Equipment Manufacturers (OEMs) are not expected to flow through to retailers in the coming 12 to 24 months, making the cost of ownership not yet comparable with diesel variants in the commercial space.

However, the availability of electric commercial vehicles is increasing. The Electric Vehicle Council reported that "the van and truck sector has seen substantial growth in the [six months to March 2022], with the sector now having access to 21 different trucks, utility vehicles (5), vans (6), and trucks (10)."²⁶

The impact of commercial vehicles is not evenly distributed across the local area. There is a significant freight and logistics presence in the southern portion of our area, particularly as it connects to Port Botany and the Sydney Airport.

Many delivery vehicles traverse our city centre every day, about 35,000 vehicle movements, but for most the city centre is not their point of origin or end-of-route destination. While the City provides kerbside loading zones, it is unlikely charging will be needed at them. Most delivery and servicing vehicles will charge at their point of origin or depot. Where appropriate, new off-street loading hubs could also provide brief charging windows.

Action 10: Advocate that the NSW Government accelerates the transition of service and delivery vehicle fleets to electric vehicles, including the use of e-bikes and other micromobility modes.

Electrification of car share vehicle fleet

Approach

Car sharing supports households and businesses who need infrequent access to a motor vehicle. The availability of car sharing reduces vehicle ownership and vehicle use. The City's Car Sharing Policy has already set benchmarks for fleet emission standards. An electric car-sharing fleet would contribute further to emissions reduction.

Car share is a unique fleet in that each vehicle in the City of Sydney has a "depot" in the form of its dedicated on-street space. While car share operators are responsible for the fleet, each individual user relies on the previous user to return the car ready for the next user. With users paying for time as well as distance, the current increased time for a user to charge a vehicle if required (compared to a quick refill for an ICE vehicle) could constrain the use of the car.

When there is a wide choice of publicly available charging, including fast charging, on-street charging for each dedicated car share bay or

vehicle is unlikely to be demanded. The cost and impact is not justified by the charging requirements. It is expected that operators will develop systems where they, or their members, refuel (or recharge) the cars, as occurs with the current fleet. The City however recognises the potential for pole-based charging in existing or potential future car share spaces; these would be commercial arrangements between the charging providers and car share operators. There is also the potential for the development of mobile charging solutions.

The City will continue to work with car share operators to transition their fleet to electric vehicles through our regular Car Sharing Policy reviews. The approach will include a target date in the City's Car Sharing Policy for 100 per cent fleet transition (most likely 2030). In future reviews, there will also be transitional benchmarks, reflecting a reasonable and predictable uptake, noting that the electric vehicle options suitable for mass fleets such as car share are currently limited. The City's Policy reviews involve extensive consultation with operators, members and the broader community.

Justification

There are around 850 car share vehicles across the local area. Each of these vehicles helps reduce vehicle emissions and reduce, delay or avoid car ownership and the associated competition for parking. The Car Sharing Policy currently mandates low emission vehicles. Car share vehicles in the local area are used on average 35 kilometres per day over about 5 hours, noting inconsistent usage patterns²⁷ and variations in each member's trip purpose. Based on this, a car share vehicle would be required to charge on average about once every two weeks. Users are generally expected to return a car share vehicle with a minimum amount of fuel.

Car share operators are responsible for the maintenance and condition of their vehicles. Early engagement with car share operators suggests that they will transition their fleets to electric vehicles for operational reasons once vehicles become available and affordable. Operators have existing systems for refuelling their internal combustion fleets. These are likely to be transferable to an electric fleet, when the expected growth in

charging opportunities occurs. The City will work with operators to better understand the charging options in the initial stages of fleet transition (when fast charging opportunities will be less available).

Car share bays take the form of on-street bays in parking spaces provided by the City and off-street bays provided within the car parks of residential, commercial and retail developments. Off-street bays can provide charging facilities to car share vehicles more easily than on-street bays, enabling convenient charging while the car is between bookings. The planning system can be used to ensure new development provides charging facilities in all car share bays.

The City uses the Car Sharing Policy to establish the obligations of eligible operators. Amending the Policy to set the expectations for the predictable transition to an electric fleet is appropriate and builds on a legacy of requiring low environmental impact vehicles.

Action 11: Work with car share operators to develop a model to electrify their fleet by 2030. This includes changes confirmed via periodic policy review and that are cost neutral to the City.

