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EV Charging - Case Studies

Carlisle Case Study

Overview

The Carlisle Building is a 139 lot strata with eight floors of apartments plus basement parking. The EV charging installation was undertaken using the *individual approach*, with all costs borne by the owner of the EV. The process of achieving installation highlights the value of an engaged building manager in facilitating the necessary regulatory and technical measures.

How EV charging was installed at Carlisle

Carlisle owner-occupier Helen Presgrave wanted to purchase a Tesla EV and have the facility of charging in her own parking space in Basement level B1. She spoke to the Building Manager, Belinda Collings, about the appropriate way to proceed. Helen also spoke with the electrician who undertook regular maintenance and repair work at the community, Deian Cousins. Belinda assisted Helen with putting together all the required paperwork to submit to the building OC.

Deian identified that it would be technically feasible to install cabling from Helen's parking spot up through the riser to the meter box for her apartment on the 8th floor. Helen also assessed the various technology options, including the charging option suggested by Tesla, which was a third-party provider as well as slow charge solutions.

Helen consulted a specialist lawyer to obtain a by-law for approval to proceed, as this is a statutory requirement for any alteration or renovation that impacts common property. The by-law and request for permission to install charging was put to a general meeting and passed at the end of 2018 and the installation including 3.7kw EV charging unit in her parking bay completed within three months.

Helen has since become Treasurer of the Carlisle OC and will be making the by-law she had commissioned available for other residents. Since installing the charger and purchasing her Tesla, many residents have expressed an interest in making their next vehicle purchase an EV purchase, so it is expected the number of installations will proceed. Where resident parking bays are not within suitable distance of a riser for installing cabling to their own electricity meter, a *common property approach* or communal charger may have to be considered.

Belinda believes that more buildings in future will see the value of installing EV charging, as it will position them to attract a greater range of both owners and tenants, who have electric vehicles. This then adds value to an apartment block.

Payment options

The installation of cabling and charging cost approximately \$4000 which Helen paid in full. She estimates the overnight charging of her Tesla is costing approximately \$50 extra on her personal electricity bill, a considerable saving compared to petrol for a conventional vehicle.

Her solution cost the OC nothing, and required no significant alterations to common property, nor does it impact on the building energy load.

Installation

The installation was completed by Deian Cousins, DCE Contracting.

Contact details

Building Manager: Belinda Collings, operations manager for Higher Living Facilities Management.

Electrician: Deian Cousins, DCE Contracting.

Breakfast Point Case Study

Overview

Breakfast Point comprises 50 individual strata buildings each with its own Building Committee and an over-arching Strata Plan Owners Committee. Installation of EV charging has varied across the precinct and incorporates a number of approaches.

The specific choice has been determined by considering the likely and current demand, the nature of the building's individual electrical systems and opportunities for least-cost charging provision. Between 30 to 40 of the buildings are wired in a way that enables charging from the individual lot owner's personal electrical supply and metering

How Breakfast Point installed charging

The precinct committee undertook a survey of residents to establish interest in EV charging, concerns and preferred options. This was followed by a webinar that explained the options and included a Q&A session.

One of the buildings that proceeded with a *reuse of existing circuits approach*. It is a strata of five three storey blocks comprising 30 three bedroom apartments in total with a shared single level basement parking area for all five blocks. There are a total of 26 two-car garages and four three-car garages.

All lot owners have access to a power source for EV charging in the basement. We identified that the air conditioning circuit could be used for charging and Ross De Rango from NHP designed an automatic interlock device to switch supply from air conditioning to EV charging. It is connected to a single phase 7.4 kw charger. The air conditioner circuit is connected to the existing individual lot

electricity meter so no common property metering is required. There is also no additional load on the overall building electricity supply.

All costs for installation including the interlock are paid by the individual lot owner, as are ongoing costs for charging. The installation costs approximately \$500 - \$1000 depending on the proximity of the lot owner's air conditioning compressor to the garage. In most lots, it is located in the basement, however, some are roof mounted and this adds to the cost of installation. The chargers cost an additional \$500-\$600 per unit.

At the time of writing, no owners with roof-mounted air conditioning have requested charging installation. There is some potential for this cost to be subsidised by the OC via all lot owners, as there will be a requirement to access common property to install cable and interlock for supply from the air conditioner circuit to the basement. Maintenance of the EV charger is the responsibility of each lot owner.

The three different scenarios for lot owners to access their own metered power for EV charging recognised by the strata's by-law are:

- i) Lot owners air conditioner compressor is located within their garage space and power can be accessed with no alteration to common property required.
- ii) The lot owners air conditioner compressor is located in common property in the basement area and requires alteration to common property to run cabling from the compressor to an EV charger in the lot owners garage.
- iii) For ground floor lot owners with their air conditioner compressors located at ground floor level there is provision for them to seek approval to alter common property and cable between their air conditioner compressor and/or lot meter and the lot owners basement garage.

