



ELECTRIC VEHICLE CHARGING INFRASTRUCTURE TRANSITION ROADMAP

Amendment A: EV Charging Targets

TABLE OF CONTENTS

SUMMARY	3
BENCHMARKING	4
EV CHARGING TARGETS	8
Charging patterns and projections	10
Current targets and rollout	11
Priority location targets	12
City of Adelaide usage data	13
Ongoing monitoring	14
Target summary	15

SUMMARY

The City of Adelaide's *EV Charging Infrastructure Transition Roadmap* (the Roadmap) details the role of the City of Adelaide (CoA) and key actions to support increased electric vehicle (EV) uptake. The Roadmap is being delivered through the City of Adelaide *Integrated Climate Strategy*.

This amendment to the Roadmap seeks to set a target for the overall number of EV chargers likely to be required at CoA-owned and operated locations, particularly with the aim of delivering the following of the Roadmap's key actions:

1	Facilitate the deployment of EV charging infrastructure within the CoA by establishing a clear framework for the rollout of EV chargers at strategic locations.	LEAD <i>Year 1</i>
2	Enable the market-led provision of on-street EV chargers in select locations which support the transition to EVs and minimise impacts on public realm.	LEAD <i>Year 1 - 3</i>
3	Work with private sector providers to lead on-street charging trials in residential areas with limited private off-street charging and constrained charging options.	LEAD <i>Year 1 - 3</i>
4	Partner with industry for the provision of destination charging within U-Park facilities.	PARTNER <i>Year 1 - 3</i>

The targets are not intended to provide for the entirety of the city's charging demands, but rather to provide fair and equitable access and cement the city as an attractive and competitive destination. Individuals and businesses will continue to install charging capacity in residences, businesses, and other commercial car parks, meeting much of this demand.

There is no widely-accepted best practice approach to setting EV charging targets. Targets are highly varied throughout Australia, with not all cities committing to operate or specifically incentivise further EV charging infrastructure. Overseas experiences highlight government market intervention early on, followed by commercial viability of EVs and public chargers.

Targets for the CoA have been developed with reference to:

- The number of CoA car parking assets
- Expected overall EV uptake
- Public EV charging behaviour
- Priority EV charging infrastructure locations from the Roadmap.

CoA data provides localised indicators of user behaviour and can be used to monitor the rollout over time. For example:

- CoA residents appear to be more likely than the average Greater Adelaide resident to use CoA chargers
- Utilisation rates can indicate where the CoA sits in terms of balancing charger supply and demand
- CoA chargers provide data including length of stay and charge session volume, which can be used to calibrate targets over time.

Based on the current data, trend analysis and forecasts, it is expected that across priority locations identified in the Roadmap, at least 25 new public EV charging bays will be required in existing on- and off-street parking assets in the short-term to 2030. This would bring the total number of EV charging bays at CoA parking assets to 103.

Beyond this short-term forecast, continual monitoring will be required as the technology evolves, the market matures and uncertainty around charging behaviour reduces.

BENCHMARKING

Review of targets across Australia and leading jurisdictions

BENCHMARKING

ABOUT THIS SECTION

With the EV transition still being in its infancy in Australia, there is no universal best practice for setting charging infrastructure targets. However, local and international benchmarks can provide insight into different methods cities are using to set targets, including from the viewpoints of jurisdictions with more matured EV uptake.

Area	EV uptake targets	On-street charging	Destination charging	Home & workplace charging	Summary
City of Sydney (CBD and metro area)	The City of Sydney aims for all vehicles to be 100% zero-emissions by 2035 but recognise that this goal requires federal legislation support ¹ .	The NSW Government has committed to funding assistance for 500 on-street charging points ² . The City of Sydney has acknowledged that on-street charging is not an effective use of space, and that adoption of this typology will be limited ¹ .	The City of Sydney estimates that up to 350 public chargers will be sufficient for 2035 demand ¹ .	N/A	The City of Sydney's <i>Electrification of Transport in the City</i> strategy ¹ is focused on prioritising mode shift away from cars - and as a result, its charging targets are relatively low for a city of its size. Charging infrastructure deployment is largely led by the state government rather than City of Sydney, and as a result is largely occurring outside of the inner-city area.
City of Melbourne (CBD and metro area)	All transport in the City of Melbourne is to be emissions-free by 2050, for which active and public transport play an important role ³ .	On-street charging is not supported in the central city, and off-street parking is preferred ³ .	The City of Melbourne is not taking on responsibility for EV charging, but rather taking a supporting role ³ .		The City of Melbourne's <i>Transport Strategy 2030</i> ³ takes a position of advocating for increased uptake of zero-emissions transport. This does not extend to being the facilitator of charging infrastructure.
Northern Territory (state wide)	N/A	N/A	The NT Government is offering 100 residential and 80 business grants for EV charger rollout, and aiming to install at least 400 chargers at certain NT Government buildings ⁴ .		