Electrification of point-to-point and taxi fleet

Approach

We will advocate for the rapid transition of taxis and other point-to-point services to electric fleets. This will be assisted by measures that increase the availability and affordability of electric vehicles (Actions 2 to 5). Currently, there is not a suitable mass fleet option available in Australia. When one is available, fleets are expected to transition quickly, given the operational cost savings.

After that, electric taxis would then become available to the second-hand car market after three to four years of use, increasing purchase options in the late 2020s.

Justification

There are about 25,000 taxi movements in the Sydney city centre on an average weekday. Taxis travel about 200 to 300 kilometres per day. Most electric taxis will charge at a depot or other point of origin on a dedicated charger to meet their range needs.

There may be some need for refuelling during use. This would need to be met with rapid charging during a shift. The NSW Government's fast-charging network on major routes will play a role here. The development of charging options in service stations (or a similar charging facility) will also contribute, and facilities such as food and beverages, car washes and bathrooms would incentivise taxi drivers to take short multipurpose breaks that could include charging.

There may be some need for dedicated rapid charging at key locations to supplement point-of-origin charging. Airports are one potential location. Charging at taxi ranks, especially in the city centre, is unlikely to be a feasible or useful option for taxis.

Action 12: Advocate that the NSW Government accelerates the uptake of zero-emission vehicles by point-to-point operators, including taxis.

2.4 Supporting electric vehicle charging options in ways that limit the impact on the public domain

Respond to the specific charging needs of different City villages

Approach

Different transport fleets across the local area will have varying needs for electric vehicle charging. Most residents and workers will charge at home. The need to provide on-street charging is largely limited to areas with limited access to and availability of off-street parking and to the availability of publicly accessible rapid-charging facilities.

Most residents in the city have either off-street residential parking or utilise parking permits to park on the street. The local areas with higher levels of vehicle ownership are also generally areas with high levels of off-street parking (for example, Green Square and City South village). However, some areas of the city have limited access to off-street parking, such as Millers Point, Macleay Street and Woolloomooloo Village, Newtown, parts of Pyrmont, Glebe and Surry Hills (Figure 3). Some areas also have relatively limited access to other public charging settings, such as large shopping centres, or City controlled car parks. The City may need to enable publicly accessible charging in village locations to supplement other charging options until the market develops (see Page 33).

Around 100 publicly available charges are currently available in the city, including at the City's Goulburn Street and Kings Cross car parks. Due to the concentration of commercial activity in the city's south, there may also be some need for publicly accessible fast charging for commercial vehicle fleets. However, it is expected that most commercial fleets will charge at their depot or point of origin.

There will not be a need for the City to provide on-street publicly accessible charging in the city centre. Commercial car parks and destination car parks currently provide charging for the public, and this is anticipated to continue.

Justification

Car ownership and access to off-street parking are fairly evenly matched across the city, with the exception of Pyrmont which has high levels of off-street parking and lower levels of car ownership, and areas such as Macleay Street and Woolloomooloo Village, Newtown and parts of Glebe and Surry Hills which have limited access to off-street parking compared to car ownership rates (Figure 3).

Under the City's optimised scenario, some 200 to 350 publicly accessible chargers are needed in or near the city, but the density required differs across village areas. These would supplement the already over 100 publicly available chargers in the local area, concentrated in the city centre.

Support off-street charging in new buildings

Approach

New buildings in our area will be "EV ready". The City is supporting the forecast growth in electric vehicle uptake by requiring new commercial and residential developments to provide an appropriate number of shared electric vehicle charging parking spaces, along with a conduit to all parking spaces to enable the easy provision of electric vehicle charging at dedicated spaces when required.

The City's planning controls will also facilitate the provision of electric car share vehicles within developments by requiring on-site car share bays in new developments to be fitted with electric vehicle charging facilities in common property ownership.

We will investigate requirements for new commercial development to provide electric vehicle charging facilities in visitor parking spaces, including retail customer parking spaces. This could help provide access to electric vehicle charging facilities to residents who do not have a way of charging at home and for 'top-up' refuelling opportunities.

As power demand increases over time, building managers can implement load balancing, individual metering and other models that all use the same underlying infrastructure ("EV ready").

Justification

Planning controls are an important part of facilitating the transition to electric vehicles and an element within the City's control.

New development should meet the future needs of building users and planning controls can ensure this happens.

