



CENTRAL VICTORIAN
Greenhouse Alliance

Outcomes Report for Central Victorian Greenhouse Alliance

Charging the Regions: Local Government EV Charging Network Study Component 5 – Outcomes Report

April 2020



Charging the Regions: Local Government EV Charging Network Study

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Disclaimer

This report was prepared for the Central Victorian Greenhouse Alliance Charging the Regions project. Ndevr Environmental accepts no liability whatsoever for reliance by any third party on any aspects of this report.

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Charging the Regions: Local Government EV Charging Network Study

1 Introduction

Ndevr Environmental was engaged by the Central Victorian Greenhouse Alliance (CVGA) to deliver the *Charging the Regions: Local Government Electric Vehicle Charging Network Study* (the project). The project is led by the CVGA, and includes 43 rural and regional councils, 12 metropolitan councils, 5 greenhouse alliances, the Victorian Government and the Electric Vehicle Council.

The project objective was to provide participating councils (shown in Figure 1) **with all the relevant information and tools to best facilitate a co-ordinated EV charging network across Victoria.**

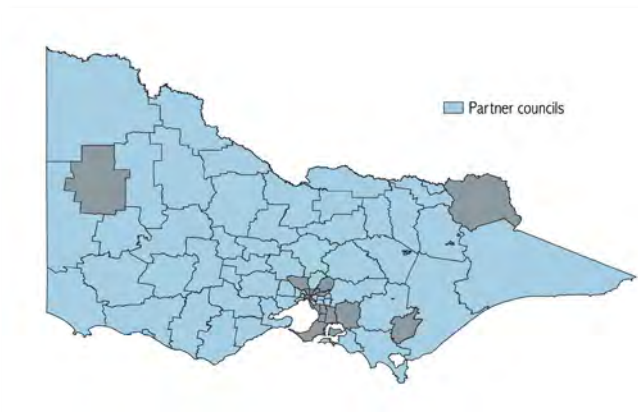
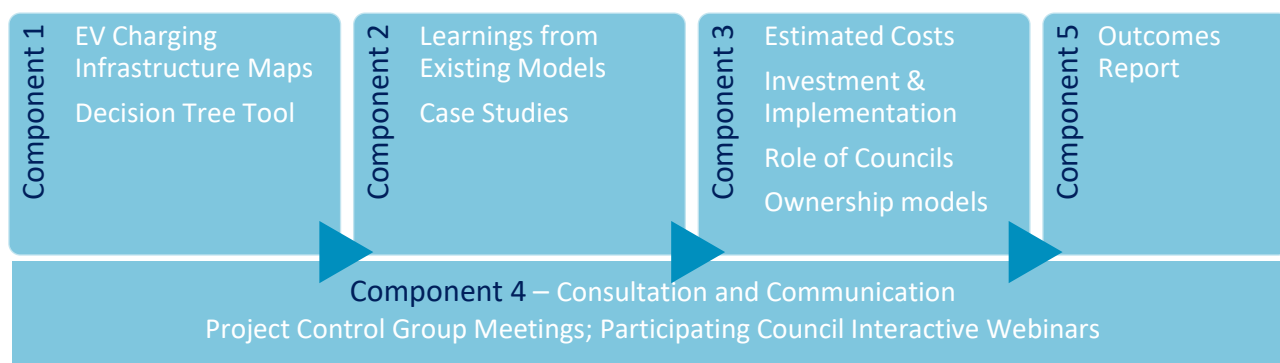


Figure 1: Participating Councils

The project has been delivered in five components:



This Report constitutes the final component, summarising the key project outcomes, and detailing the next steps. This follows the delivery of two interim reports and two knowledge-sharing webinars. The project has been delivered with thanks to all stakeholders who provided insights. Stakeholders include end-users, installers, suppliers, governance bodies, the Project Control Group and all participating councils who participated in multiple online forums and surveys.



Note this is not an exhaustive list of relevant stakeholders

2 Key Project Outcomes

The outcomes of the project are as follows:

2.1 Current network and gaps

There is a gap in charging infrastructure across regional Victoria.

Component 1 of the project involved engagement with participating councils, and charging network providers to identify existing and planned charging infrastructure across Victoria. These were provided in maps in Section 3 of the **Components 1 & 2 Report**. The maps showed the significant role Tesla has played in the development and installation of EV charging networks, given the prevalence of Tesla Infrastructure across Victoria (red markers shown in Figure 2) in comparison to other models. It also highlighted the gap in connectivity in regional areas for non-Tesla EV drivers, as Tesla stations are designed for Tesla vehicles only.

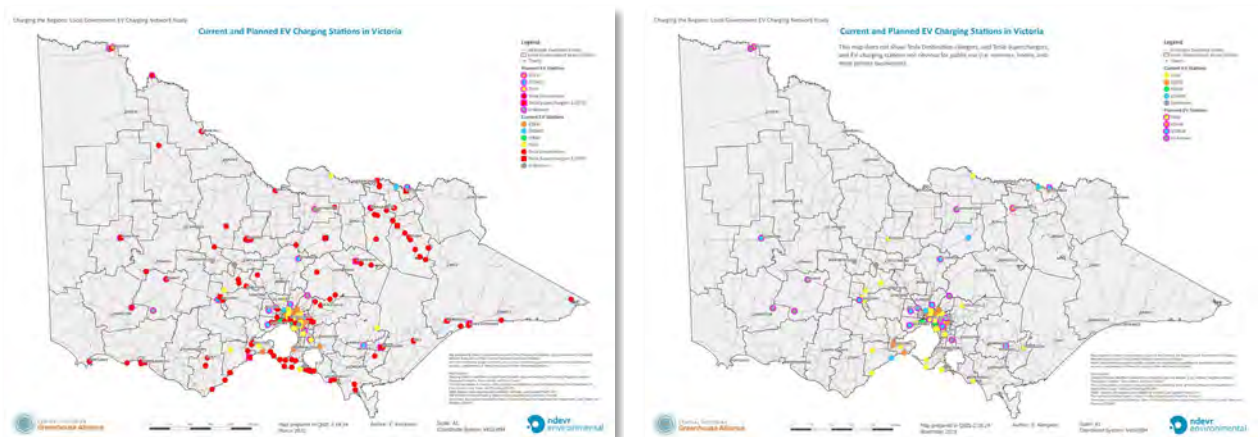


Figure 2: Map of Stations (a) including Tesla (b) excluding Tesla (stations over 7kW available to the public)

Priority towns in need of charging infrastructure to enable regional connectivity for all EV drivers were identified based on traffic volumes and regional connectivity; proximity to existing or planned charging station; population densities; proximity to popular tourist destinations; access to amenities; socio-economic areas; and planning zones as illustrated in Figure 3 and detailed in the **Components 1 & 2 Report**.

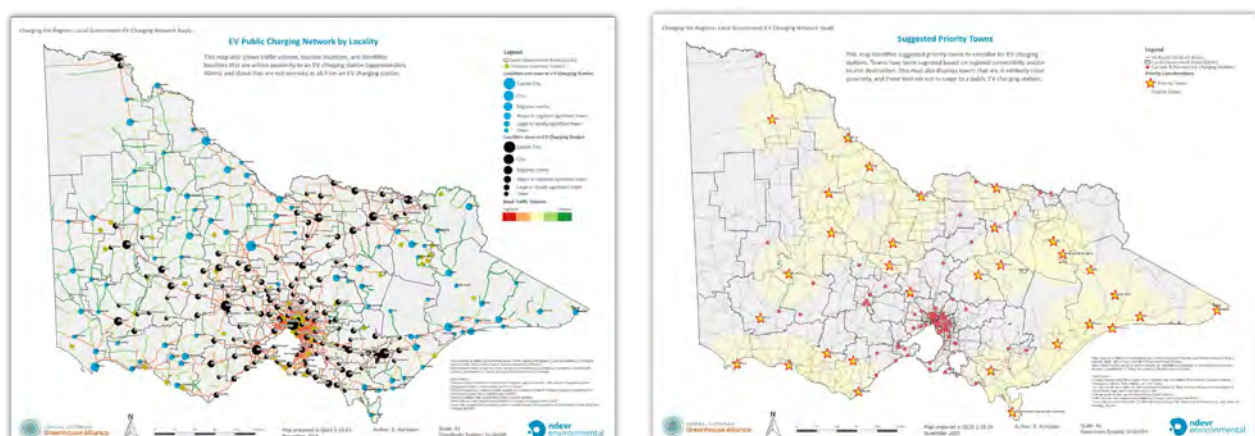


Figure 3: Suggested Priority Towns and Zones

Full sized maps are attached in Appendix A – Maps at the end of this report.

2.2 Learnings from others

The experiences of others in installing public charging infrastructure provided valuable insights into key considerations.

To ensure a charging infrastructure project roll-out by a large consortium of councils has the greatest chance for success, it was important to consider the lessons from those councils and government bodies that have previously installed public charging stations.

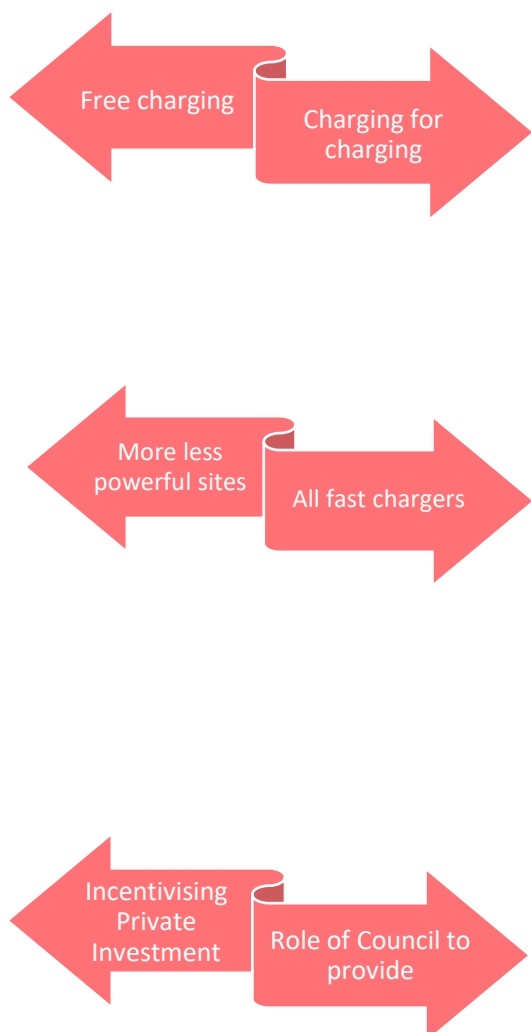
Section 4.3 and Appendix C of Components 1 & 2 Report contains an overview of each of the studies, including City of Adelaide, Tri Councils in NSW, the NRMA, Queensland Super-Highway, New Zealand, the City of Moreland and Knox City Council, with a desktop case study of Norway and Western Australia.



Figure 4: Case Studies were developed in consultation with stakeholders to be provided to the public

Key takeaway learnings from Australian and International case studies were compiled in [Section 4.3](#) and incorporated into the Decision Tree tool and in the development of the recommendations.

The following considerations identified in the case studies were explored with participating councils in the webinars:



While some councils (e.g. City of Moreland) firmly believe in providing free charging to support Australia's relatively low EV uptake, many other case studies advised against providing free charging to ensure that it was not taken for granted. Many case studies had initially provided free charging in the form of a free trial roll-out but found that it sometimes led to strange charging behaviour and that it was difficult to start charging for something that was previously free.

A mix of charging stations will be required to provide a future ready network of charging for Victoria. Enough fast and ultra-rapid chargers on the major arterials and a dense number of destination chargers in and around towns to cater for both passing through and visiting tourists will be required. New Zealand advised that they experience queues for public charging and recommended that more stations be installed. Similarly, the Tasmanian roll-out highlighted the desirability of sites that could accommodate additional sites in future as uptake increases.

While some councils firmly believe that it is their role to provide charging infrastructure, the City of Adelaide has shifted from providing chargers to incentivising private investment through the City of Adelaide Sustainability Incentives Scheme as detailed in the case study. The Charging the Regions project saw the value in a combination of these approaches.

Appendix C presents a more in-depth and visual two-page outline of each case study.

2.3 Costs and Benefits

The various costs and benefits associated with a charging infrastructure network roll-out are outlined in **Component 3** in **Section 3**, with the **Decision Tree Tool** helping councils select sites that would maximise benefits and keep costs low. The costs associated with various roll-outs will vary depending on the number, type, location of stations, and how they are procured. The benefits will also vary depending on the extent of the roll-out.

The many different costs to consider have been outlined in **Section 3.1. Table 2** in this section summarises the various cost categories, the different cost components and then estimates a cost range for each component. Because of the wide variability in the cost of nearly every element of charging infrastructure, the figures provided should serve as a guide only. More detailed pricing of charging hardware is provided in **Appendix B of Component 3**. For other cost components, such as installation costs, which vary greatly, and public infrastructure costs, which are not widely disclosed, estimations were made from case studies and various stakeholder consultations, ongoing throughout the project.

The various benefits are outlined in **Section 3.2**. The benefits associated with a charging station roll-out include direct financial benefits through payment for use of the chargers; and indirect financial benefits through increased expenditure in the local communities, avoided health costs from the associated removal of internal combustion engine vehicles, and the environmental benefit of the same. Various existing revenue models for direct financial benefits are outlined in the case study overview in **Section 4.3 of Components 1 & 2**.