Other strata communities within Breakfast Point have begun to install a full common property EV charger backbone funded by the individual scheme owner corporations. These communities have first undertaken an energy audit to establish capacity, installed a load management system and billing technology and had cable trays put in place throughout the parking area that enable an individual owner to pay for their own cable to connect their own EV charger unit to the common property cable tray.

A by-law was passed by the Breakfast Point OC that addresses all possible variations of EV charger approaches. As each individual scheme proceeds to install EV charging it will need to be endorsed by the committee of the individual scheme.

The by-law states:

Electric Vehicle Charging: *An owner or occupier of a Lot must not install any device with respect to electric vehicle charging without prior approval of their subsidiary body. This approval is required irrespective as to whether the source of the electricity is from common property or not. The approval is at the sole discretion of the subsidiary body.*

Installation

By local electrician

Contact details:

NHP Electronics: Ross de Rango

The Horizon case study

Overview

The Horizon is a 22-year old strata building of 43 storeys and more than 280 residential lots. There are either one or two car spaces for all lots, and in addition, around 20 spaces are owned and leased out by a single owner. There are also approximate 30 dedicated visitor car spaces. Constraints due to the age of the building and configuration of the existing electrical infrastructure made a *common property approach* the most suitable approach. The solution chosen can also be expanded in future as demand and EV uptake increases.

How the Horizon installed EV charging.

The energy assessment for the building showed two possible power supply boards servicing the garage with a combined maximum possible capacity of 22 charging units at a restricted capacity of 2.3Kw, that is single phase or the equivalent of a domestic power point. Due to the age of the building, it would be extremely expensive to install the infrastructure to enable more power supply to the garage area.

Thus, the issue was whether to allow a small number of owners to access the available power supply or to find a solution to service electric vehicle needs as they increase. The OC also wanted to make charging available to tenants as well as owners, which would be difficult under the single owner/single connection model.

A further issue for the building was the complex infrastructure required to wire every parking space due to the size of the area and the positioning of the spaces. The OC also considered the pros and cons of whether to make this a capital project for the whole owners corporation or require each owner requesting a charging facility to pay for and own the infrastructure.

The OC's objective was to identify options which would:

- Maximise availability and charge all types of electric vehicles, and
- Minimise charging time/rate so that more cars can be charged per 24 hour period.

The common property approach was selected as the most suitable method of utilising the limited resources.

The most efficient placement of a common property charging facility was identified as two adjacent spaces directly proximate to both CCTV and to the internet connection (for ethernet rather than relying on wi-fi).

Level 2 three-phase charging capacity was decided on as this maximises charging rate and therefore allows more users to charge their vehicles each day well into the foreseeable future. The charging station has two outlets so two cars can charge at a time (although they would revert to single phase charge output).

Payment Options

The charging is administered by the EV operator and the driver can use either an app or an RFID card. The charge per kWh is based on an average of the peak, shoulder and off-peak rate charged to the OC plus a small *cost recovery* charge to compensate the OC for the costs payable to the EV

operator by the OC (as the service provider to the owners). The drivers set up their account with the EV operator and the company returns the electricity component quarterly or half yearly depending on usage.

The cost to the OC was about \$20,000 including a second check of the power capacity by the selected provider, painting, bollards etc.

The use of the facility is booked using our building management system and to ensure fair access, signage is used to identify the spaces and the bollards are to stop visitors parking and obstructing the space.

Installation

Installation of the project was outsourced to an EV operator as a turn-key solution.



Waratah Case Study

Overview

The Waratah building in Potts Point comprises 175 lots. The OC identified an opportunity to future proof the building for increased EV uptake by implementing a *modular approach* to EV charging installation. An energy audit was first undertaken to establish electrical supply capacity and the best technology options. Concurrently, energy-efficiency measures were implemented to ensure sufficient power supply capacity as uptake of EVs increases.

How Waratah installed EV charging

A resident of Waratah asked the owners corporation to consider EV charging installation in the building as he was buying an EV. We had previously done a resident survey and expected demand from residents for on-site charging to increase. Energy consultant Ethan Burns (Sustainability Now) was first engaged to undertake an energy audit and identify potential energy savings. Ross De Rango, from NHP was also engaged to undertake scoping and options assessment for EV charging. Energy savings initiatives completed prior to EV charging installation included installing smart LED lighting throughout common areas and replacing legacy inefficient and expensive pool heaters with efficient heat pump units as part of the City of Sydney Smart Green Apartments program. The energy assessment examined the supply capacity of the common property circuits through hour by hour monitoring of usage, and identified sufficient capacity to supply charging during the 11pm – 6am off-peak period. The significant energy saving from the pool heating upgrade ensures even when charging is being used, off-peak use will not exceed the peak load.