Planning controls should not cause development to overprovide or overbuild infrastructure for electric vehicle charging that would exceed the forecast uptake.

Action 13: Prepare draft planning controls in the Sydney Development Control Plan 2012 requiring new development to be 'electric vehicle ready', with car parking spaces enabling electric vehicle charging.

Support off-street vehicle charging in existing buildings

Approach

The City will work with the NSW Government, the energy sector and building owners in priority sectors to understand and help facilitate options for charging provision in existing buildings and to promote publicly accessible charging. This will help building owners to make more informed decisions about what charging is, or is not, required on-site.

We know EV charging and electrification of existing apartment buildings can be complex for owners and renters. We will undertake research to explore the technical, governance and management challenges facing strata communities. The research will include an in-depth study of a small sample of the different types of apartment buildings in our local government area in terms of size, age and complexity.

We will assist building owners in priority sectors to investigate electric vehicle charging options as part of a broader energy management plan. Our Green Building Grants supports Owners Corporations and building owners in the accommodation sector to undertake environmental ratings, certifications, audits and assessments for existing buildings to be resource efficient and achieve net zero emissions by 2035.²⁸

We will also provide guidance on electric vehicle charging options through our energy action plans in our Smart Green Apartments program.²⁹ Through our Smart Green Apartments program we work with an intake of Owners Corporations annually, supporting them to improve efficiency, sustainability and resilience of their apartment buildings and residential precincts.

While there are challenges with retrofitting, grid supply and heritage constraints, the City envisages ongoing expectation from people in private buildings with off-street parking to charge their electric vehicles there. They may see other people with off-street parking taking advantage of the opportunity – charging when they like at a speed

that suits their needs, potentially using electricity they themselves generate. Feasibility of occupiers meeting that demand will vary from building to building. We will investigate classifying electric vehicle chargers as exempt development in local planning controls so they don't require planning approval and this will apply to the installation of chargers in shared, commercial and non-private contexts.

Justification

The more people that can charge in their own off-street parking, the less the demand for other charging.

The NSW Government Office of Energy and Climate Change has developed guidance for residential strata buildings³⁰ and for commercial office buildings³¹ on electric vehicle charging. NSW planning controls allow for electric vehicle charging for private use to be installed without a development application.

There is a significant stock of existing apartment buildings and offices with off-street car parking that can be investigated for retrofitting to support electric vehicle charging. Solving this challenge in place matters. There is no 'one-size-fits-all' solution, as differences in buildings' age, location and size and other factors require a mix of information, incentives and guidance. Some buildings may not be suitable for retrofitting. One consideration, it that there are a large number of residents in the city that rent rather than own their dwelling. Under current systems, it is a challenge to facilitate them to be able to access electric vehicle charging on-site.

By 2035, at 100 per cent uptake, around 5 to 20 chargers will be needed in the average strata building, noting that the size, availability of off-street parking, age and location of strata buildings vary across our area (Section 1.5).

Action 14: Work with governments, industry, peak bodies and strata communities to support electrification of buildings and upgrades to enable onsite electric vehicle charging.

Action 15: Fund electric vehicle charging feasibility assessments as part of net-zero plans and energy audits in Green Building Grants and provide guidance on electric vehicle charging through our energy action plans in the Smart Green Apartments program.

Support publicly accessible vehicle charging in ways that assist the transition to electric vehicles while limiting the impact on streets and public space

Approach

Electric vehicle charging will take place primarily off-street, through a combination of charging facilities in residential and commercial buildings and through market-driven, private approaches to charging stations accessible to the public.

The City already provides publicly available charging stations in two of its car parks: the Goulburn Street Car Park and the Kings Cross Car Park.

To supply confidence to the burgeoning public charging network, the City will lead the early provision of publicly accessible chargers. We will work with service providers to deliver a number of paid publicly accessible chargers in our off-street car parks at no or minimal cost to Council. In addition, we will work with private sector providers to trial paid on-street publicly accessible charging in residential areas with constrained private charging opportunities. This would limit the impact of charging infrastructure on the public domain, especially footpaths. It is important that this is paid rather than free parking / charging to



Photographer: Katherine Griffiths / City of Sydney

meet the equity aims of this Strategy. The aim is to provide additional public charging in the first few years of transition during which the private sector establishes a more extensive, scalable charging network.