¹ *Electrification of Transport in the City: Strategy and Action Plan* - City of Sydney, 2023

² *NSW Electric Vehicle Strategy* - NSW Government, 2021

³ *Transport Strategy 2030* - City of Melbourne, 2020

⁴ *Northern Territory Electric Vehicle Strategy and Implementation Plan 2021 - 2026* - Northern Territory Government, 2020

BENCHMARKING

Area	EV uptake targets	On-street charging	Destination charging	Home & workplace charging	Summary
Brisbane City Council (CBD and metro area)	Queensland Government is aiming for 100% of new vehicle sales to be zero-emissions by 2036 ⁷ .	Brisbane City Council has free public EV charging stations at two locations ⁸ , and do not have public targets for further EV charging infrastructure.			Brisbane City Council does not publicly advertise an intention to provide additional charging stations.
ACT (state wide)	80-90% of vehicles to be zero-emissions by 2030	ACT has a goal of 180 public chargers by 2025 ⁹ , and estimate that 580 - 1000 chargers will be required by 2030 ¹⁰ . The ACT Zero Emissions Vehicles Strategy 2022-2030 highlights plans for regulation to require EV charging in some new residential and commercial buildings.			ACT's upper-limit goal is similar to NT (approximately one charger per 430 residents).
Oslo, Norway (CBD and metro area)	Norway is aiming for 100% of new passenger cars and light vans to be zero emissions from 2025 ⁵ . As of November 2022, approximately 80% of new car sales are EVs.	Oslo Kommune (population 709,000) had implemented 400 free chargers by 2011 ¹ . Free parking was previously offered for EVs, but as Oslo's focus has shifted to active and public transport ⁴ , this incentive has been rescinded (along with the removal of 4,000 parking spaces since 2016) ^{2,3} . Across Norway (population 5.4 million) there are 5,041 publicly accessible rapid chargers (>50kW), with only 700 implemented with the help of subsidies ⁵ . Norway's <i>National Charging Strategy (2023)</i> ⁵ did not identify a need for further subsidies for light vehicle chargers, but suggested they could be worthwhile for heavy vehicles during early stages.	In Norway, "charging rights" give apartment owners with parking spaces the right to have an EV charger installed, alleviating some of the challenges of apartment charging ⁵ .		Oslo, and more broadly Norway, has been a global leader for EV adoption. However, Oslo has made a commitment to zero car traffic growth in favour of active and public transport ⁴ - and continued incentives for EVs are largely incompatible with this goal. Oslo presents a case that while EV charging incentives can lead to radical change, it's important to consider the role of EVs in reaching more sustainable transport goals.
European Union (region)	The EU has a zero-emission target for new cars and vans from 2035.	The EU requires that from 2024, its member states provide 1.3kW of public charging capacity for every registered light-duty battery electric vehicle ⁶ . In terms of 22kW chargers (common in Adelaide), this would equate to approximately 17 vehicles per charger. However, this can be re-considered once the share of EVs exceeds 15% ⁶ .			

¹ *Making EVs the right choice* - Euro Cities, 2014

² *Norwegian EV policy* - Norsk elbilforening, 2023

³ *Why Norway - the poster child for electric cars - is having second thoughts* - D Zipper / Vox Media, 2023

⁴ *Reallocation of Road and Street Space in Oslo* - A Tennøy, & OH Hagen / International Transport Forum, 2020

⁵ *National charging strategy* - Ministry of Transport, 2023

⁶ *Regulation (EU) 2023/1804 of the European Parliament and of the Council*

⁷ *Queensland's Zero Emission Vehicle Strategy 2022 - 2032* - Queensland Government, 2022

⁸ *Electric Vehicles* - Department of Energy and Climate, 2024

⁹ *Government funding for public EV chargers* - ACT Government, 2021

¹⁰ *Electric vehicle charging infrastructure* - ACT Government, n.d.