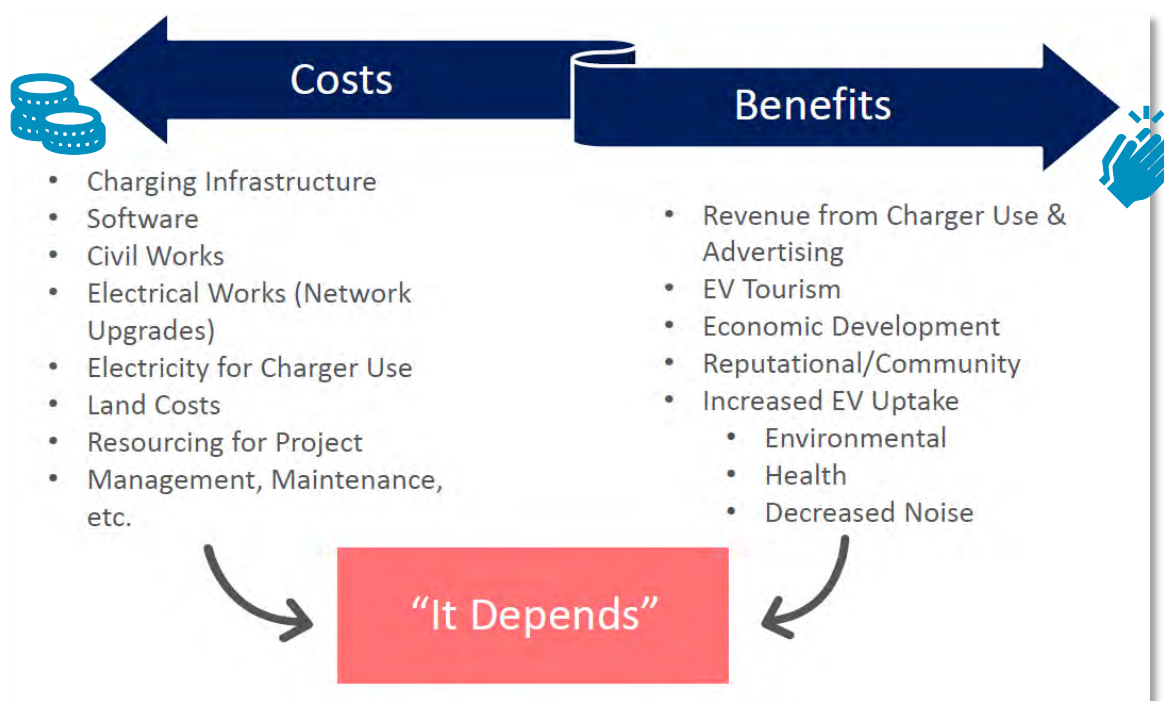


Figure 5: Most common response from stakeholder was "it depends"

Participating councils were provided with a business case calculator (excerpt shown Figure 6) which enables them to investigate the costs and benefits of different scenarios (i.e. charger numbers, charger types, charging rates, weighted average cost of capital, revenue model).

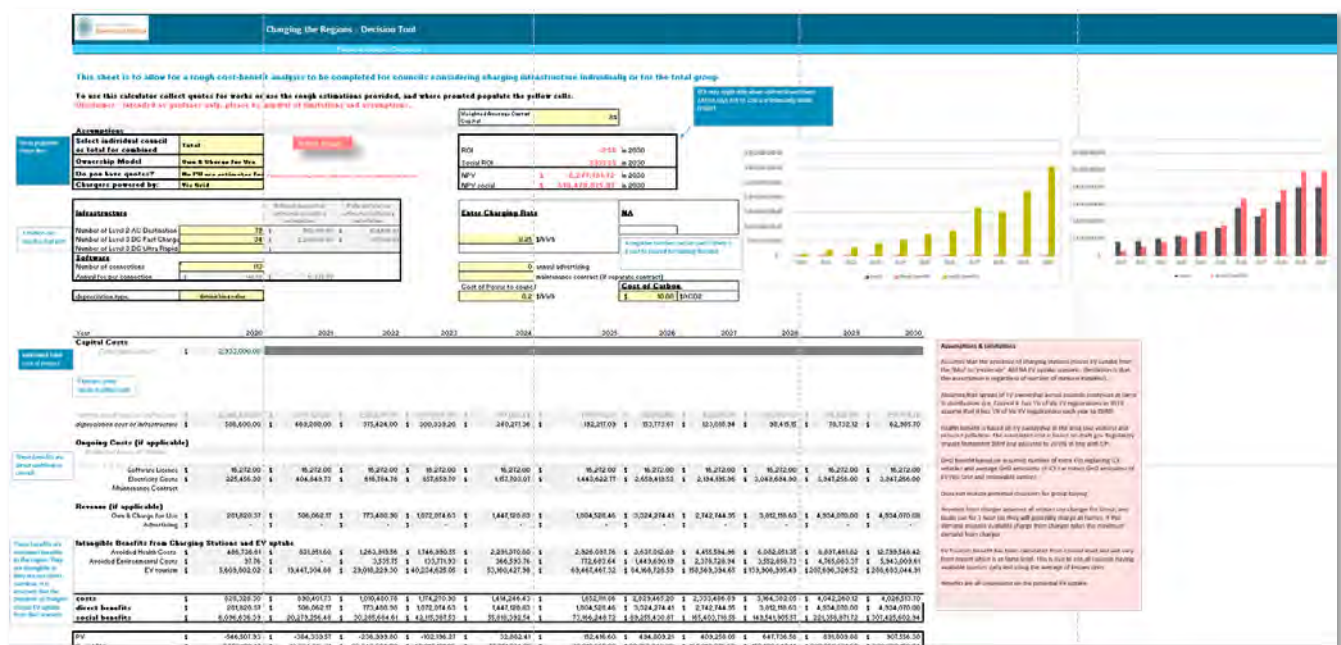


Figure 6: Excerpt from Financial Analysis Calculator

The tables below provide an indication of costs and benefits of the two options discussed in the webinar.

Table 1: Costs and benefits of two roll outs

| 25-50kW DC | | 7kW AC | |
|---|---|---|--|
| Costs | Benefits | Costs | Benefits |
| Charging infrastructure around \$17,800 – 35,000 AUD (excluding bulk buy discounts, GST and installation) | More attractive to customers/users, more likely to stop | Low infrastructure costs (from \$1,500 AUD) | Available to most EVs on the Australian market today |
| Potential installation/electrical costs for network/switchboard upgrades | Available to most cars on the Australian market today | Low installation costs (~\$800 AUD) | Economic development – estimated linger time – 2.7hr* |
| Outright ownership will come at a higher cost, but councils will have full control and can pick sites | Building EV tourism and regional connectivity – objectives of the project | | Broader benefits – environmental, health, reputational |
| | Economic development – estimated linger time 20-60 min* | | Only requires single phase power |
| | Broader benefits – environmental, health, reputational | | Still contributes to connectivity but less attractive to long distance EV drivers. |
| | Potential for revenue directly from charging | | |

2.4 Environmental, social and economic benefits

Increasing charging infrastructure visibility is known to increase EV uptake by dispelling perceived range anxiety.¹ Increasing the uptake of EVs across Victoria from the ARENA business as usual scenario to even the moderate uptake scenario by 2030 was modelled to **avoid in the order of \$12.8M in health costs, and 600,000tCO₂-e.**² Further, a roll-out to ensure regional connectivity could potentially generate \$258M for regional economies over the next ten years by the respective EV tourists.

The current low penetration of EVs in the Australian market hinders the purely financial business case, which is reliant on revenue from EV drivers charging. However, there is a strong business case when considering the environmental, health and social benefits that can be achieved through facilitating greater EV uptake, which in turn improves the financial business case due to the increased number of EVs.

There is a business case for councils to continue this project to achieve regional connectivity, climate change mitigation, and to demonstrate leadership to the local communities, which was the objective of the project.

The business case calculator provided to participating councils in [Component 3](#) allows for multiple variables to be altered.

Figure 7 adjacent illustrates one scenario where: 70 50kW DC networked fast chargers are installed across Victoria; the price of the estimated installation is straight-line depreciated; councils pay \$0.20/kWh and charge \$0.25/kWh for usage; and a price on carbon is \$10/ tCO₂e.



Figure 7: Excerpt from Financial Analysis Calculator

In this scenario the estimated cost is in the order of \$5M. In comparison, the ARENA funding component alone for the Ultra Rapid Charging Stations was \$6M for 21 stations from Adelaide to Brisbane, around Perth and in Tasmania. While more than a single station should be installed for future-proofing, a minimum of one will help alleviate range anxiety concerns and can be built upon in future.

¹ Morrissey, P., Weldon, P. and O'Mahony, M. (2016).

² Ndevr Environmental modelling in component 3

2.5 Site Selection

Component 1 of the project also utilised the learnings from the case studies prepared in Component 2 and stakeholder consultation to provide site selection guidance for participating councils in identifying optimal locations within their municipality. These are detailed in Section 4 of Components 1 & 2, and captured in an accompanying Decision Tree Tool, to enable participating councils to assess the feasibility of locations within their municipality by working through a series of prompting questions and considerations to rank different sites (Figure 8).

Charging the Regions - Decision Tool

Guidance to help select optimum sites

Answer the questions below in the yellow cells to identify any key considerations for the site as well as any red or green flags. (note, not all questions will generate a flag)

A suitability score will be generated to allow comparison of sites. That can be tallied in the table to the right.

Refresh answers before assessing a new site.

Refresh Answers

Cover Towns Site Chargers

| Site Name | Site 1 | Site 2 | Site 3 |
|-----------|--------|--------|--------|
| Score | | | |

| Question | Ans. | Comments/ Considerations | Flags | Score |
|--|------|--|-------|-------|
| General | | | | |
| Are you considering a site that was identified as a priority zone? | | | | |
| What is the objective of the charger? | | | | |
| Do you know the level charging station you want? | | | | |
| How many stations would you like to install? (insert #) | | | | |
| Will charging infrastructure at this site be connected to a charging network? (e.g. EVup, EVIE, Chargefox, ChargeNet, Chargepoint, NRMAs, Tesla) | | | | |
| Planning & Site Location | | | | |
| Is the site council owned land? | | | | 0 |
| Is there a reason for wanting drivers to stop here? (i.e. regional connectivity, tourism, potential demand) | | | | 0 |
| Are amenities (toilets & eateries) in close proximity? | | | | 0 |
| How far away is the next charging station? (km) | | | | |
| Are there places to linger and spend? | | | | 0 |
| Is the site highly visible? | | | | 0 |
| Is the site subject to any planning scheme restrictions? | | Refer to https://marche.vic.gov.au/visison-and-confirm-with-Planning-Team | | 0 |
| Is the site an existing car space? | | | | 0 |
| Is the site accessible to the public 24-7? | | | | 0 |
| Is the location outdoors? | | | | 0 |
| Are there any parking restrictions? | | | | 0 |
| Power | | | | |
| Does the site have an existing meter? | | | | 0 |
| Does the site have 3-phase power? | | | | 0 |
| Does the site have spare allocated network capacity? | | | | 0 |
| Is the site in close proximity to the switchboard? | | | | 0 |
| Would trenching be required to lay cables to connect the charging station to the switchboard? | | | | 0 |
| Is the switchboard in suitable condition? | | | | 0 |
| Is there a spare circuit breaker? | | | | 0 |
| Does the circuit breaker correspond to the charging station power? | | | | 0 |
| Connectivity | | | | |
| Is there an available internet connection or mobile internet signal? | | | | 0 |
| Is there a strong mobile reception signal? | | | | 0 |
| Physical | | | | |
| Is there physical space for a charging station? | | | | 0 |
| Is it safe to access? (i.e. clear visibility from oncoming traffic, and constructed crossovers) | | | | 0 |
| Are vehicles able to manoeuvre into the space? | | | | 0 |
| Will the cable reach the car charge point? | | | | 0 |
| Sustainability | | | | |
| Does the site have solar? | | | | 0 |
| Does the site purchase Greenpower or contract via a Power Purchase Agreement (PPA)? | | | | 0 |
| User Safety | | | | |
| Does the site have adequate lighting? | | | | 0 |
| Is the site in a safe/ desirable location for tourists? | | | | 0 |
| When plugged in could the cables be a tripping hazard? | | | | 0 |

Listed here to consider

| Installation Considerations | |
|-----------------------------|--|
| Tyre stops and bollards | |
| Wayfinding signs | |
| Instructional signs at site | |

| | |
|------------|-----------|
| Green Flag | 0 |
| Red Flag | 0 |
| Score | 0 from 20 |

Figure 8: Excerpt of Questions in Decision Tree Tool

The ideal sites are existing off-street, highly visible council-owned car spaces with access to power near public amenities.

Key features of a desirable site included:

1. **Potential demand.** Regional Connectivity, Tourism.
2. **Desirable for an EV user to stop.** Proximity to amenities such as restrooms and food.
3. **Access to power & connectivity.** An existing grid connection, with available capacity at the site and from the network. Network upgrades, if required, can be costly and time-consuming.
4. **Physical space.** For the car, charger and transformer (if required).
5. **Off-street parking** is preferred to on-street. Off street will generally have more space, be in closer proximity to an electrical supply, and on-street EV charging can (a) present liability concerns due to potential tripping hazards, and (b) require illegal parking for EVs to charge.
6. **Highly visible** location with lots of signage to increase awareness of existence of EVs for non-EV owners and reduce perceived range anxiety.
7. **Council owned** land with planning approvals so that council can install stations.
8. **Minimal civil installation works** to minimise costs. For example, a garden bed is easier to dig up to install cabling than a footpath, and the closer proximity to power the less trenching required.