Charging options are rapidly being developed that reduce impact on the public domain from charging infrastructure. On-street models can be explored to respond to a particular area's needs if required. This would be managed to support access and limit impact on the public domain as well as costs and the use of public funds for private vehicle use. For example, charging directly from power poles is a model that uses infrastructure already in the public realm, adjacent to parking. We will include areas with relatively low availability of potential public charging options in trials and rollout of on-street charging.

The City will also work with operators of commercial car parks to promote charging in these locations and we will work with the NSW Government to make sure the public know available charging locations.

Justification

To protect the liveability of our neighbourhoods for a diverse population and encourage increased use of public transport, walking and cycling, the City, through its Neighbourhood Parking Policy, prioritises use of on-street, kerbside parking spaces for residents, businesses and their visitors and customers. Maintaining this priority requires that commuter on-street parking in residential neighbourhoods and commercial areas be actively discouraged. Publicly accessible on-street electric vehicle parking with charging will only be considered where it is in line with these objectives and priorities.

A key element of the transition to electric vehicles will be the expansion of the publicly accessible charging network, including fast charging for those who need it.

Providing on-street refuelling ('charging facilities') for one type of private vehicle is not equitable, especially considering the current affordability and availability issues. Most vehicles refuel now at publicly accessible service stations, not on public streets. The infrastructure requirements, impacts and costs are unlikely to make publicly accessible on-street charging feasible or scalable in our area, where many people have access to off-street parking.

Retail locations and public car parks in our area are already providing electric vehicle charging. It may be already easier for our residents to charge an electric vehicle than fuel up a petrol vehicle. There are already over 100 publicly available electric vehicle chargers in the City – underlining the importance of making sure the public know where they are.

There are 7 service stations within the City of Sydney with over 20 additional stations within a 2-kilometre range. Major service station operators are transitioning to provide dedicated electric vehicle charging. These types of facilities, which are already optimally located on key routes and near key destinations, will expand publicly accessible charging access, and serve an important role in facilitating the transition for our residents that are not able to charge at home.

The NSW Government has planned for fast charging along the M1 and the A4 (City West Link).

The City will play an important early leadership role that still allows the rapid development of market-driven public charging facilities in the medium and long term.

Action 16: Advocate that the NSW Government investigates appropriate and feasible market driven options for scalable publicly accessible off-street charging.

Action 17: Work with owners of publicly accessible car parking and servicing (including service stations, retail parking, public parking stations) to promote the opportunity to provide EV charging for public use.

Action 18: Support the NSW Government to ensure the public knows where publicly accessible chargers are.

Action 19: Provide additional off-street publicly accessible charging in City-controlled car parks across the LGA in locations where feasible (other than in City parks).

Action 20: Work with private sector providers to trial paid on-street charging in residential areas with constrained private charging opportunities. This should be cost neutral to the City and avoid negative impacts on the public domain including footpaths and planting.

Action 21: Investigate charging models for areas with constrained charging options. This is a contingency. The model should only supplement other public charging offers; be based on an evidenced need; community acceptance; be cost neutral to the City; be based on available or advanced technology; and avoid negative impacts on the public domain including footpaths and planting.



3. Action Plan

The City is not responsible for providing charging but has a responsibility to facilitate access and equity through enabling the right charging solutions in the right places.

This strategy outlines key actions the City can do to support this transition, including working with, advocating, and actions within the City's control.

working with

advocating

actions within the City's control

Action number	Action	New or continuing	Timeframe	Responsible Business Unit	Other agencies
Creating a city for walking, cycling and public transport					
Action 1	Work with the NSW Government to reduce vehicle kilometres travelled (VKT) by all vehicle fleets by creating a city for walking, cycling and public transport to reduce transport-related emissions.	Continuing	Immediate	City Access	NSW Government
Government pricing and policy that prioritises electric vehicles over internal combustion engine vehicles					
Action 2	Advocate that the Australian Government immediately raise fuel and emissions standards to make electric vehicles more attractive, and to avoid Australia receiving vehicles not saleable elsewhere.	Continuing	Immediate	Sustainability & Resilience	Federal Government
Action 3	Advocate that the Australian Government develops a transition plan for new vehicles to be zero emissions by 2030 and powered by a fully renewable electricity grid by 2035.	Continuing	Immediate	Sustainability & Resilience	Federal Government