BENCHMARKING

BENCHMARKING SUMMARY

EV charging targets and approaches are highly varied throughout Australia and Europe, with not all cities committing to operate or specifically incentivise further EV charging infrastructure. At this point in time, there is no universal method for setting EV charging targets.

Specific targets, and the quantum used to define those targets, varies by jurisdiction:

- Europe: 1.3kW per EV
- Northern Territory: 1 charger per 425 people
- Australian Capital Territory: 1 charger per 430-743 people
- City of Sydney: 1 charger per 203 resident-owned cars
- Norway: currently have 1 charger per 1071 residents

Electrification strategies by the City of Sydney and City of Melbourne emphasise the importance of mode shift away from cars of any kind as part of transport decarbonisation goals - particularly highlighting the inefficient space requirements of cars.

Oslo provides a forward-looking viewpoint of a more progressed city in terms of EV adoption. Through incentives including charging, Oslo has achieved a very high share of EVs, but now seeks to focus more on replacing vehicles entirely with public and active transport.



EV CHARGING TARGETS

Local charging patterns and growth projections

EV CHARGING TARGETS

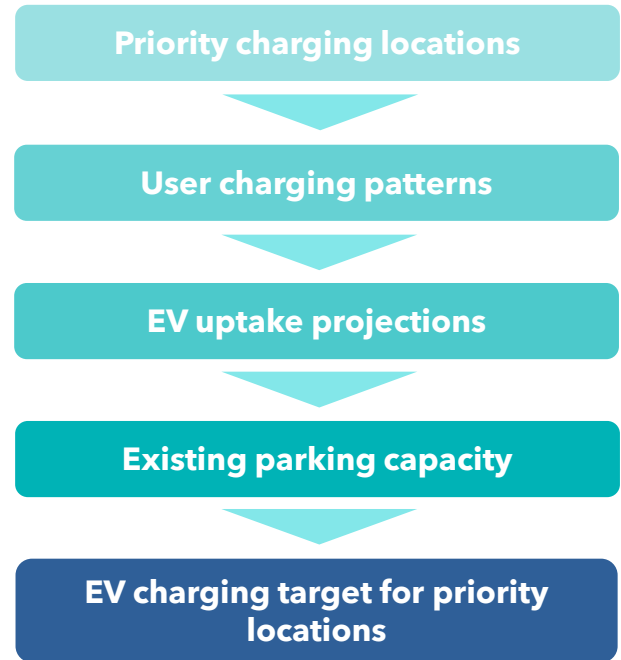
OVERVIEW

This section provides an initial short-term target for public EV charger rollout at priority charging locations, and an indicative upper-limit number for 2030 in CoA.

Two key considerations when estimating the number of public charging bays required are:

- How many EVs might be parked in existing on- and off-street CoA assets in the future?
- How many of those might want/need public charging infrastructure at any given time?

Noting that EV technology, competition, and the broader transport mix are not stagnant, it's important for any target to be monitored over time. This section will also include some analysis of the utilisation and performance of CoA's current EV charging network.



CHARGING PATTERNS AND PROJECTIONS

EV CHARGING PATTERNS

Research indicates that the vast majority of EV charging currently occurs at home. A 2022 Electric Vehicle Council study indicated that only around 10% of surveyed Australian EV owners used public or workplace chargers at least weekly¹. A CSIRO report estimates public charging will account for 5 - 11% of charging by 2050².

Most EV owners charge an average of 4 times per week³. Assuming 10% of these sessions occur outside the home, this translates into approximately 0.4 public charging sessions per EV per week.

CHARGING VOLUMES

The City of Adelaide manages a total of approximately 18,300 parking spaces across the City and North Adelaide⁵.

Assuming parking assets remain constant, and considering EV market share projections by the CSIRO⁴ (figure A.1), EVs could occupy 7 - 21% of spaces by 2030; meaning EVs may account for up to 1,300 - 3,800 vehicles parked in CoA parking spaces at any given time.