Figure 9 Example of EV required to park illegally to use on-street charging



Figure 10: The Tesla Super charger site in Euroa is located in a public off-street car park opposite a public toilet and within walking distance to the main street

2.6 The role of Councils

The new *Local Government Act 2020* requires local governments to: give priority to achieving the best outcomes for the municipal community, including future generations; promote the economic, social and environmental sustainability of the municipal district, including mitigation and planning for climate change risks, innovation and continuous improvement is to be pursued; and collaboration with other Councils and Governments and statutory bodies is to be sought.

Councils are on the ground with the community and, therefore, have an important role in supporting local communities through transitional periods. The benefits of a coordinated approach are discussed in [Section 4.4 of Component 3](#). There is clear power in numbers, as higher levels of coordination bring about more benefits, such as network connectivity and seamless experiences for users driving from station to station, the opportunity to investigate user behaviour and the possibility of meeting financial requirements for funding, as well as a wide range of manufacturer and distributor discounts.



Figure 11: Role of Council

The Australian Government has yet to release its new national strategy on EVs. Similarly, the Victorian Zero Emission Vehicle (ZEV) Roadmap is not scheduled for release until mid-2020, and while the provision of charging infrastructure will be a component of it, the measures that the State government is currently considering have yet to disclosed. In contrast, the NSW government in its recently released Net Zero Plan, has committed to an *Electric Vehicle Infrastructure and Model Availability Program*. Investment will be targeted by running competitive funding processes that co-fund: (a) the deployment of fast EV charging infrastructure; and (b) vehicle fleet owners, such as car rental companies, car share companies and local councils, to procure electric vehicles. Hopefully, the Victorian strategy includes similar measures, given that the barriers to uptake of vehicle affordability and access to fast charging are the same in Victoria.

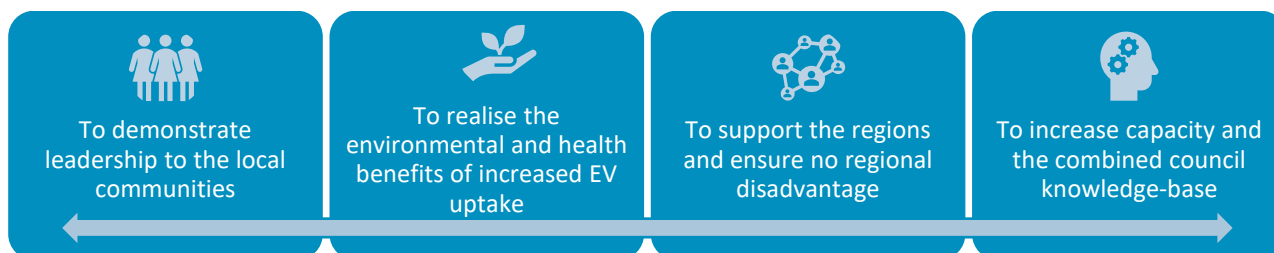


Figure 12: (L – R) National EV Strategy is coming, Victorian EV strategy is coming, NSW has committed to an EV investment program, Infrastructure Australia highlighted the need for national fast charging network

2.7 Council objectives

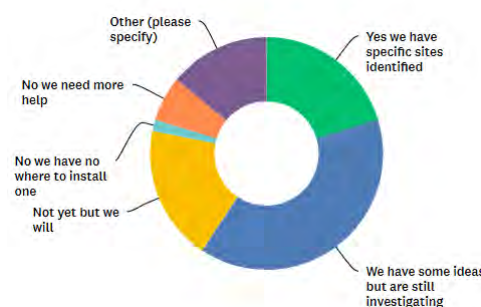
Local councils want to collaborate to best support their local communities and mitigate climate change.

132 responses to the initial online survey from 57 different participating councils highlighted that the key drivers for the Charging the Regions project were:



The key barriers identified at the beginning of the project and how they have been addressed through this project are listed below:

- **Uncertainty of local government's role** with respect to charging stations. Councils considering it be supporting private investment, purchasing and maintaining public stations, or no role at all. The role of council was a focus of the **Component 3 Report** and a discussion point for the second webinar. As the level of government closest to the community, council has a key role in **supporting community uptake, leading by example, and advocating to higher levels of government**. This is further discussed in Section 2.5.
- **Access to funds** to purchase, install, manage and maintain the infrastructure. This is still a barrier for some councils. However, this project has endeavoured to demonstrate the value in investment.
- **Financial business case.** The current low uptake of EVs hinders the purely financial business case of installing stations for the revenue they will generate. The business case for councils to install stations is that the presence of charging stations will help overcome the perceived range anxiety that is currently a contributing factor to limiting EV uptake.
- **Uncertainty of best locations** and where stations were currently installed. The maps identified current and planned stations and advice on location selection was provided in Component 1 & 2; and at the final survey 20% of respondents had selected sites, a further 39% had a shortlist they were investigating, and 19% had the intentions to identify public charging sites soon.
- **Network constraints** whether real or perceived. Network distributors have indicated a desire to work with councils to facilitate supply and understand future demand on the network from EVs.
- **Knowledge gap** of most appropriate infrastructure and requirements. At the final survey, 94% of the councils reported that their understanding of the EV space had grown since the beginning of the project through the project webinars and interim reports. Further, while the project was initially for the regions, an increasing number of metropolitan councils joined in due to the value in the capacity-building component.



2.8 EV Market players and Ownership options

Given the number of market players and ownership models, inviting the market to provide best offers for the roll-out will provide councils with the best value options.

While the international EV market is more developed compared to Australia and most of the charging hardware available on the market is manufactured internationally, several Australian-made options are currently available. These are outlined in Section 2.2 of Component 3. An overview of different charging stations with indicative pricing and specifications is available in Appendix B of the Component 3 Report, and a range of supplier brochures included in Appendix D of the same Report.

An overview of key stakeholders (hardware manufacturers, distributors, software, installers, landowners/host sites and approval bodies) is included in Section 2 of Component 3; and a visualisation of the partnerships between Australian market players is included in Appendix C of Component 3, as shown by excerpt in Figure 13.

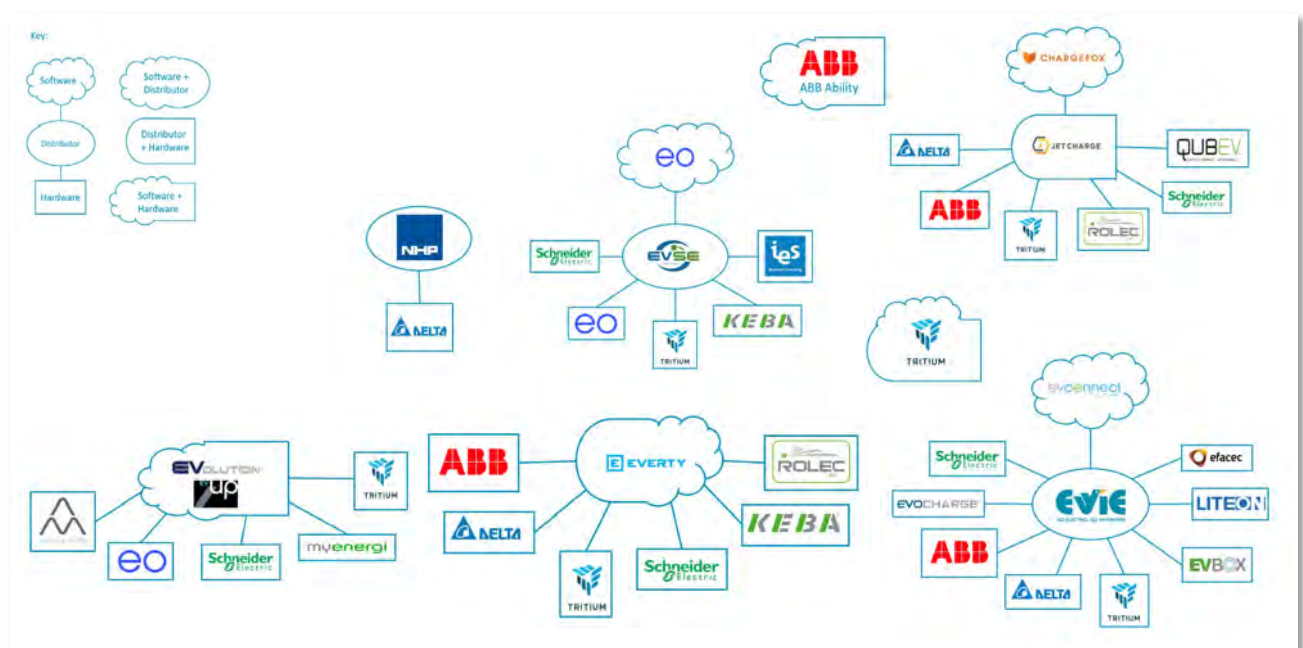


Figure 13: Examples of market players and relationships (note this is a snapshot in time and not exhaustive; additional relationships and stakeholders will likely exist by the time of publishing)

The EV space is in a growth phase in Australia. The project attempted to provide a present day “screenshot” of the EV space in Australia but the overview provided will not be exhaustive – other products, companies and relationships may exist due to the rapid rate of growth in the EV space.

Given this growth and the number of players in the market, councils will enjoy the benefit of competition in putting a request to the market for best value options in terms of hardware, software and ownership models.



Figure 14: Ownership models

In the final webinar, the potential for the market to own and operate public charging infrastructure sites was discussed as a third-party model. This option would mean the role of council would be to provide the land, while the third party operates the business, and therefore, incurs the associated costs and financial benefits. The presence of the charger would still contribute to the social benefits desired by councils.

While a potentially low-cost and, therefore, desirable option for some councils, the site would need to be in high demand for there to be a financial business case to the market; and given the current low EV uptake particularly in the regions, this will be a barrier to the market pursuing this approach.

An additional consideration relevant to a model directed at private market involvement in the roll-out of charging stations, is legislative limitations and/or requirements applicable to the use of public land. These differ depending on the type of land (as either Crown Land or Alienated Land) and the rules that govern commercial leases of such land. Requirements that may need to be satisfied range from procedural to substantive considerations, such as the need for public notices, consultation and consent of the Crown Lands Minister, to limitations on the terms for commercial leases.

Market sounding indicated that given the number of sites to be included in the Charging the Regions roll out – providers will offer different and innovative solutions in order to increase their presence in a growing and competitive market; and all those spoken to indicated a strong desire to be involved.

Additional detail on ownership models and considerations of each are included in [Component 3](#).

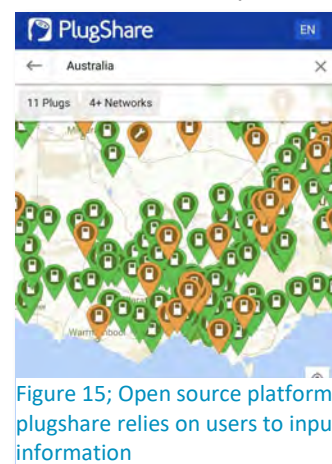
2.8.1 Site Maintenance and Management

The general preference that emerged from the surveys and webinar was for the council ownership model. In addition to funding, a barrier to this model was the potential resource challenge should councils be responsible for site management and maintenance. While in the leasing option, the provider still owns and therefore maintains the asset, and this cost for service is included in the leasing arrangement, but in the ownership model it can be included or excluded.

In most case studies, maintenance was included by the provider – either the hardware provider directly or the distributor. Exceptions included Northern Queensland where sites were not networked, and site hosts are responsible for maintenance; and the NSW NRMA case study given the NRMA developed its own software platform and managed the maintenance. The installation of software allows stations to be visible to users in real time through a portal, collecting and reporting on usage and performance, as well as sending alerts instantaneously to the site manager and provider if there are any faults.

City of Adelaide recommended that councils have a clear service agreement with the provider that includes a 24/7 helpline for support, processes in place for escalation of any issues, and protocols for the help desk and technical support. In addition to any potential maintenance issues, EV drivers may have questions when at the site on how to operate the charger. This role is best provided by the supplier.

A number of different software platforms are available (Figure 13). Individual software platforms will only show stations on their network and an EV driver will still need to refer to open source platform Plugshare to identify stations on his/her route. It was for this, and data ownership and reliability concerns, that New Zealand developed its own software *EV Roam* which overlayed across all the stations to provide a single source for visibility of all stations with real time data on usage. However, software development is not the role of councils, and the different options available on the market are suitable for use.



2.9 Recommended Roll Out

A 25-50kW DC networked charging infrastructure option is recommended for regional connectivity.

Currently a non-Tesla EV owner has limited to no fast-charging options in regional Victoria (Figure 15). While the existence of the AC chargers will enable committed drivers to find chargers, it does not overcome the perceived range anxiety barrier addressed by fast-chargers.