Action number	Action	New or continuing	Timeframe	Responsible Business Unit	Other agencies
Government pricing and policy that prioritises electric vehicles over internal combustion engine vehicles (continued)					
Action 4	Advocate that the NSW Government investigates pricing mechanisms to incentivise the transition to electric vehicles in the city centre, including low emissions zone, parking levies and kerbside charging.	Continuing	Immediate	City Access	NSW Government
Action 5	Advocate that subsidies for electric vehicles (including for charging) proposed by the Australian and NSW Governments reflect the City's fleet transition hierarchy (i.e. e-bikes and other micromobility and public transport first then commercial, and finally private vehicles).	Continuing	Immediate	City Access	NSW Government Federal Government
A transition to electrification that focuses on high-impact transport fleet					
Action 6	The City will maximise electrification of its light fleet by 2030 and heavy fleet as soon as possible.	Continuing	Ongoing	Fleet services	
Action 7	The City will encourage the uptake of electric vehicles to be used in our contracted services through our procurement processes (including waste collection, cleansing and maintenance).	Continuing	Ongoing	Fleet services	
Action 8	Advocate to the State and Federal Government that grants to encourage fleet electrification include local government depots to facilitate and encourage local governments to transition their fleets.	New	Immediate	Fleet services	Federal Government

Action number	Action	New or continuing	Timeframe	Responsible Business Unit	Other agencies
A transition to electrification that focuses on high-impact transport fleets (continue					
Action 9	Advocate that the NSW Government accelerates the electrification of the bus fleet serving the City of Sydney, prioritised by depot and corridor, to reduce noise, localised pollution and carbon emissions by 2030.	Continuing	Ongoing	City Access	NSW Government Transport for NSW
Action 10	Advocate that the NSW Government accelerates the transition of service and delivery vehicle fleets to electric vehicles, including the use of e-bikes and other micromobility modes.	Continuing	Ongoing	City Access Sustainability Programs	NSW Government
Action 11	Work with car share operators to develop a model to electrify their fleet by 2030. This includes changes confirmed via periodic policy review and that are cost neutral to the City.	Continuing	Ongoing	City Access	Car share operators
Action 12	Advocate that the NSW Government accelerates the uptake of zero-emission vehicles by point-to-point operators, including taxis.	Continuing	Ongoing	City Access	NSW Government NSW Point to Point Commission

Action number	Action	New or continuing	Timeframe	Responsible Business Unit	Other agencies
Supporting electric vehicle charging options in ways that limit impacts on the public domain					
Action 13	Prepare draft planning controls in the Sydney Development Control Plan 2012 requiring new development to be 'electric vehicle ready', with car parking spaces enabling electric vehicle charging.	Continuing	Immediate	Planning	NSW Department of Planning and Environment
Action 14	Work with governments, industry, peak bodies and strata communities to support electrification of buildings and upgrades to enable onsite electric vehicle charging.	Continuing	Immediate	Sustainability Programs	NSW Office of Energy and Climate Change
Action 15	Fund electric vehicle charging feasibility assessments as part of net-zero plans and energy audits in Green Building Grants and provide guidance on electric vehicle charging through our energy action plans in the Smart Green Apartments program.	New	Immediate	Sustainability Programs	NSW Government Building owners and Managers
Action 16	Advocate that the NSW Government investigates appropriate and feasible market-driven options for scalable publicly accessible off-street charging.	New	Immediate	City Access	NSW Government
Action 17	Work with owners of publicly accessible car parking and servicing (including service stations, retail parking, public parking stations) to promote the opportunity to provide EV charging for public use.	Continuing	Ongoing	City Access City Communications Planning	Public parking providers Commercial parking operators

Action number	Action	New or continuing	Timeframe	Responsible Business Unit	Other agencies
Supporting electric vehicle charging options in ways that limit impacts on the public domain (continued)					
Action 18	Support the NSW Government to ensure the public knows where publicly accessible chargers are.	New	Immediate	City Comm-unications	NSW Govern-ment
Action 19	Provide additional off-street publicly accessible charging in City-controlled car parks across the LGA in locations where feasible (other than in City parks).	New	Immediate	City Access CITO	DPIE
Action 20	Work with private sector providers to trial paid on-street charging in residential areas with constrained private charging opportunities. This should be cost neutral to the City and avoid negative impacts on the public domain including footpaths and planting.	New	Immediate	City Access CITO	Electric Vehicle charging providers Grid operators
Action 21	Investigate charging models for areas with constrained charging options. This is a contingency. The model should only supplement other public charging offers; be based on an evidenced need; community acceptance; be cost neutral to the City; be based on available or advanced technology; and avoid negative impacts on the public domain including footpaths and planting.	New	2 to 3 years	City Access City Design Traffic Operations City Engagement	NSW Govern-ment Electric Vehicle charging providers