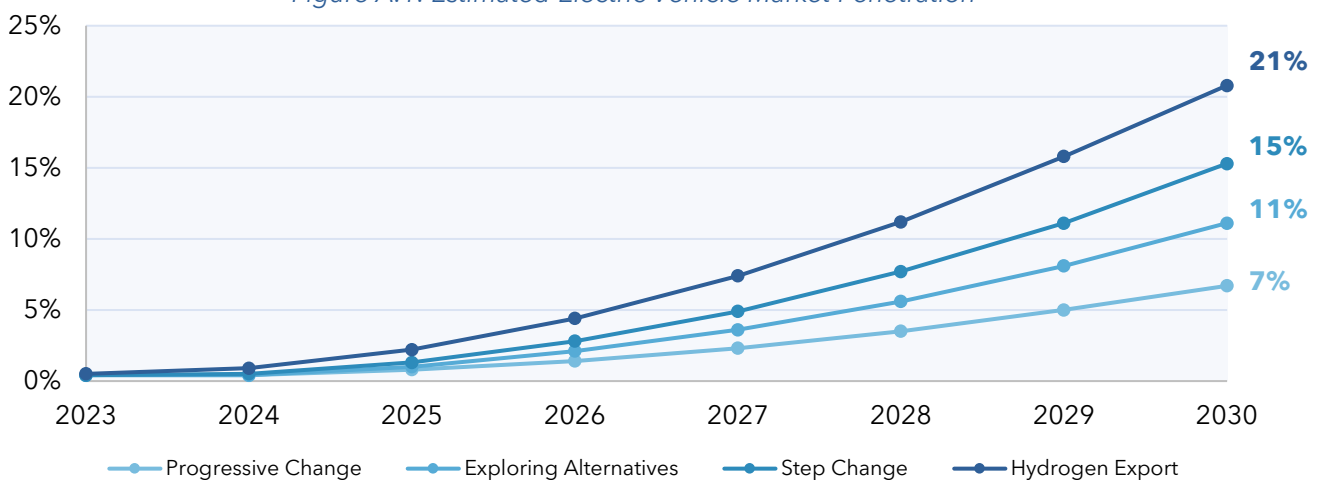
UPPER-LIMIT ESTIMATE

Based on current public charging rates, an upper limit estimate of 3,800 EVs could be expected to generate 217 sessions in public chargers by 2030.

Although the total number of EVs using CoA parking spaces may be greater due to parking space turnover, pricing and time limit policies can help to ensure that similar turnover rates apply to EV charging spaces, ensuring those who need a charger can access one.

Providing a total of ~220 EV chargers has the potential to fully meet charging demand to 2030 based on current public charging rates. However, this is an upper-limit estimate, not considering the trade-offs required to place this quantum of infrastructure in the public realm. In the short-term, a more targeted approach is recommended, focused on ensuring targeted coverage to priority locations identified in the Roadmap, followed by observation of utilisation.

Figure A.1: Estimated Electric Vehicle Market Penetration⁴



¹ *Insights into electric vehicle ownership* - Electric Vehicle Council, 2022

² *Electric vehicle projections 2021* - P Graham & L Havas / CSIRO, 2021

³ *Milestone 8: EV Management and Time-Of-Use Tariff Profiles* - WJ Nacmanson, J Zhu, & L Ocha, 2022

⁴ *Electric vehicle projections 2022* - P Graham / CSIRO, 2022

⁵ *Parking in the city* - City of Adelaide, 2024

CURRENT TARGETS AND ROLLOUT

CURRENT EV CHARGER ROLLOUT

The City of Adelaide draft Integrated Climate Strategy 2030 sets a goal of providing 100 public EV charging bays by 2030.

CoA is tracking well with respect to accelerating the shift to EVs, with a current capacity of 78 charging bays (figure A.2):

- 72 EV charging bays in UPark facilities (42 of which have been installed since 2022).
- 6 EV charging bays on-street or in similar short-term parking locations¹.

These chargers vary in terms of charging typology, and the mechanism through which they're provided; with most chargers installed from 2022 being provided through a partnership (for example with RAA Charge).

The performance of CoA's public charging network is detailed in following sections.