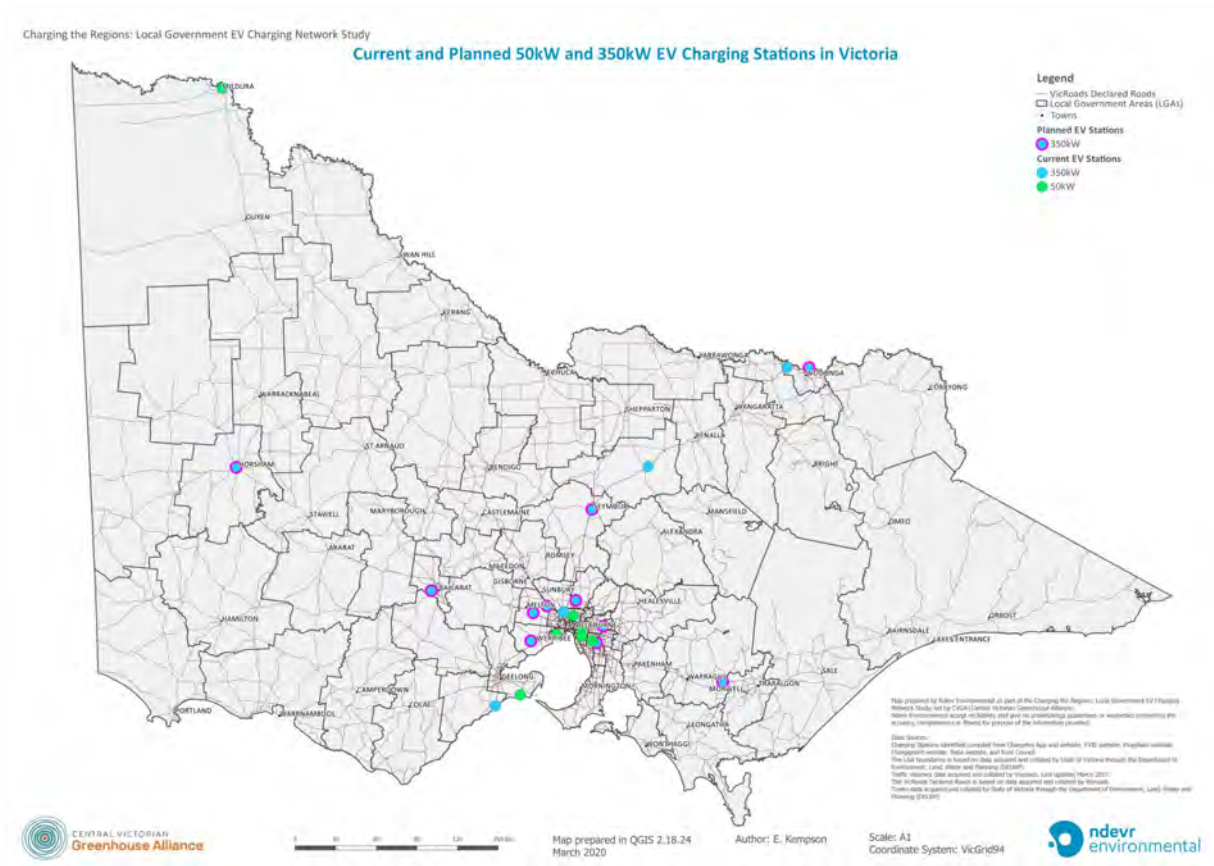


Figure 16: Current and Planned EV Fast Charging (DC) Stations in Victoria

Charging infrastructure comes in different levels, in reference to their charging rate, and within each of these levels there is a range of power ratings. The higher the power rating, the faster the charging infrastructure can provide charge to an EV. However, the higher the charge rate, the more complex the requirements of the network, chargers and vehicles, and therefore the higher the associated costs. An overview as discussed in the webinars is shown in Figure 17.

The installation of 25-50kW DC chargers is recommended for installation in the priority towns (at a minimum) as part of the Charging the Regions roll out.

This level of station is considered to provide the best value for money to achieve the regional connectivity desired by councils for their communities. These lower kW rated fast chargers are attractive to EV drivers as a fast-charge option without the wear and tear on their batteries that the higher rate can cause. Data has shown that the average charge time for EV drivers, who unlike conventional vehicle drivers will top up when they can rather than depleting their battery, is an hour³. An hour charge at 25-50kW will provide 100-200km range.



Figure 17: Example of a Tritium 50kW DC Station, and a Tritium 25kW DC station

³ Chargefox presentation at 2019 All Energy Conference Melbourne



| | Level 1 Trickle | Level 2 AC Destination Charging | | | | Level 3 DC Fast Charging | | | |
|--|--|---------------------------------|---|-----------|--|--------------------------|-----------------------------|---|--|
| | 2.3kW AC | 7kW AC | 11kW AC | 22kW AC | 25kW DC | 50kW DC | 100kW DC | 350kW DC | |
|  Locations | General Power Point | Homes, Hotels, Council Offices | Shopping Centres, Car parks, Destinations | | Destination | Transport Corridor | Transport Corridor/High way | Superhighway | |
|  Electrical Inputs | Single Phase, 10A | Single Phase, 32A | Three Phase, 32A | | Three Phase, 40A | Three Phase, 80A | Three Phase | Three Phase | |
|  EV Limitations | None | None | The majority of EVs on the market cannot charge at more than 7kW AC | | Some older model EVs and PHEVs cannot use DC | | Tesla Only | The majority of EVs currently on the market cannot charge at this rate. | |
|  For 100 km | In theory: 8.7 hr For most of the current day EVs: 8.7 hr | 2.7 hr | 1.7 hr | 55 min | 50 min | 24 min | 10 min | 5 min | |
|  Approximate Hardware Cost | \$\$\$ | ,\$,\$,\$ | ,\$,\$,\$ | ,\$,\$,\$ | ,\$,\$,\$,\$ | ,\$,\$,\$,\$ | ,\$,\$,\$,\$,\$ | ,\$,\$,\$,\$,\$ | |


Figure 18: Overview of Charging infrastructure

It is also strongly recommended that the stations are networked on a software platform to enable visibility to users and site managers in real time to see that a station is functioning and available. It is recommended that councils enter into an arrangement with the supplier to provide 24/7 station helpline and technical support to maintain sites technically, while individual councils can manage site maintenance with respect to landscaping and tidiness. Different software platforms can be selected based on the results of the RfQ provided that all provide access to the data collected.

In the final webinar a second option was discussed to supplement the DC charging roll-out with additional 7kW AC stations as a low cost, low network impact, easy to implement additional option (Table 1); and it is still recommended that individual councils pursue additional AC charging in addition to transitioning council fleets and the community to include EVs.

Software and Network Coordination

Future Proofing



**25-50kW
DC Fast
Charging**

**Outright
Ownership
or Lease**

**3rd Party
Ownership**

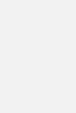
Appx. linger time: 20-60 minutes
*estimated time to add 100km to car range varies

- Attractive to customers/users
- EV Tourism & regional connectivity
- Building for future
- If getting market to install, might not want the same location – demonstrate business case to mitigate risk
- Outright ownership will come at a higher cost, but council will have full control and can pick site freely (pending electrical suitability)
- Indicative hardware costs appx. \$17,800-50,000 AUD

Next steps:

- ☐ Put forward 2-3 sites
- ☐ Select ownership option
- ☐ Seek supplier offers/ State or Federal Government

Base Coverage + Infill



**7kW AC
Destination
Charging**

Council Bulk Buy

Council

**Local
Businesses**

Appx. linger time: 2.7 hr
*estimated time to add 100km to car range varies

- Low cost (especially bulk buy) – indicative hardware costs appx. \$1,500 without discount
- Building a connected, dense network – one in every regional town
- EV tourism – enabling access anywhere
- Low impact on network, ensure still include load management capability
- Accessible to all EVs currently on AUS market
- Longer length of linger/stay, but may be less attractive to users
- To be used in tandem with council EV fleet

Next steps:

- ☐ Indicate number of chargers desired
- ☐ Individual Councils pursue

3 Next Steps

The increased uptake of EVs has clear environmental, health and social benefits to local communities. Participating councils have collaborated to better understand the benefits and requirements of charging infrastructure; and have indicated a desire to continue collaborating to achieve the best outcomes for their communities.



Given additional measures underway by State and National EV strategies, the EV space will likely continue to grow rapidly, and councils are wise to be prepared to ensure their communities are not left behind and disadvantaged.

3.1 Charging the Regions Fast Charging Roll Out

The following process is recommended to alleviate the remaining barriers.



3.1.1 Phase One – Confirm Site Locations and Participation

- **Site Selection.** Participating councils to continue to investigate and identify potential locations for public charging infrastructure within their respective municipalities using the tools provided through this project.
- **A Council EOI** to be distributed to councils to confirm numbers interested in continuing to participate in the roll out and to collect information on sites. A prospectus is attached that can be included to highlight the value. The final survey indicated that a large number were unsure of their ability to continue (Figure 21). Reasons for uncertainty included access to funding and uncertainty in the role of council in funding a state-wide charging network. This staged process aims to overcome this
- **Consultation with distributors** on the site shortlist will allow any network limitations to be identified and alternative options to be considered prior to going to market. Distributors are keen to support councils in ensuring an optimal site selection roll out.

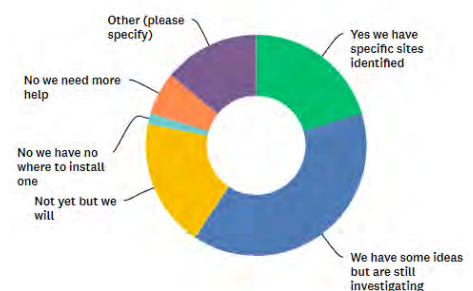


Figure 19: Current status of councils with selecting suitable sites

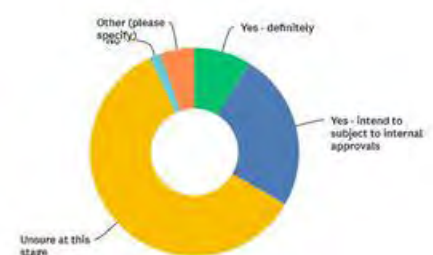


Figure 20: Current level of council certainty in participating in DC roll out

3.1.2 Phase Two – Competitive Tender Process

Councils have power in numbers when going to the market for pricing for a networked charging station model. This approach will allow the market freedom and the best offers to be made, while still allowing council to specify charger locations. This is a rapidly emerging market and new players are wanting to enter, which will result in competitive prices.

The **joint procurement guidelines** provided to participating councils detail site specific information for councils to collate and include in the market EOI/RfQ; and guidance on specifications required of respondents.

It is recommended that the market be invited to propose best value offers to provide a network of 25-50kW DC charging stations for the given list of vetted locations. To ensure future-proofing, all hardware must be Open Charge Point Protocol (OCPP) compliant and have in built load management. The preference is that stations are tethered, and that respondents include the maintenance and operation of stations.

The market will be invited to propose software options to ensure real-time visibility to EV drivers and to councils; and councils must have access to all data collected.

One provider does not need to be the only provider, as different suppliers may be better suited or capable to provide better options in different areas.

3.2 Council Leadership and Demonstration



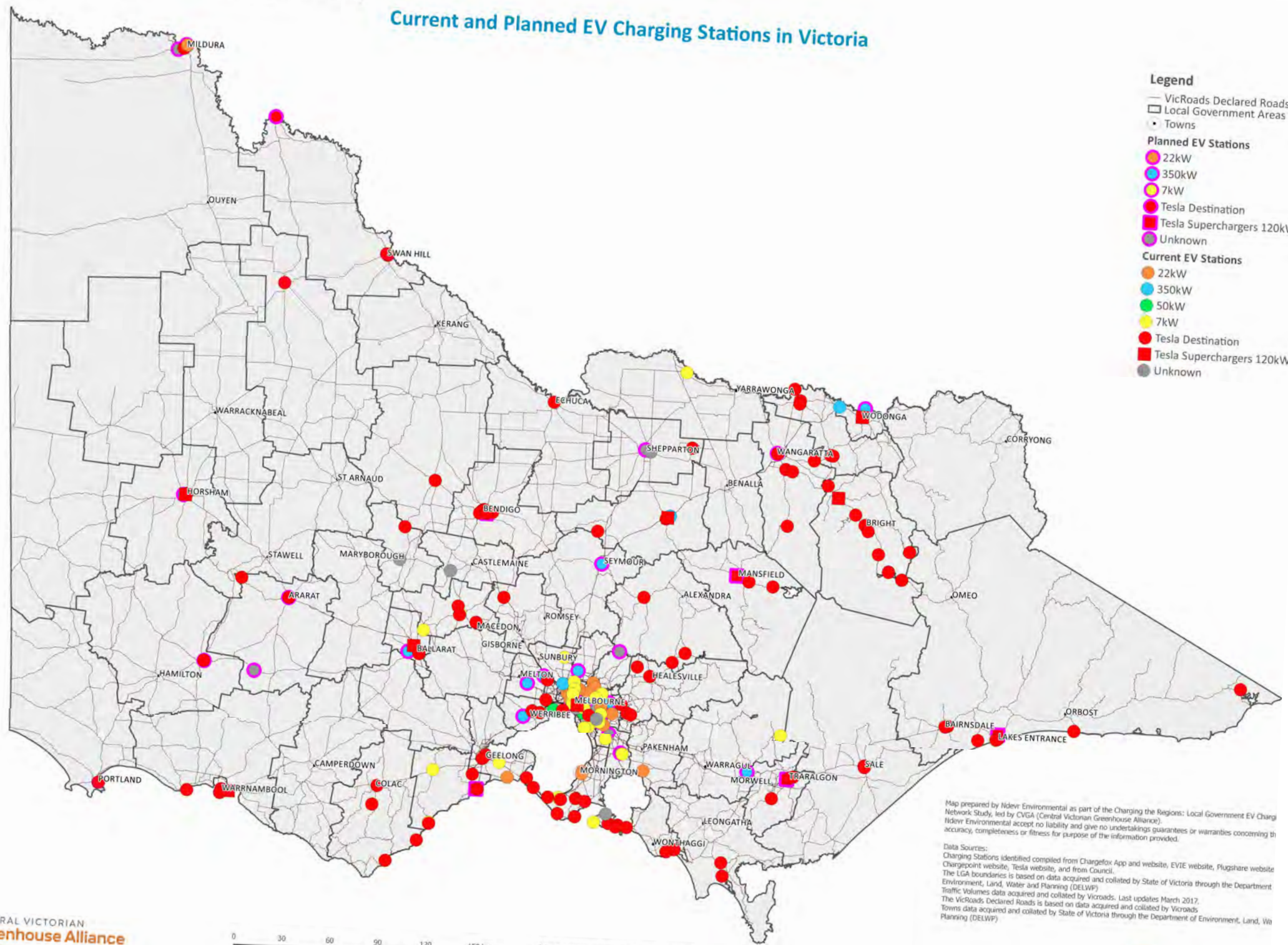
It is recommended that in addition to the DC fast charging roll out, councils continue to lead by example and incorporate EVs and charging infrastructure into council fleet operations; and support local communities and businesses in understanding and procuring AC charging infrastructure.