Ross De Rango worked with the committee to compare options including a dedicated Jetmaster fast-charging unit and De Rango's own NHP product as it was able to deliver EV charging to the unit owners car space.

The decision was made to proceed with the NHP unit and an EV readiness board with load control via timer in the EV readiness box that ensures charging can only occur during the off-peak period. The charging occurs in the resident's own carparking space.

The NHP units can be rolled out floor-by-floor as demand increases, allowing the community to have capacity for charging of up to 60 vehicles overnight.

Payment options

The installation of the EV readiness box, meter, cabling and other elements cost under \$5000. This was funded by the OC with costs to be recovered from users over a two-year period. Usage costs are calculated on a kWh basis based on data from the usage meter, with cost recovery invoiced quarterly in advance.

In the event of an EV user cancelling their usage or leaving the building, they are liable for the full amount owed for charging.

Installation

Our local electrician, David Campbell from Camco Electric, completed the first installation, using the modular approach ensuring future installations can be easily and cost-effectively carried out by replicating the technology and installation approach on other car parking floors.

Contact details:

NHP Electronics: Ross de Rango, Sustainability Now: Ethan Burns

Altair Case Study

EV Charging (EVC) at Altair

June 2021

Overview

Altair is a strata plan of 141 lots with approximately 165 resident car spaces and 16 visitor car spaces over two full and two half levels of carpark. Altair has overall power restrictions that require ongoing management; and electrical infrastructure limitations including only four open 'slots' remaining on the Electrical Mains Distribution Board.

The OC decided to proceed with a *whole-of-building approach* that will enable any resident to access EV charging to their parking space, individually metered and billed to the individual owner. There are no plans to provide charging to visitor car parking spaces.

How Altair installed EV charging

The OC wrote a detailed brief and then consulted with two EV specialist companies who undertook on-site visits. Both companies responded to the brief with thorough and very professional recommendations.

One company proposed that the OC embark on a ten-year programme with staged installations. Their proposal involved (in part) proprietary equipment/systems. The other company proposed a discounted 'all-up-one-off' installation using no proprietary equipment/systems. The cost differential was substantial.

Altair Owners were sent a detailed newsletter covering the issues and requesting feedback. The OC then addressed all issues raised. Most feedback simply required further clarification on some aspects of the plan. There was negligible negative feedback.

The initiative was put to the Owners at the 2021 AGM. The Owners passed three motions:

1. Essentially covering the works on common property.
2. Some administrative protocols.
3. Authorising the SC to make key executive decisions regarding such aspects as timing, cost within an agreed limit, systems, suppliers etc. This motion proved important in expediting effective and efficient decision-making.

Altair is proceeding with the 'all-up-one-off' installation not only because it provides considerable savings but because it means that they are not locked into proprietary systems and could change all contractors should a major issue arise.

The works involve engaging a contractor to add Electric Vehicle Distribution Boards (EVDB) on each of the four carpark levels using the four available open 'slots' on the building's Mains Board, installing cable trays through-out the carparks and introducing a Wi-Fi system that allows metering and billing into each carpark level.

The Altair system will charge at 7.4 kw. This means that an EV will charge a battery from 0-100% in about ten hours. The OC may decide to limit EV charging to 11pm – 6am when building electricity load is at minimum. The current system will be effective in topping up EV charging or 'fully charge' overnight, but will not super charge.

EV owners will be billed at the average common area tariff which represents a significant discount on the normal domestic apartment tariff. The installation of cabling and smart chargers will be strictly monitored and controlled by the Altair building manager to ensure compliance with the

system. A sole centralised billing agent will be appointed to use the Wi-Fi system to execute metering and billing for individual EV owners.

Payment options

The installation of EVDBs, cable trays and the Wi-Fi system is being funded by the OC through the Capital Works Plan at a cost of approximately \$75,000. Each individual EV owner funds the installation of the cable from the cable tray and on completion this cable becomes common property when connected. The connection cost will be equalised so each owner pays the same amount regardless of distance from the cable tray to car parking bay and this is expected to be in the range of \$1200-\$1400 per vehicle (and will be CPI adjusted).

Each EV owner will also fund a 'Smart Charger' to link the cable to their EV and the charger remains the property of the owner. These off-the-shelf units cost approximately \$2000 and work through the Wi-Fi system to allow individual metering and billing. The smart charger is (generally) portable and will remain the property of the EV owner.

The billing agent will directly charge individual EV owners \$150 p.a. for administration and the billing agent reimburses Altair monthly. The OC aims to break even with a small additional margin to avoid subsidising the scheme.