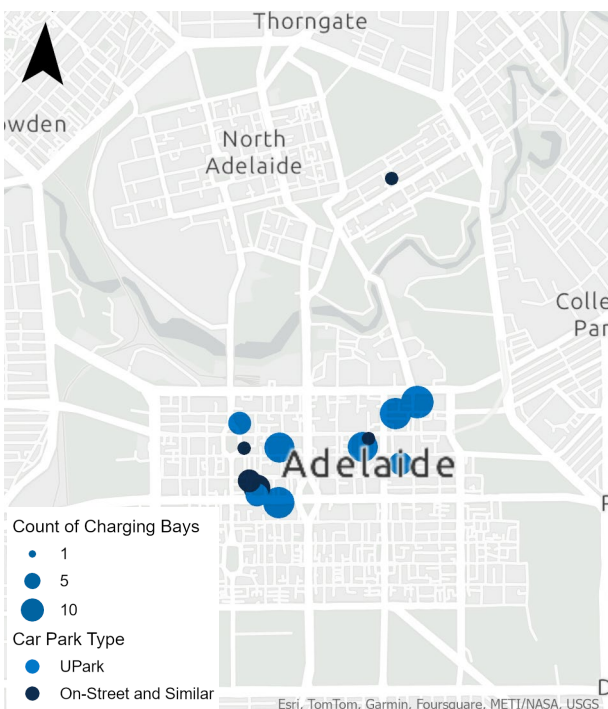


Figure A.2: Current EV charging capacity in City of Adelaide parking locations

¹ Excluding chargers at 109 Franklin Street, as this site has been sold to Renewal SA and will undergo redevelopment.

THE ROADMAP

The Council's intention is to prioritise EV charging infrastructure in the locations defined in the Roadmap (summarised in figure A.3 on the following page).

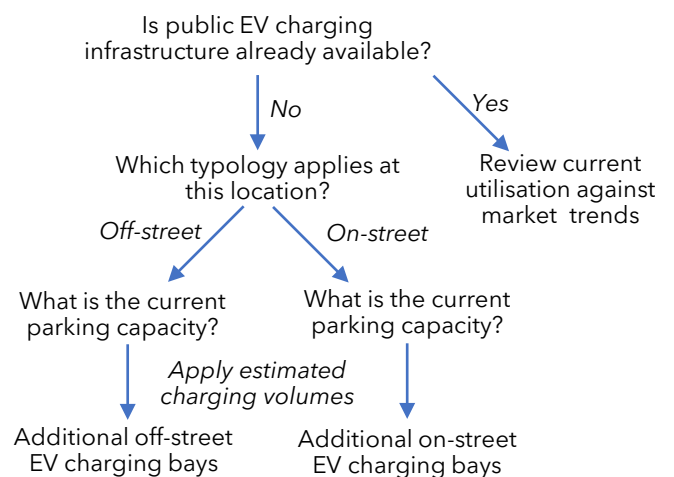
The priority locations are split between destination (which are generally off-street) and on-street charging, as each typology serves different need:

- On-street parking is typically used to meet residential and shorter-term, higher-turnover parking needs, suiting faster charging infrastructure.
- Off-street parking is generally used for longer duration stays and can be more suited to slower charging typologies.

The charging infrastructure that has been implemented to date (predominantly in UParks) generally meets the needs of visitors parking for longer durations. Focusing on other charging typologies, including on-street, can help to ensure residents' needs are also met.

TARGET DEVELOPMENT

Initial EV charging infrastructure requirements were derived for each of the Roadmap's priority locations using the below process:



This leads to an initial target of **25 new public EV charging bays** across the Roadmap's priority locations, described in further detail on the following page.