Figure 21: Example of Moreland EV; Council Demonstration in Benalla

Appendix A – Maps

Current and Planned EV Charging Stations in Victoria



Current and Planned EV Charging Stations in Victoria

This map does not show Tesla Destination chargers, and Tesla Superchargers, and EV charging stations not obvious for public use (i.e. wineries, hotels, and most private businesses).

Legend

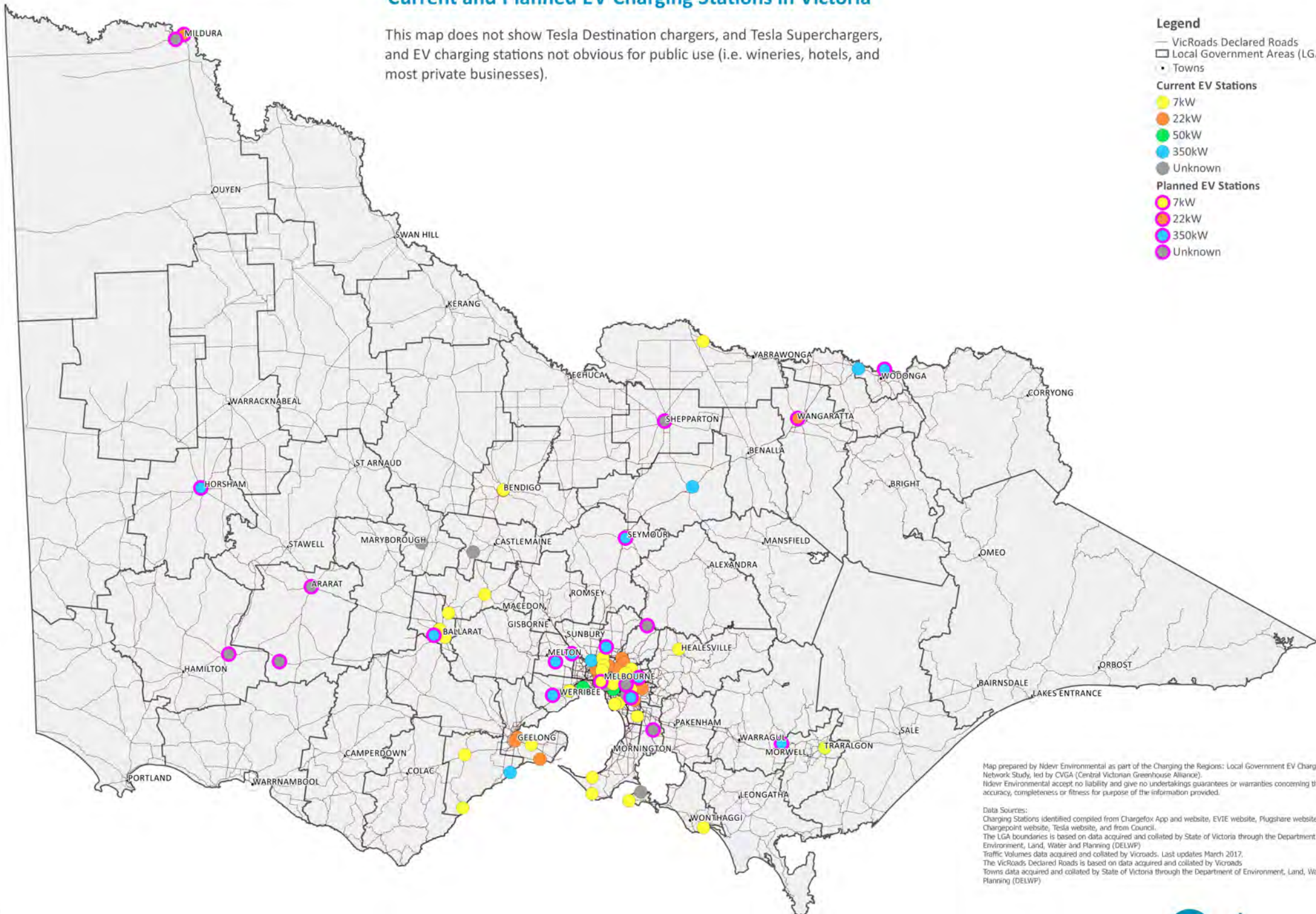
- VicRoads Declared Roads
- Local Government Areas (LGA)
- Towns

Current EV Stations

- 7kW
- 22kW
- 50kW
- 350kW
- Unknown

Planned EV Stations

- 7kW
- 22kW
- 350kW
- Unknown



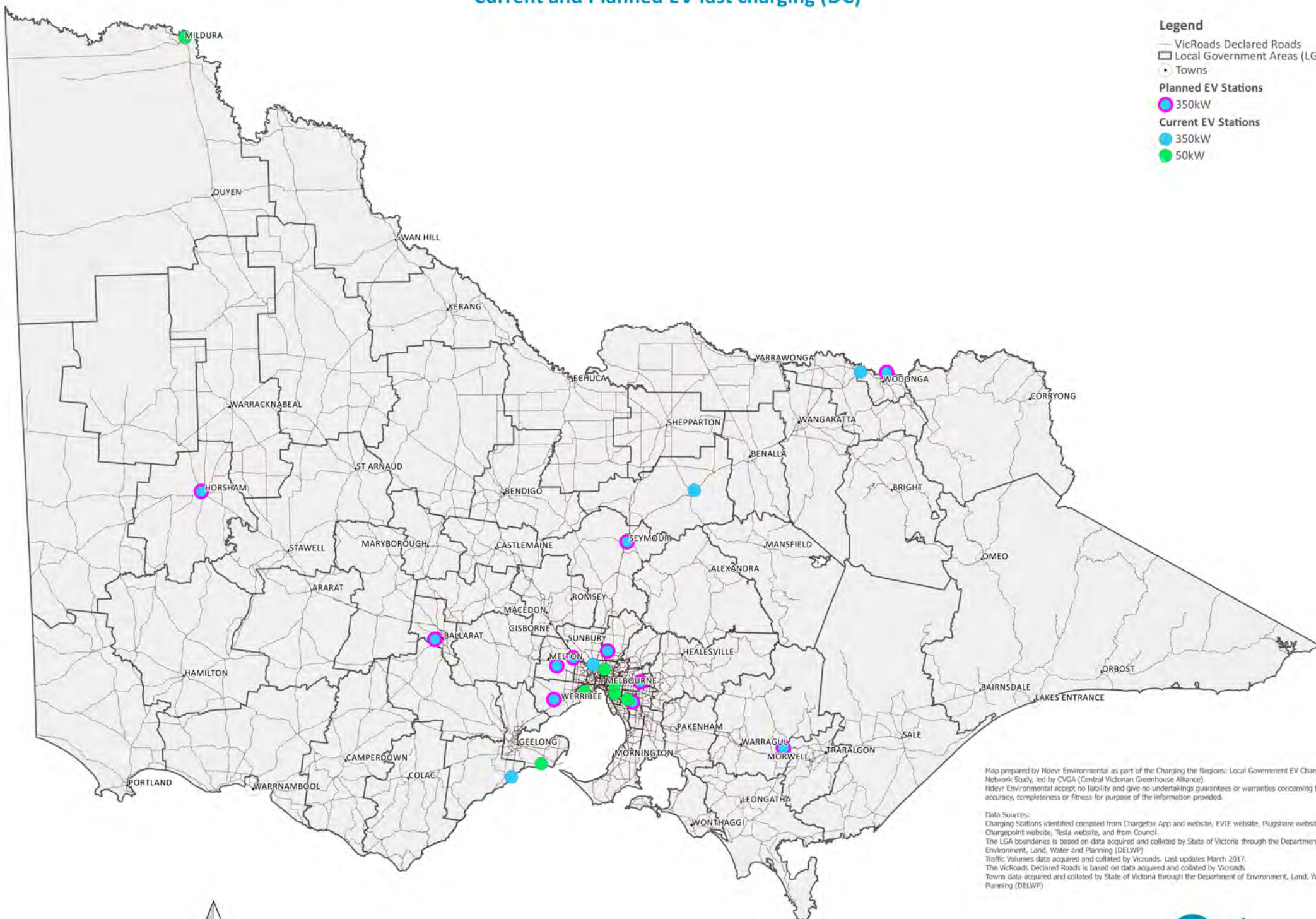
Map prepared by Ndevr Environmental as part of the Charging the Regions: Local Government EV Charging Network Study, led by CVGA (Central Victorian Greenhouse Alliance).
Ndevr Environmental accept no liability and give no undertakings guarantees or warranties concerning the accuracy, completeness or fitness for purpose of the information provided.

Data Sources:
Charging Stations identified compiled from Chargefox App and website, EVIE website, Plugshare website, Chargepoint website, Tesla website, and from Council.
The LGA boundaries is based on data acquired and collated by State of Victoria through the Department of Environment, Land, Water and Planning (DELWP).
Traffic Volumes data acquired and collated by VicRoads. Last updates March 2017.
The VicRoads Declared Roads is based on data acquired and collated by VicRoads.
Towns data acquired and collated by State of Victoria through the Department of Environment, Land, Water and Planning (DELWP).

Current and Planned EV fast charging (DC)

Legend

- VicRoads Declared Roads
- ▭ Local Government Areas (LGA)
- Towns
- Planned EV Stations**
- 350kW
- Current EV Stations**
- 350kW
- 50kW



Map prepared by Ndevr Environmental as part of the Charging the Regions: Local Government EV Charging Network Study, led by CVGA (Central Victorian Greenhouse Alliance).
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The VicRoads Declared Roads is based on data acquired and collated by VicRoads.
Towns data acquired and collated by State of Victoria through the Department of Environment, Land, Water and Planning (DELWP).



EV Public Charging Network by Locality

This map also shows traffic volume, tourism locations, and identifies localities that are within proximity to an EV charging station (approximately 40km), and those that are not serviced at all from an EV charging station.

Legend

Local Government Areas (LGAs)