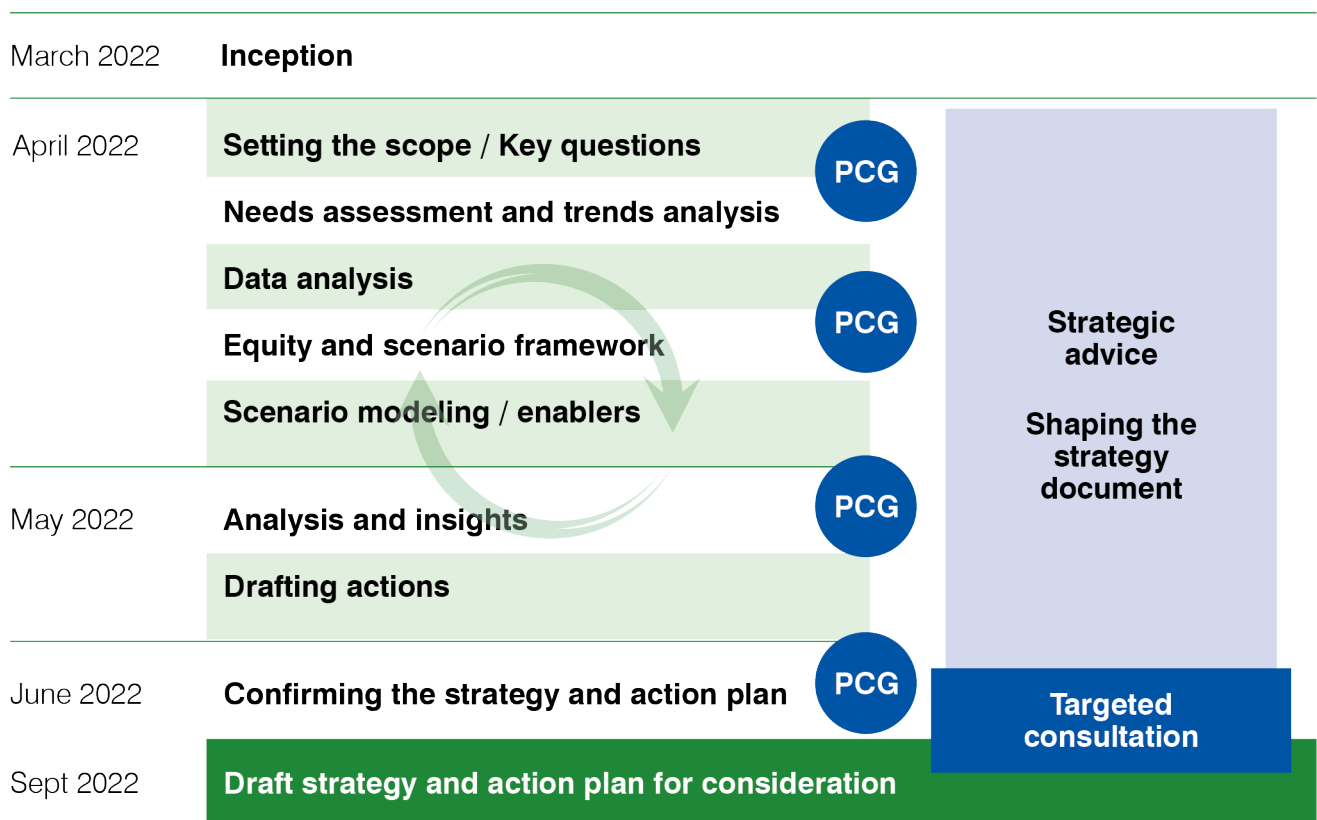
4. Reference Materials

4.1 Process to develop the strategy and action plan

Figure 9 illustrates the process undertaken to develop this strategy and action plan along with key dates and key meeting points.

The development of this strategy and action plan was supported by a technical report and an internal Project Coordination Group.