RECOMMENDED LOCATION TARGETS

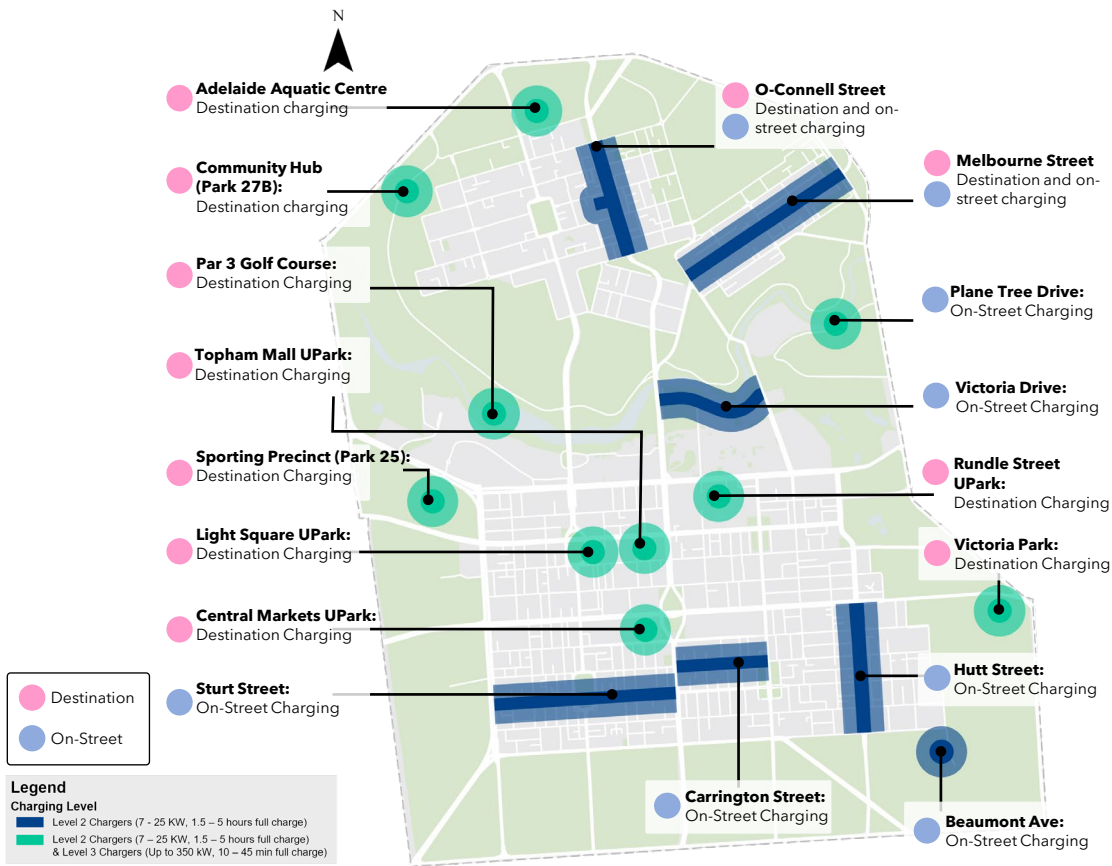


Figure A.3: Priority public EV charging locations from the Roadmap

RECOMMENDED LOCATION BREAKDOWN

Charging bay quantities

The following targets consider the number of on- or off-street EV charging bays at each priority location. In some cases, the infrastructure required may be minimised by using one charging station to serve two charging bays simultaneously.

Existing UPark capacity

Public EV charging is available at the UPark locations listed in the Roadmap. While there may be opportunity for additional charging capacity for fleet customers or residents, introduction of increased public EV charging capacity at these locations is not recommended in the short-term and should depend on the utilisation of existing infrastructure. Supporting analysis is provided in the following sections.

Council's role

Some priority locations are not under the care and control of City of Adelaide, and the Council seeks to influence charging infrastructure in these locations.

Recommended locations	On-street	Destination
Adelaide Aquatic Centre		<i>Influence</i>
Beaumont Avenue	2	
Carrington Street	2	
Community Hub (Park 27B)		2
Hutt Street	4	
Par 3 Golf Course		2
Sporting Precinct (Park 25)		2
Victoria Drive	2	
Victoria Park		<i>Influence</i>
Melbourne Street	2	2
O'Connell Street	1	<i>Influence</i>
Plane Tree Drive	<i>Influence</i>	
Sturt Street	4	
UParks		<i>Implement selectively</i>
Total	17	8

CITY OF ADELAIDE USAGE DATA

DATA AND LIMITATIONS

The CoA EV chargers record anonymised usage data that can be used to calibrate projections to the CoA's context, and to monitor the performance of CoA's charging network as it is rolled out.