Tourism Locations Council

Localities not close to EV Charging Station

Capital City

City

Regional centre

Major or regional significant town

Large or locally significant town

Town

Localities close to EV Charging Station

Capital City

City

Regional centre

Major or regional significant town

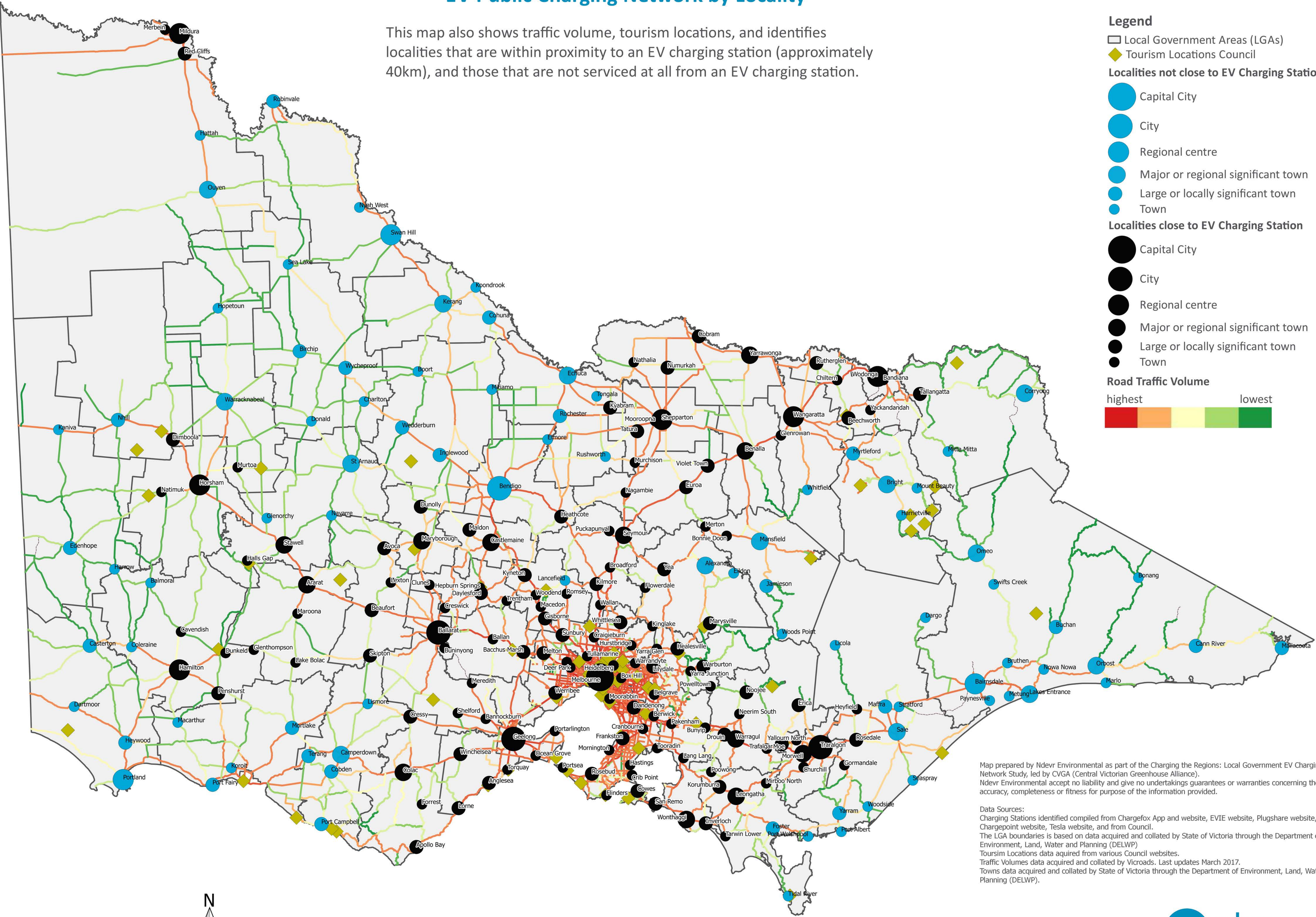
Large or locally significant town

Town

Road Traffic Volume

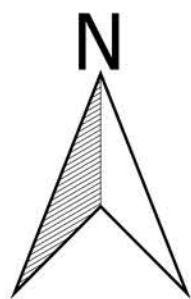
highest

lowest



Map prepared by Ndevr Environmental as part of the Charging the Regions: Local Government EV Charging Network Study, led by CVGA (Central Victorian Greenhouse Alliance). Ndevr Environmental accept no liability and give no undertakings guarantees or warranties concerning the accuracy, completeness or fitness for purpose of the information provided.

Data Sources:
Charging Stations identified compiled from Chargefox App and website, EVIE website, Plugshare website, Chargepoint website, Tesla website, and from Council.
The LGA boundaries is based on data acquired and collated by State of Victoria through the Department of Environment, Land, Water and Planning (DELWP)
Tourism Locations data acquired from various Council websites.
Traffic Volumes data acquired and collated by Vicroads. Last updates March 2017.
Towns data acquired and collated by State of Victoria through the Department of Environment, Land, Water and Planning (DELWP).

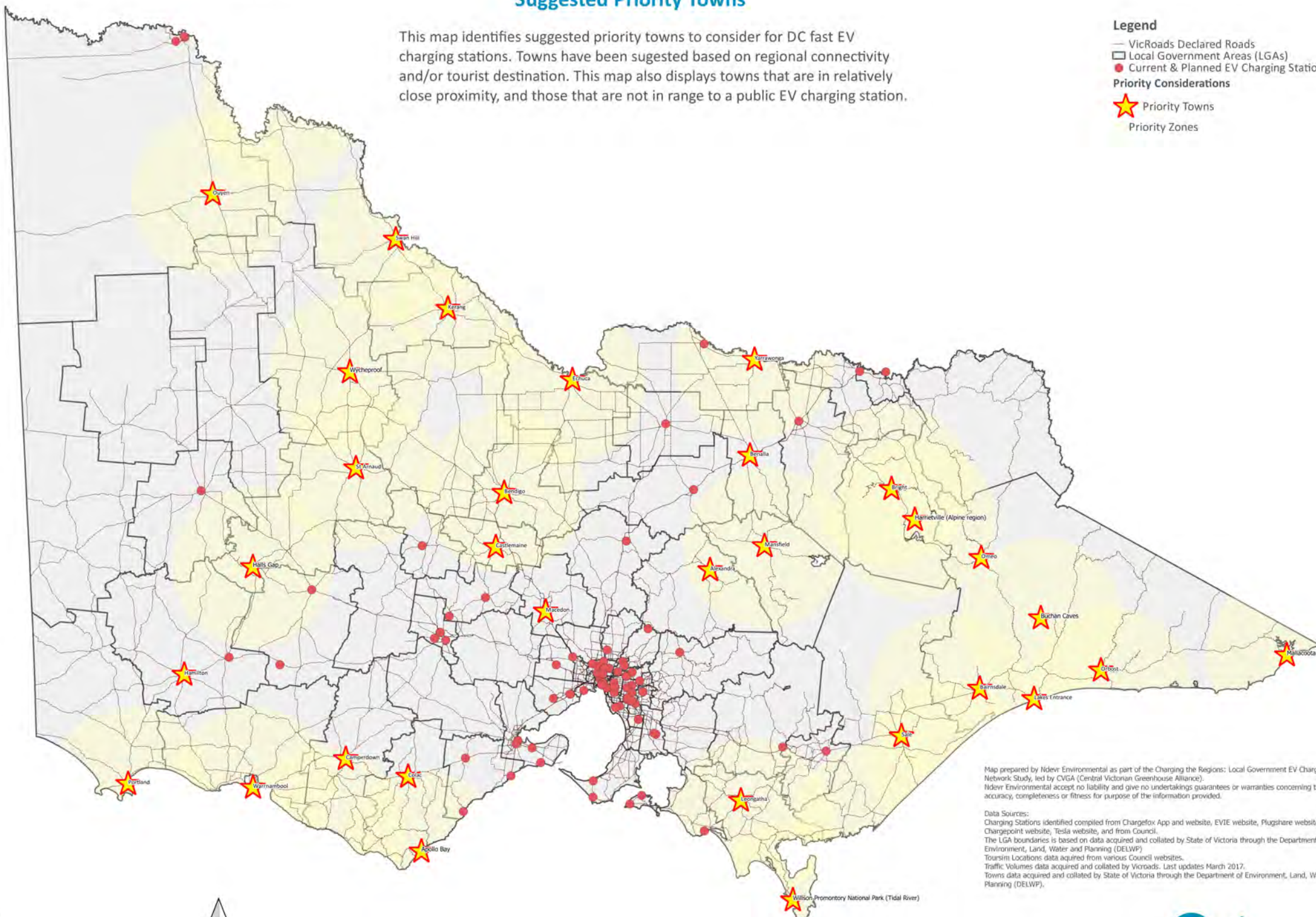


Suggested Priority Towns

This map identifies suggested priority towns to consider for DC fast EV charging stations. Towns have been suggested based on regional connectivity and/or tourist destination. This map also displays towns that are in relatively close proximity, and those that are not in range to a public EV charging station.

Legend

- VicRoads Declared Roads
- Local Government Areas (LGAs)
- Current & Planned EV Charging Station
- ★ Priority Towns
- Priority Zones



Map prepared by Ndevr Environmental as part of the Charging the Regions: Local Government EV Charging Network Study, led by CVGA (Central Victorian Greenhouse Alliance).
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Traffic Volumes data acquired and collated by VicRoads. Last updates March 2017.
Towns data acquired and collated by State of Victoria through the Department of Environment, Land, Water and Planning (DELWP).



Appendix B – Prospectus

Charging the Regions: Electric Vehicle Charging and Local Councils in Victoria

Why do we need more EV charging stations?

The EV industry is growing at a rapid rate. While Australia has been relatively slow to catch up to the global trend, sales of EVs increased by more than 200% between 2018 and 2019 as depicted in Figure 2.

EVs are coming to Australia, and the objective of the CVGA Charging the Region project is to ensure that regional Victoria does not get left behind. Ultra-fast electric charging networks are being built around the main highways and routes in Australia (see Figure 3), but this does not support regional connectivity or EV tourism.

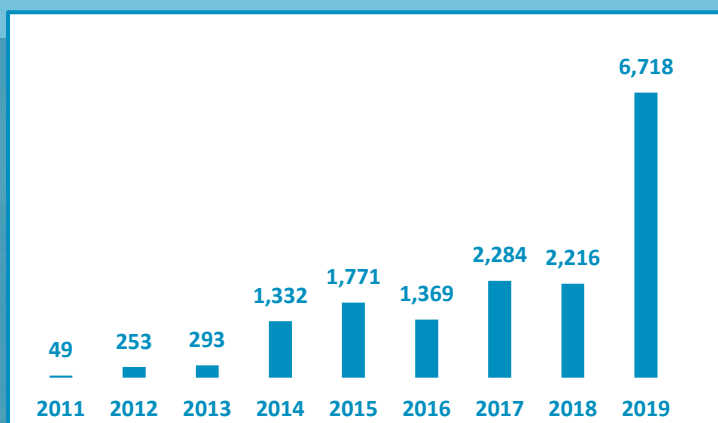


Figure 2: Annual Australian EV Sales

Why should local councils install EV charging stations?

The *Local Government Act* includes promoting the social, economic and environmental viability and sustainability of their districts. EVs provide a wide range of broader benefits, including:

- **Reputational** - uptake of EVs demonstrates an ethical and forward-thinking council
- **Community Responsiveness** - there is strong community support and interest in public charging and broader EV adoption
- **Regional Benefit** – indirect financial benefit to local economy through driver linger and spend
- **Public Health Benefits** – ICE vehicle emissions are linked to public health issues such as lung disease, heart disease and strokes and a wide variety of respiratory conditions
- **Reduced Traffic Noise**
- **Environmental Benefits** - ICE vehicles have detrimental environmental impacts on local communities and EVs provide a more sustainable option, with no tailpipe emissions
- **Land Use Benefits** – EV chargers may be a good solution to putting to use underutilised land

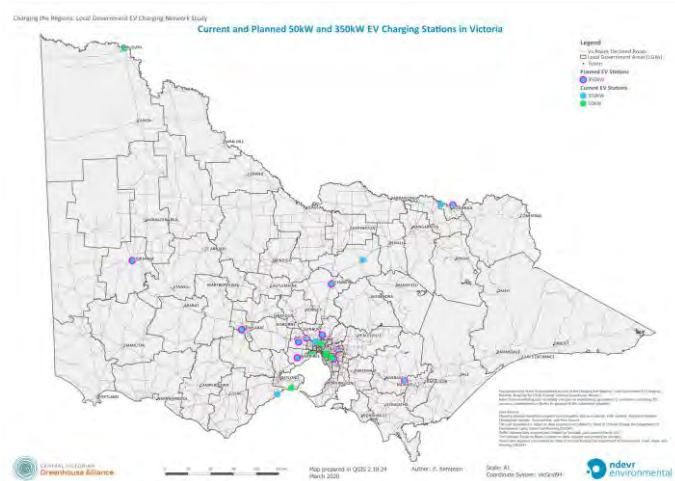


Figure 1: Current and planned DC Charging in Victoria is limited

EV Tourism in Victoria could be worth over \$264M by 2030

Australia's EVs sales are predicted to represent 22%-64% of yearly vehicle sales by 2030 ¹

Emissions from ICE vehicles cause around 500-1,000 deaths in Australia every year ³

52% of Victorians would support shifting all new car sales to EVs by 2025 ²

¹ Energeia (2018). Australian Electric Vehicle Market Study. ARENA and CEFC.

² The Australia Institute (2019a). Polling - Electric Vehicles. The Australia Institute.

³ Parliament of Victoria (2018). *Inquiry into electric vehicles*. No 377. Melbourne.

Which charging stations should local councils install, and where?

To build for the future and future-proof council's investments, the primary recommendation by the Charging the Regions project is to install fast, Level 3 DC chargers. Priority zones have been identified by the project group in Figure 3.

25-50kW Level 3 DC chargers are the recommended option for councils supporting regional connectivity and building for the future. They are fast enough to be attractive to users, but they still encourage a linger time while charging. They are significantly more affordable than ultra-rapid chargers, and DC chargers at this range are compatible with most EVs currently on the Australian market today.

User data shows that most Australian EV drivers charge at publicly available charging stations for an about an hour doing "top up" charging while they stop for lunch or go shopping.

In addition to a network of fast chargers, slower **Level 2 AC chargers** are suitable for fleet charging and to quickly develop a dense and affordable charging network. AC chargers are also suitable for smaller towns that have not been identified as a priority for a fast charger. They have a low impact on the grid; and are fully compatible with all the cars currently on the Australian market.

All levels of charging have a role within a robust charging network. It is important to consider a location's population density, traffic density, whether it is a place of regional connectivity or tourism to determine an appropriate amount of chargers needed in order to future proof EV charging in your region.