Figure 9. Process to develop the strategy and action plan



Technical report

The strategy and action plan builds on analysis and understanding of vehicle use within our local context. The City partnered with SGS Economics and Planning and Kinesis to develop and provide strategic and technical advice. The technical report providing the analysis and modelling undertaken is available at: [\(link to be included\)](#).

Engagement

An internal cross-divisional Project Coordination Group (PCG) steered the development of the strategy and action plan, with representatives from Strategic Planning and Urban Design, Sustainability and Resilience, Sustainability Programs, City Access, Strategy and Communication and City Fleets.

This PCG met formally to undertake intensive working sessions coordinated with the development of the strategic advice, technical analysis and modelling by SGS Economics and Planning and Kinesis (15 December 2021, 24 March 2022, 20 April 2022, 20 May 2022, 10 June 2022) along with informal and targeted meetings between key members.

The PCG provided input into iterations of the draft, including drafting and approving the actions and reviewing the 80 percent draft strategy and draft action plan.



Photographer: Paul Patterson / City of Sydney

4.2 Key terms

Key terms	Definition and explanation
EV ready	Refers to parking spaces that have the required wiring, power outlets and connection points for an electric vehicle charger to be installed when required. These can be parking spaces in new buildings or retrofitted parking spaces in existing buildings.
Kilowatt (kW)	A kilowatt is how much energy is moving or being used at one time. It is used in reference to the speed of chargers.
Kilowatt hour (kWh)	Amount of energy used in an hour. Used in reference to the capacity of a battery, for example, how much energy a battery can hold and store.
Micromobility	A term used to refer to a range of smaller vehicles such as bicycles, cargo bikes, electric bikes, electric scooters and three-wheeled delivery vehicles, that can be electric or human powered.
Point-to-point vehicles	Refers to vehicles used to transport people on demand for a fee, such as taxis, hire cars, ride-share services and tourist services.

4.3 Electric vehicle charging standards

	Power	Range added per hour	Charging time	Typical application
Level 1 – single phase (domestic)	2.4-3.7kW	10-20km range / hour	5-16 hours	Home
Level 2 slow – single phase (domestic or public)	7kW	30-45km range / hour	2-5 hours	Home, work, shopping centres, car parks
Level 2 fast – three phase (public)	11-22kW	50-130km range / hour	30 mins-2 hours	Urban roadside
Level 3 – fast charge (public)	50kW	250-300km range / hour	20-60 mins	Regional near highways, motorways and key routes
Level 4 – super fast charge (public)	120kW	400-500km range / hour	20-40 mins	Regional near highways, motorways and key routes
Ultra-fast charge (public)	350kW	1000+tkm range / hour	10-15 mins	Highways and motorways

Source: NSW Government Electric vehicle charging types.