The EV charging data contained in this document only contains CoA owned-and-operated charging stations¹ (i.e. RAA Charge and similar schemes are not included).

Charging data is recorded only when a user connects an EV to a charger, and hence the data in this document does not include cases where a vehicle is parked in (but not connected to) an EV charging bay.

To gain a comprehensive understanding of patterns and potential growth projections would require additional data points - including the full network of chargers operating within CoA parking assets and including statistics for non-charging vehicles.

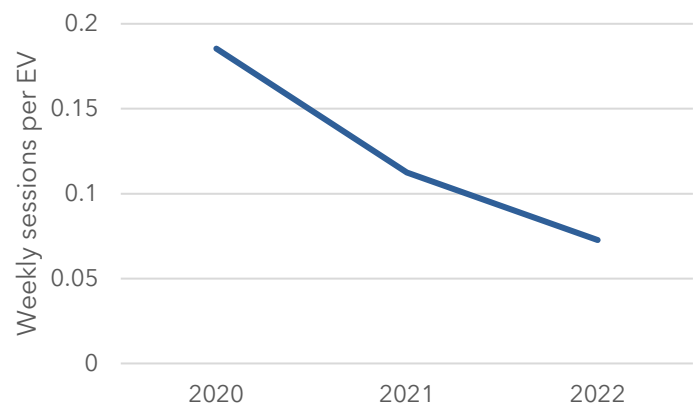
CHARGING SESSIONS PER EV

Correlating CoA charging data with EV registrations in Greater Adelaide provides a high-level overview of current charging trends in Adelaide (figure A.4).

The rate of charging sessions per EV has trended downwards since 2020, which could be due in part to more 'competition' from home, apartment, and other privately-operated chargers. Overall charging rates remain relatively low, with only 0.075 sessions per EV per week in CoA chargers. This is lower than research suggests but is reasonable considering that not all registered EVs are driven to the city, and not all public charging occurs at CoA owned-and-operated chargers.

This analysis highlights the importance of re-evaluating charging targets as the transition to EVs progresses in line with market and technology trends, and changes in charging behaviours over the next decade.

Figure A.4: Weekly charging sessions on CoA chargers per Greater Adelaide-registered EV



RESIDENT CHARGING

The postcodes of EV drivers are available for some charging sessions in CoA. Assuming postcode data was entered correctly by charger users, CoA residents accounted for approximately 11% of charging sessions at CoA chargers in 2022.

At 0.12 sessions per EV per week (compared to 0.075 sessions per week for all Greater Adelaide EVs), CoA EV owners appear much more likely to use CoA owned-and-operated chargers than the Greater Adelaide average.

Some CoA residents do not have access to off-street parking or live in buildings without charging capability. This may be contributing to the rate of charging being higher among CoA residents than the Greater Adelaide total.

ONGOING MONITORING

As the EV market and transition matures, understanding the performance and utilisation of EV chargers will be important as the share of EVs increases, and additional chargers are added to the network both within and externally to CoA parking assets.

CHARGING DURATIONS

In CoA owned-and-operated charging locations from Q1 2022 - Q1 2023, the average length of a charge session was:

- UPark chargers: 6.5 hours (2.4 hours of charging, and 4.1 hours of parking). This longer-term occupancy is likely reflective of the facilities being used for all-day parking.
- Other chargers: 1.4 hours (1.1 hours of charging, and 0.3 hours of parking). This shorter-term occupancy is likely reflective of these locations having time limits imposed on parking.

CHARGING SESSIONS PER DAY

Current available data shows that on average²:

- Hindmarsh Square and Franklin Street chargers perform well, with up to ~4.5 charge sessions per charger, per day.
- Light Square and Jerningham Street are less utilised, with 0.5 to 1.2 sessions per charger per day.
- UPark chargers are more varied, with peak usage between 0.1 - 1.9 sessions per day. Most UPark chargers experience fewer than one charging session per day. It is likely that EV charging bays are being occupied more than indicated, but not used for charging.