For a successful and future ready EV charging roll-out, the project group is strongly advising that all EV chargers:

- ☐ Be OCPP compatible
- ☐ Have load/demand management
- ☐ Be networked through software
- ☐ Allow access to user data

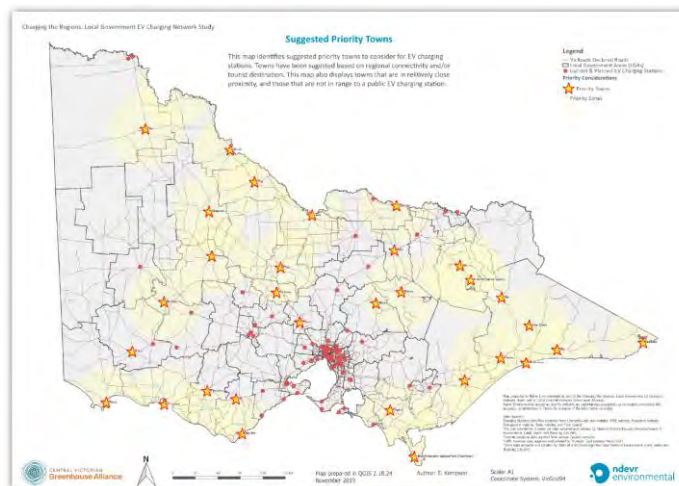


Figure 3: Priority Zones to Ensure Coverage and Connectivity

80% of motorists want fast charging in regional towns ⁵

49% of motorists would view government more positively if they progressed an EV charge network ⁵

81% of Victorians would support the government building a network of EV chargers ⁴

⁴ The Australia Institute (2019b). *Polling - Policies for low emissions and electric cars*. The Australia Institute.

⁵ Electric Vehicle Council (2018). *New Policy Proposal: Accelerating electric vehicle adoption*. Electric Vehicle Council.

Appendix C – Case Studies

Charging the Regions Case Study

City of Adelaide



The City of Adelaide is striving towards carbon neutrality and aims to reduce carbon emissions and improve air quality. The charging infrastructure project forms part of City of Adelaide vision and goals. Further driving the project is City of Adelaide's desire to position itself as an EV hub for tourists and residents, to harness positive economic and environmental outcomes for residents.

Charger Types:

The project involved the installation of 40 EV charging stations in on-street and off-street public car parks. This included a combination of chargers:

- 2 x 50kW DC fast chargers
- 38 x 22kW 3-phase AC chargers

2 x 15amp single-phase (trickle chargers) were installed in 2009.

The City has found that different charging services need to be provided for different user groups to avoid unnecessary expenditure on higher output chargers.



Maintenance & Operations:

City of Adelaide owns the charging stations; Chargefox maintains and operates the software for the charging network and payment system.

Financial Models:

The following three models were used:

- Self-funded - City of Adelaide covered approximately 60% of the costs of the project
- Grants – received grants from the South Australian Government and Mitsubishi
- Co-investment – SA Power Networks co-invested to develop systems and capabilities that could be applied across all of South Australia. Tesla co-paid on one site for the remainder of the costs.

Payment:

Payment is possible through the Chargefox app, with contactless payment available. Payment structure is:

- 50kW DC – 30c/kWh all times
- 22kW AC – free for first hour, then 20c/kWh 6am-6pm Mon-Fri, then 10c/kWh all other times (min. \$1 fee)
- 15amp AC – free all times

Due to the higher cost of more powerful chargers and need for peak electricity demand management systems, it may be necessary for reserve parking customers to pay an annual fee and electricity consumption fees for these services to ensure they are financially sustainable.

Utilisation:

Over two-thirds of all usage has been recorded at one site, the Franklin Hub. This site has 4 chargers and is in front of the Central Market, South Australia's most visited tourist attraction. The car spaces offer 2 hours of free parking and 1 hour of free charging on the AC 22kW charger.

Insights for this case study were provided from discussions with the City of Adelaide.

Barriers to Uptake:

City of Adelaide identified several barriers to the implementation and operation of EV charging stations:

- Councils lack of knowledge and expertise in electricity network and technology of chargers, old switchboards and electrical systems
- Phase charging differences between EV models, capacity limitations of existing main electrical switch and distribution boards
- Australian road rules - reverse parking not permitted in on-street parking bays in South Australia, causing need for longer cables.
- Offers of free chargers usually come with long contract terms and conditions such as commercial advertising that may be inconsistent with local government urban design and public realm hazard reduction priorities (footpath and visual obstructions).

Be wary of hidden agendas in partnership offers

Key enablers:

City of Adelaide recommends early engagement with electricity distributors to understand network constraints and how much capacity is available at certain sites.

Contactless payment is important from a bigger picture perspective, allowing a seamless and user-friendly experience across different models.

Communications and Marketing:

To date the campaign has involved education on the existence of EVs and EV charging. Roll out in near future of advertising on back of buses and social media, targeting up to 100,000 people who have been in proximity of a car dealership within the last 2 months.



Signage Used:

Educational/restrictive signage was used to identify a parking bay as an EV charging bay with operation instructions.

City of Adelaide identified that visibility of signage is key primarily for non-EV users to raise awareness and ease perceptions of range-anxiety and encouraging uptake.

The City implemented a UPark Smart EV Parking System, a modular system for multi-level car parks to match EV demand to total car park facility utilisation. This involves a shift to limit the number of EV parking bays available as car park occupancy increases to over 60%. At 95% capacity, if there are vacant bays in the EV parking area, only 2/10 EV charging bays will be designated as EV only, using the overhead lighting system.

The overhead lighting system indicated availability as below:

- Red – occupied bays
- Green – vacant bays (all customers)
- Orange – EV only bays

Future Plans:

Move from council-ownership and leadership model towards an incentive-based, broad community uptake model through City of Adelaide's *Sustainability Incentives Scheme*. A \$1,000 rebate is being offered to City of Adelaide property owners and tenants on a >7- <50kW charger and a \$5,000 rebate on a >50kW charger.

A better business case for local councils is an incentive-based model

Insights for this case study were provided from discussions with the City of Adelaide.

Charging the Regions Case Study

Knox City Council



Knox City Council installed two twin charging points (two stations, with four charging points in total) in April 2019. One of these stations is available for public charging and the other is for council use for their EV fleet. Public chargers are located at the front of the Knox Civic Centre, next to the entrance for high visibility.

Knox City Council had noticed a gap in publicly available charging infrastructure in its municipality. Council wanted to ensure availability of publicly accessible chargers to support EV uptake, as well as to show leadership in the community. Council acquired several EVs for its fleet, which influenced the direction of the project by adding private charging for Council use.

Charger Types:

Each station is 22kW with 2 x Mennekes sockets (users have to bring their own cables to connect).

Jet Charge supplied and installed Schneider hardware with Chargefox providing software.

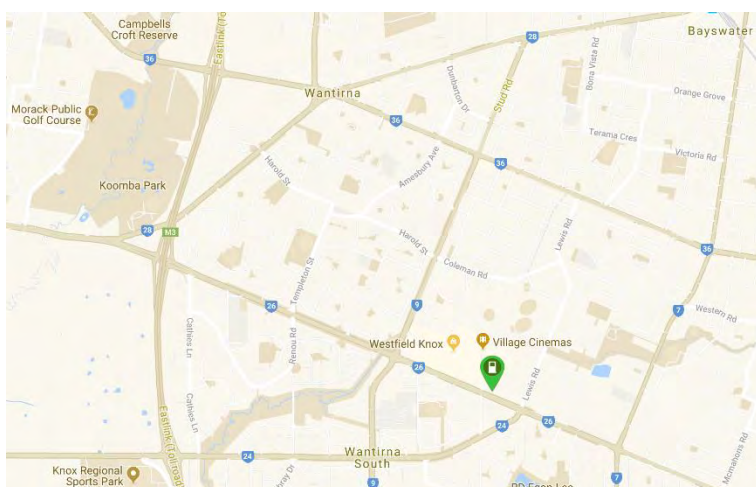
Prioritise visibility for public charging to encourage uptake and utilisation

Location:

Visibility of the public charging station was prioritised during the location decision-making. The draw-back of this prioritisation is that trenching costs for the public chargers exceeded the cost of the chargers themselves. Trenching costs were also influenced by the fact that the works triggered the need for traffic management, as the works extended across the road. Other considerations for council were:

- Lighting
- CCTV coverage
- Location of station under trees (to prevent damage from sap or bird droppings) or sheltered and protected from the elements
- Proximity to amenities (e.g. bathrooms, water, seats and benches)

Keeping driver in mind – providing seating and proximity to amenities



Insights for this case study were provided from discussions with Knox City Council.

Financial Models:

The project is owned and was financed in full by Knox City Council.

Payment:

To date, charging has been provided for free by Council. If Council installs more chargers in the future, this may eventually change.

Barriers to Uptake:

Many unknowns, for example:

- Knowledge around charging/EVs within council
- Lack of standards and blueprint for council around EV implementation (e.g. where to place charger)
- Community perceptions
- Future uptake

Lack of standards and
blueprint for councils a barrier

Key enablers:

- Very strong support from Council and CEO
- Consulting with other Councils who had undertaken EV charging projects
- Seeing the value for money regarding EVs and EV charging – biggest cost to project was trenching

Council and CEO support is
key enabler



Signage Used:

Signage used includes standard parking signs and green markings on pavement indicating EV use. As of now, signage denotes parking is for EVs that are plugged in and charging, and council may time-restrict parking in the future – depending on uptake and whether behavioural or congestion issues arise.

Communications and Marketing:

Chargers were communicated through a mostly digital media release and presence, as well as through a local paper. Council EV fleet is kitted with sleek stickers on the sides promoting EV fleet, reading “Knox going electric”.

Utilisation:

Council has noticed increased use on weekends and after hours, with slightly over 40% of usage of public charger occurring on weekends and Public Holidays.

Insights for this case study were provided from discussions with Knox City Council.

Charging the Regions Case Study

Moreland City Council



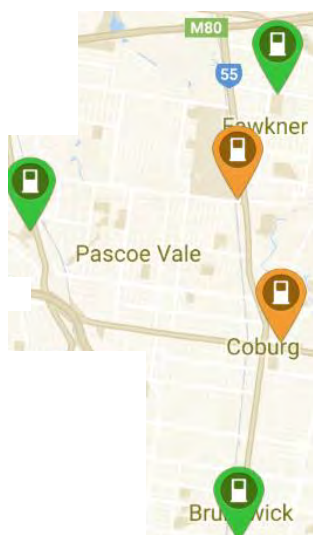
In April 2007, Moreland City Council endorsed a Climate Action Plan, which includes a commitment to the goal of zero net emissions for Council's corporate emissions by 2020, and the goal of zero net emissions for the Moreland community by 2030. Moreland City Council has been certified carbon neutral since 2012. As part of its strategy, the Council supports uptake of zero emissions vehicles and the promotion of zero emissions transportation.

Moreland City Council has been an EV pioneer since joining the Victorian Government's EV trial program in 2012. The Council installed the first DC fast charging station in Victoria (the second DC charger in Australia!) at Council offices in 2013.

Charger Types:

10 x public charging stations, several with multiple parking bays – a combination of DC (50kW) and AC (22kW and 7kW) charging.

Mix of Type 1 and Type 2 plugs, looking to phase out Type 1 plugs.



Maintenance & Operations:

Hardware and Software is provided by a combination of Chargepoint and Tritium, and more recently Chargefox and JET Charge. Maintenance and operations are provided accordingly.

Council will need to make a change once Chargepoint departs Australia (2023). This is complicated by the fact that Chargepoint products are closed protocol and because the Plug 1 types will need to be retrofitted.

Look out for closed protocol products

Financial Model:

Council received \$50,000 from joining the Victorian Government's EV trial program in 2012; otherwise local Council funded.

Council has also bought 14 EVs for its fleet and is looking to add 6 more this financial year.

Payment:

Has been free with free parking, with no plans to start charging.

DC fast chargers – 1 hour free parking

AC charging – 3 hours free parking

Strongly advise free charging – believe it is role of Council to provide this service

Insights for this case study were provided from discussions with Moreland City Council.

Barriers to Uptake:

Moreland City Council identified the following factors as barriers to uptake:

- Internal stakeholders (Council management), understanding, especially regarding contested parking
- Complexity in development of Council EV strategy

Key Enablers:

The City of Moreland identified Council support from the Executive level as a key success factor.

The City's smart approach to implementation, based on a feasibility study for one location, which was then replicated and reused for other sites, rather than conducting a full study for each site as a critical enabler.

In addition to funding, potential enablers for councils could also be through EV requirements for new buildings/precincts or existing council infrastructure.

Replication and reuse of
feasibility study a big
timesaver

Utilisation:

Overall, very positive and Council regularly receives requests for further chargers to be installed— Moreland has installed 11 private chargers (for Council owned vehicles) in addition to the 10 publicly available ones.

Council endeavours to add 3 more public chargers this financial year.



Signage Used:

Council has installed both restrictive and instructive signage.

Communications and Marketing:

Purchased EVs for use in Council fleet. Council EVs are clearly marked by a prominent sticker on the side of the vehicle. The sticker displays the carbon neutral logo and Council name.

Since Moreland Council was an early adopter, media interest in the project was high and as such Council did not feel the need to market or communicate the project through a focused campaign. Having the first fast charger in Victoria (and the second in Australia) certainly helped!