4.4 Endnotes

1. City of Sydney (2022). *Sustainable Sydney 2030–2050 – Continuing the Vision*, available at <https://www.cityofsydney.nsw.gov.au/sustainable-sydney-2030-2050> and City of Sydney (2022). *Community Strategic Plan – Delivering Sustainable Sydney 2030–2050*, available at <https://www.cityofsydney.nsw.gov.au/strategies-action-plans/community-strategic-plan>.
2. NSW Government (2021). *NSW Electric Vehicle Strategy*. Environment, Energy and Science and Department of Planning, Industry and Environment. Available at <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Climate-change/nsw-electric-vehicle-strategy-210225.pdf>.
3. www.iea.org/data-and-statistics/charts/comparative-life-cycle-greenhouse-gas-emissions-of-a-mid-size-bev-and-ice-vehicle
4. www.reuters.com/business/autos-transportation/when-do-electric-vehicles-become-cleaner-than-gasoline-cars-2021-06-29
5. NSW Government (2021). *NSW Electric Vehicle Strategy*. Environment, Energy and Science and Department of Planning, Industry and Environment. P.14. Available at <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Climate-change/nsw-electric-vehicle-strategy-210225.pdf>.
6. Place is used in this context to refer to the quality, design and availability of the public space and public domain provided, along with the broader attributes of a place such as sense of place.
7. NSW Government Fast Charging Master Plan Map at <https://www.energy.nsw.gov.au/business-and-industry/programs-grants-and-schemes/electric-vehicles/Fast-charging-master-plan#master-plan-map>
8. The NSW Government estimates that “a taxi driver can save up to around \$4500 per year by switching from a hybrid petrol car to a battery EV or even more if switching from a traditional petrol vehicle” (p. 10). NSW Government (2021). *NSW Electric Vehicle Strategy*. Environment, Energy and Science and Department of Planning, Industry and Environment. Available at <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Climate-change/nsw-electric-vehicle-strategy-210225.pdf>
9. See “NSW Government’s Electric Vehicle Strategy” at <https://www.nsw.gov.au/initiative/nsw-governments-electric-vehicle-strategy> and “Electric vehicles” at <https://www.energysaver.nsw.gov.au/reducing-emissions-nsw/electric-vehicles>
10. NSW Government Fast Charging Master Plan Map at <https://www.energy.nsw.gov.au/business-and-industry/programs-grants-and-schemes/electric-vehicles/Fast-charging-master-plan#master-plan-map>
11. NSW Government’s update <https://www.nsw.gov.au/media-releases/supercharges-ev-rollout>
12. The Electric Vehicle Council keeps a list of charging organisations. See <https://electricvehiclecouncil.com.au/about-ev/charger-map/>.
13. See <https://www.transport.nsw.gov.au/projects/electric-vehicles/charging-an-electric-vehicle/charging-map> and <https://www.plugshare.com/>.
14. This varies with Potts Point–Woolloomooloo having about 16,600 people/square kilometre and Pyrmont–Ultimo 16,500 people/square kilometre.
15. SGS Economics and Planning with Kinesis Technical Report, electric vehicle projects under three scenarios based on current NSW Government policy, current Federal Government policy and optimised for 100 per cent electric vehicle take up in the local area. Data sources used: ABS census, NSW Registrations, City of Sydney LSPS 2012, NSW Government electric vehicle strategy and the Labor Government’s election policy announcements.

16. See <https://www.transport.nsw.gov.au/projects/electric-vehicles/charging-an-electric-vehicle/range-and-charging>
17. SGS Economics and Planning with Kinesis. Areas with a deficit in off-street residential parking.
18. *Draft City of Sydney Access Strategy and Action Plan*
19. Reference SGS Economics and Planning with Kinesis Technical Report. Modelling of home and public charging profiles. Charging profiles are indicative only and based on a Danish study calibrated to electric vehicle charging demanded in the local area using car use from Transport for NSW's Household Travel Survey.
20. See City of Sydney (2021). Environmental Strategy 2021–2025. Available at <https://www.cityofsydney.nsw.gov.au/strategies-action-plans/environmental-strategy>.
21. These include emissions from brake wear, tyre wear, road pavement and road wear.
22. The 'last mile' in transportation planning is the final part of a journey, often from a transportation hub (e.g. a bus stop or train station) to the final destination (e.g. home or work).
23. NSW Government (2022). "Zero Emission Buses" (Project update, June). Available at <https://www.transport.nsw.gov.au/projects/current-projects/zero-emission-buses>.
24. NSW Government (2021). NSW Electric Vehicle Strategy. Environment, Energy and Science and Department of Planning, Industry and Environment, p. 10. Available at <https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Climate-change/nsw-electric-vehicle-strategy-210225.pdf>.
25. See NSW Government (2022). Zero Emission Buses. Available <https://www.transport.nsw.gov.au/projects/current-projects/zero-emission-buses>. Note that prior announcements used 2030 as the deadline, rather than 2035.
26. Electric Vehicle Council (2022). State of Electric Vehicles – March 2022, p. 4. Available at: <https://electricvehiclecouncil.com.au/reports/state-of-electric-vehicles-march-2022/>.
27. The City's Car Sharing Policy sets minimum use levels for each vehicle.
28. More information available at <https://www.cityofsydney.nsw.gov.au/environmental-support-funding/green-building-grants>
29. More information available at <https://www.cityofsydney.nsw.gov.au/environmental-support-funding/smart-green-apartments>
30. NSW Government Energy Saver. "Making your residential strata building EV ready". Available at <https://www.energysaver.nsw.gov.au/reducing-emissions-nsw/electric-vehicles/electric-vehicle-ready-buildings/making-your-residential-strata-building-ev-ready#the-5-steps-to-ev-readiness>.
31. wNSW Government Energy Saver. "Making Your Commercial Building EV Ready". Available at <https://www.energysaver.nsw.gov.au/reducing-emissions-nsw/electric-vehicles/electric-vehicle-ready-buildings/making-your-commercial-building-ev-ready>.