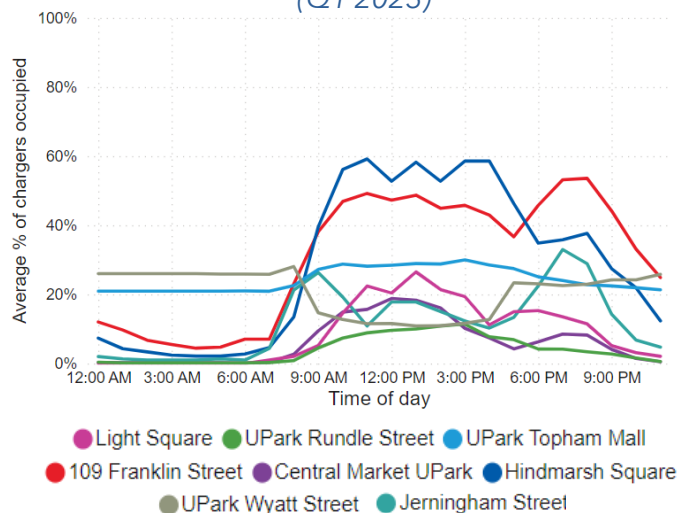
OCCUPANCY RATES

The occupancy of CoA's existing charger network provides another indicator of whether existing EV charger supply is sufficient. However, the data available at the time of writing only includes occasions where users plug in their cars; a key gap in measuring total occupancy.

From the available data, most CoA owned-and-operated EV charging locations had an average peak occupancy below 50% in Q1 2023 (figure A.5), indicating that CoA EV charger supply may be ahead of where it needs to be at present.

It is worth noting that Hindmarsh Square and Franklin Street have particularly high occupancy rates, likely due to parking being free at these locations.

Figure A.5: Average occupancy at CoA owned-and-operated EV charging locations (Q1 2023)



¹ The data has been filtered to remove significant periods of time during which no usage was recorded to account for charger inoperability. Resulting figures are approximate.

² H1 2022 - H1 2023. In addition to ¹ above, sessions less than 20 minutes have been removed.

TARGET SUMMARY

TARGET SUMMARY

Based on current public charging rates and estimated EV uptake, there could be demand for 25 new public EV chargers in the Roadmap's priority locations by 2030.

Together with the 78 EV chargers currently available in CoA on- and off-street parking assets, this would bring the total capacity to 103.

There are currently 72 EV chargers in UParks. Usage data for these chargers suggests that demand is relatively low at present. In future, CoA may still choose to implement additional charging at UParks that do not yet have charging facilities (such as Gawler Place UPark), but significantly more capacity could likely be achieved through parking control changes, rather than new infrastructure.

Of the recommended 25 public EV chargers, 8 were identified for priority off-street locations, and 17 on-street.

Actual distribution should be based on spatial need, and with appropriate pricing and time limits applied to ensure sufficient turnover. For example, initiatives to shift some EV charging demand from on-street locations to UParks could help to minimise impacts on urban amenity.

Targets should be regularly benchmarked against other available data, including occupancy rates (as shown previously). Low occupancy rates indicate that CoA may be ahead of the curve already, and a further rapid build out risks creating redundant infrastructure in the short term. High rates at particular locations can help to target future expansion.

COMPARISON TO OTHER REGION TARGETS

City of Sydney

City of Sydney's targets translate to a goal of approximately 1 charger per 200 resident motor vehicles in 2035. At this rate, 103 chargers would correspond with 20,600 resident motor vehicles, which is approximately double the number of all vehicles registered in CoA as of 2021.

Geographically, Sydney's target results in a higher density of chargers compared to Adelaide (approximately double). However, Sydney's population density is also approximately 5x greater than Adelaide's.

NT and ACT

Targets for NT and ACT correspond with approximately 1 charger per 425 residents.

At this rate, 103 EV chargers would correspond with a population significantly greater than the population of CoA (as of 2021).

European Union

The EU has a target of 1.3kW of charging capacity per light-duty battery EV (while EV share is below 15%).

Based on the projections provided earlier, EVs could account for 7 - 21% of all vehicles parked in CoA parking spaces at any given time by 2030 (1,300 - 3,800 vehicles).

Applying the EU target to this number of vehicles would correspond with 1,690kW - 4,940kW of charging capacity. This equates to between 77 - 225 chargers with 22kW output.

With 78 EV chargers already available at CoA on- and off-street parking assets, the lower bound estimate is already being provided for. The short-term target will increase capacity further, and monitoring can help to refine longer-term targets.