Being an early mover holds
marketing benefits

Charging the Regions Case Study

NSW Tri-Council Project



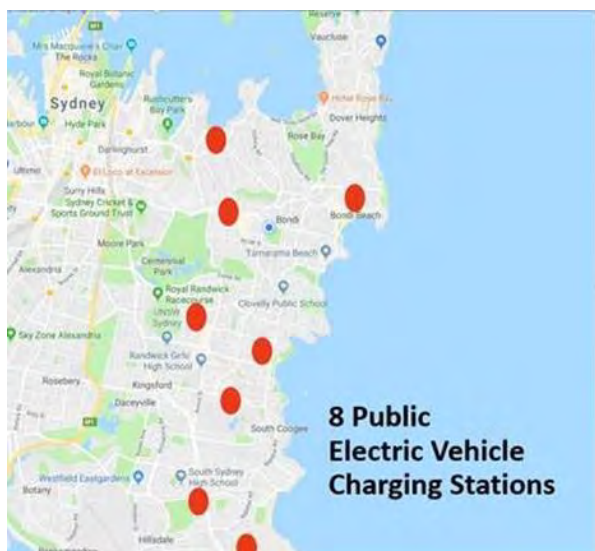
Three councils in Sydney's eastern suburbs – Waverley, Woollahra and Randwick - became the first councils in NSW to provide public on-street EV charging stations. The installation was completed in June 2019. Stations are currently installed at Bondi Beach, Double Bay, Coogee Beach and Randwick, Bondi Junction and Maroubra.

The charging station network forms a key part of the tri-council's plan to reduce emissions across the region, committing to make their suburbs 'EV-ready' and to support the transition to zero emissions vehicle transport. Other drivers for the project include providing revenue to local areas, fuel cost reduction to residents, pollution and noise reduction, as well as overcoming range anxiety.

Charger Types:

8 x Level 2 22kWh AC charging stations.

All stations are powered with 100% renewable energy.



Maintenance & Operations:

Hardware installed and managed by JET Charge, software (network and payment) managed by Chargefox.

Council in charge of the maintenance of other aspects around the charging station (civil works e.g. pavement/bollards).

Financial Models:

Self-funded – three councils funded the project entirely.

Payment:

Initially free for a three-month roll-out period.

Now, different payment rates have been implemented for charging depending on the time of day:

- 25c/kWh in peak (2pm-8pm)
- 15c/kWh in shoulder (7am-2pm, 8pm-10pm)
- 10c/kWh in off-peak (10pm-7am)

Council was interested in tap & go payment but could not find anything that was robust enough for outdoor use.

Strongly advise against free roll-out

Barriers to Uptake:

Some of the biggest barriers to the project have been within councils and the energy space. A major barrier was internal stakeholder management (within council). This included getting agreement and approvals, managing and coordinating priorities and expectations.

Additionally, there was substantial uncertainty surrounding the suitability of sites - both electrically and in terms of finding a parking spot that can be reserved for EV charging in a high demand area. A specialised electrician was required to conduct an electrical suitability assessment to scope out sites, which meant additional costs and time.

Internal (within council)
stakeholder management a
big barrier

Key enablers:

Not many existing enablers – a lot of hoops to jump through and moving parts to the project. Future key enablers would include:

- EV charging providers covering everything necessary (hardware/software/installation/management etc.) in one package
- Setting standards for uniformity to make it easy for councils to know what to do and expect

Providers can be best
enablers



Signage Used:

No wayfinding signage - council was worried about too much visual clutter on streetscape and adding to it, citing that technology in cars and smartphones are adequate to cover wayfinding.

Signage on site is educational and restrictive, with additional instructional stickers on charger infrastructure.

Communications and Marketing:

Project was communicated through variety of media channels (TV on 6pm news, radio, print, online), launch event and partner announcement.

Utilisation:

Few charging sessions per week have been recorded.

Expected to rise during summer and with release of new EV models.

Charging the Regions Case Study

New Zealand



The Ministry of Transport announced an EV programme in 2016. The programme entailed the development of public charging infrastructure along with other incentives for EV uptake such as rebates and the creation of guidelines to make installation easier and uniform. The programme was so successful in encouraging EV uptake that targets for public chargers are continually revised and updated – currently, the aim is to install one DC charger for every 35 EVs where home charging is limited and 4 DC charging points every 100km.

Charger Types:

230 x DC chargers (indicated in yellow on map)
Many more AC chargers (not indicated on map)

Roads coloured red indicate there is more than 75km between DC chargers.



Maintenance & Operations:

Chargenet is the largest operator and is leading the market in NZ. Chargenet installed 150 of the 230 DC chargers and is in charge of the operation and maintenance of its hardware. A handful of energy providers supplied the remainder of the hardware and those providers are responsible for maintenance. 95% of all chargers use Chargenet software.

In addition to Chargenet software, the New Zealand Transport Agency developed EVRoam, a live database using real-time information which allows users to locate chargers and see whether or not they are in use.

Advise having own software
overlayed on provider
software. Data is valuable

Financial Models:

The New Zealand Transport Agency is the owner of the project, receiving an initial \$17 million in funding from the government. Funding also comes from the NZ Low Emission Vehicle fund, which offers up to \$7 million a year to fund public charging infrastructure, along with electric buses and car sharing programs, among other projects, and is currently in its seventh year of operation. Furthermore, EV Roam was developed using a \$3.4 million fund from the National Land and Transport Fund.

Payment:

Free AC charging

Usual DC charging rate: 25c/minute + 25c/kWh

Some variance in DC charging if not operated by Chargenet

Insights for this case study were provided from discussions
NZ Transport Agency.

Barriers to Uptake:

Trying to figure out where EVs fit in terms of Government and funding – New Zealand does not subsidise fuel, and thus there was no existing framework to subsidise EV charging.

Key enablers:

- Early start – formed clear guidelines around EV charging that was able to be applied across whole of New Zealand
- Uniformity of experience across country
- Small size of country, relatively easy to connect and easier to combat range anxiety
- Early engagement with electricity industry
- Paired with government incentives on purchase of EVs – part of bigger strategy
- 85% of all energy in NZ renewable seen as an enabling factor to positive perception surrounding EVs
- NZ fleet predominantly consists of used Japanese imported EVs. The lower price of these cars has supported uptake.

Consistent guidelines key

Utilisation:

Uptake has been significant, and New Zealand has experienced significant congestion at chargers where charging is provided for free. NZ plans to expand charging infrastructure four-fold over the next four years.

Encourage multiple fast chargers at one site to build for future



Signage:

Considered old school in NZ at this point, redundant because of so much technology surrounding EVs.

However, would be valuable in Australia because of low uptake – signage would help place EVs on radar and inform of all possible charging stations, easing range anxiety of potential EV owners, as well as prompting general public to wonder about EVs.

Signage key for EV awareness and important in Australian context

Charging the Regions Case Study

Queensland Electric Super Highway



Queensland Government
Department of Transport and Main Roads

The Queensland Electric Super Highway is the world's longest single-state electric superhighway, spanning 1,800 kilometres along the coast of Queensland. It was started in 2017 and connects Cairns in North Queensland to Coolangatta in South Queensland, and inland to connect Toowoomba to Brisbane.

The highway is part of a bigger state tourism strategy. The 2017 Queensland Electric Vehicle Strategy estimated that EV- based domestic tourism in Queensland could be worth up to \$234 million within the next decade (not including international visitors), and that an inherent risk was presented if Queensland did not support the roll out of charging infrastructure for EV owners not taking driving holidays into regional Queensland.



Charger Types:

There are currently 18 charging stations, each with both a 50kW DC and a 22kW AC charger (with the exception of one location, which has 2x50kW DC chargers). They are placed no more than 200km apart, with 50 more chargers planned in Stage 2 of the project to fill in the gaps and create a denser network, with chargers around 100km apart. Chargers have been supplied with renewable energy bought through credits.

Maintenance & Operations:

Queensland TMR engaged Chargefox on 1 July 2019 to provide a "driver care management" package. This includes:

- Portal for customer access and eventual payment
- Customer service support
- Complete maintenance of site

Additionally, TMR and Energy Queensland have hosting agreements with councils.

Financial Models:

The project is owned and operated by Yurika, and the first phase was co-funded by TMR and Energy Queensland. The second phase will be funded by TMR.

Payment:

To support the roll- out and implementation of the Super Highway, the stations have been free of charge, which is set to change in October 2019. The plan is to encourage a linger-and-spend model (where tourists linger and spend in local shops while waiting for the charge to complete).

Insights for this case study were provided from discussions with the Department of Transport, Yurika and Main Roads and Economic Development Queensland.

Barriers to Uptake:

- Electrical upgrading of several locations and high civil/electrical conduit costs from dispersed car parking (e.g. longer trenching, conduits, etc).
- High cost of upgrading car parks – paving, fencing (etc).
- Many moving parts and stakeholders, often waiting a long time for an answer.
- Council fragmentation (internal stakeholder management) causing delays in acceptance of land use for EV charging and hosting agreements
- Expectation management – some councils wanted to be a part of the Super Highway but TMR had to focus on key sites on the highway to prioritise funding, and could not include all.

Avoid electrical and location upgrades to decrease costs

Key enablers:

- Engaging whole of council.
- Message about not doing this to make money but to make change and getting EVs into regional areas, selling it as an economic opportunity story.
- Introduced as part of broader economic and social government strategy – developing an EV tourism product.
- All land was provided to the project for free.
- Partnerships with airports to encourage EVs for rental cars and capture international tourism.



Utilisation:

Have seen 100% growth when comparing August 2018 (appx. 238 charges) to August 2019 (appx. 450 charges). Expecting greater uptake.

Signage Used:

There is consistent wayfinding signage along the highway – this is especially important in remote areas, where reception is less reliable. However, users mostly use technology - the Chargefox app, a smartphone, or built in EV software and GPS to find charging stations. Location specific signage consists of parking information (e.g. “EV Only” signs and “1-hour parking” limits), and instructional signage on how to operate chargers.

Tropical North Queensland EV Drive:

This separate pilot project complementing the Queensland Electric Superhighway has implemented a set of six 7kW chargers. These chargers are free, based on a ‘linger and spend’ model at tourism locations. These chargers will be non-networked due to the network challenges in these areas and the types of chargers.

Linger and spend model

Insights for this case study were provided from discussions with the Department of Transport, Yurika and Main Roads and Economic Development Queensland.

Charging the Regions Case Study

Moreland City Council



Moreland City Council

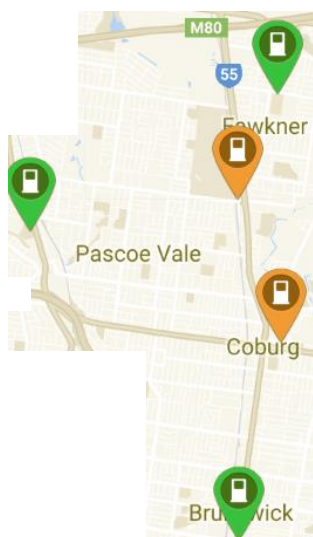
In April 2007, Moreland City Council endorsed a Climate Action Plan, which includes a commitment to the goal of zero net emissions for Council's corporate emissions by 2020, and the goal of zero net emissions for the Moreland community by 2030. Moreland City Council has been certified carbon neutral since 2012. As part of its strategy, the Council supports uptake of zero emissions vehicles and the promotion of zero emissions transportation.

Moreland City Council has been an EV pioneer since joining the Victorian Government's EV trial program in 2012. The Council installed the first DC fast charging station in Victoria (the second DC charger in Australia!) at Council offices in 2013.

Charger Types:

10 x public charging stations, several with multiple parking bays – a combination of DC (50kW) and AC (22kW and 7kW) charging.

Mix of Type 1 and Type 2 plugs, looking to phase out Type 1 plugs.



Maintenance & Operations:

Hardware and Software is provided by a combination of Chargepoint and Tritium, and more recently Chargefox and JET Charge. Maintenance and operations are provided accordingly.

Council will need to make a change once Chargepoint departs Australia (2023). This is complicated by the fact that Chargepoint products are closed protocol and because the Plug 1 types will need to be retrofitted.

Look out for closed protocol products

Financial Model:

Council received \$50,000 from joining the Victorian Government's EV trial program in 2012; otherwise local Council funded.

Council has also bought 14 EVs for its fleet and is looking to add 6 more this financial year.

Payment:

Has been free with free parking, with no plans to start charging.

DC fast chargers – 1 hour free parking

AC charging – 3 hours free parking

Strongly advise free charging
– believe it is role of Council
to provide this service

Insights for this case study were provided from discussions with Moreland City Council.

Barriers to Uptake:

Moreland City Council identified the following factors as barriers to uptake:

- Internal stakeholders (Council management), understanding, especially regarding contested parking
- Complexity in development of Council EV strategy

Key Enablers:

The City of Moreland identified Council support from the Executive level as a key success factor.

The City's smart approach to implementation, based on a feasibility study for one location, which was then replicated and reused for other sites, rather than conducting a full study for each site as a critical enabler.

In addition to funding, potential enablers for councils could also be through EV requirements for new buildings/precincts or existing council infrastructure.

Replication and reuse of
feasibility study a big
timesaver

Utilisation:

Overall, very positive and Council regularly receives requests for further chargers to be installed— Moreland has installed 11 private chargers (for Council owned vehicles) in addition to the 10 publicly available ones.

Council endeavours to add 3 more public chargers this financial year.



Signage Used:

Council has installed both restrictive and instructive signage.

Communications and Marketing:

Purchased EVs for use in Council fleet. Council EVs are clearly marked by a prominent sticker on the side of the vehicle. The sticker displays the carbon neutral logo and Council name.

Since Moreland Council was an early adopter, media interest and in the project was high and as such Council did not feel the need to market or communicate the project through a focused campaign. Having the first fast charger in Victoria (and the second in Australia) certainly helped!

Being an early mover holds
marketing benefits



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Ndeivr Environmental is a specialist carbon, energy and sustainability focused consultancy that partners with clients to achieve positive business and environmental outcomes.

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