

Submission to Electric Vehicle Enquiry

Prepared: Greg Luck
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EV Charging in Strata Title Complexes

From the 2021 census, 2,620,903 people, or 10.3% of the population live in apartments. These are strata title complexes, and present difficulties for EV charging.

Issue 1 - Body Corporate Bans on EV Charging

I have two apartments. My Gold Coast apartment at Ephraim Island, Paradise Point, implemented a ban on all new EV chargers in December 2023, due to concerns about EV fires. They stated that there was a lack of government direction on the issue.

The QFES have actually put out a [statement](#) on their recommendations for new EV chargers in car parks and apartments.

Recommendations:

1. Coordinate with the states to change the body corporate legislation to prevent body corporates from banning EVs, provided that state safety requirements have been followed.
2. Coordinate with the states to harmonise safety standards for charging.

Issue 2 - Common Infrastructure Requirements for EV Charging

With a stand-alone dwelling, it is a simple matter to have an electrician install a charger. 7.4KW chargers can operate with normal single-phase electricity. Three-phase power for a 22kw charger may not be readily available, however the existing single-phase power connection can be used. Three-phase power is often installed for pool heaters and air conditioners.

For body corporates, there is a shared power supply. A charger can usually not simply be installed because:

- there is insufficient power in the complex to allow all owners to have an EV charger. The electrical standards allow for a loading factor for air conditioners and other electrical users where planning assumes only part of the maximum supply is being consumed by each lot. For EV charging, the standard requires all EV chargers to be counted as always on.
- meters may be outside the apartment, and not in the basement. If they are outside the apartment cabling would need to be run from the charger up to the apartment. Multi-storey apartment buildings have fire seals between floors, so this requires penetrating and resealing those. It is a great cost.

Instead, body corporates need to install a managed system. These utilise available power and share it out. They also do the metering. There is a significant cost to these systems. On average, the infrastructure costs about \$1,500 per apartment to be picked up by the body corporate, and then a charger to be paid for by the lot owner costing \$1,500 - \$2,500.

See Appendix 1 for a fully worked example of how to go about sizing and planning a system for the Infinity apartment, where I am a lot owner.

It often happens that the first few people to install are allowed to do so, as it does not overload the existing power supply. After that, no new installations can be done. That is the case with my Infinity apartment. I cannot install a charger. I have waited 5 years to do so and eventually sold the charger.

Recommendation:

1. Provide grants to existing body corporates to allow partial offset of the common infrastructure cost.

Issue 3 - Body Corporate Approval of EV Charging Infrastructure

The building standards require, from 1 July 2023, all new apartment complexes to provide for the ability for a lot owner to install a 7.4KW(single-phase) charger in their carparks. However, there is nothing requiring existing body corporates to do the same.

Because those adopting EVs are a minority, and body corporates are democratic entities, it is difficult to get EV charging infrastructure costs approved. You can make an argument that it improves the value of the building and therefore each apartment, but that is about all you can offer to a non-EV owner.

A second issue is that the costs cannot be paid from the sinking fund. The sinking fund is for maintenance of existing infrastructure, not something brand new. That is at least the view of our treasurer. This then requires the raising of a special levy, something residents hate, and almost guaranteed to be defeated.

Recommendations:

1. Coordinate with the states to modify body corporate legislation to specifically allow sinking funds to be used for purchasing common EV charging infrastructure
2. Coordinate with the states to modify body corporate legislation to set a date by which a body corporate must allow for at least a 7.4KW charger per lot. After that date, a motion to install EV charging infrastructure need only meet a 25% vote threshold.

Appendix 1

Infinity EV Options

Prepared by Greg Luck, 114 with assistance from Chris Lehman and Tania Crowley.

Summary

This document explores the options to allow EV charging from car parks at Infinity.

The preferred option is a 3-phase Fast EV charger with 250amp switches on B1 and B2 for a cost of \$116,000. This will provide 64 three-phase chargers, further expandable.

A backup stop-gap option is trickle phasing for 10 cars. This is at no cost to the Body Corporate and provides very slow-speed charging until a fast charging system is installed.

A slower single-phase 7.4KW system is not preferred. It costs \$90,000 but only delivers 1/3 the charging speed of the 3-phase system.

Background

While there are public chargers, they are often busy. The nearest is a QLD Government Electric Superhighway charger at Hamilton Northshore. The nearest Tesla superchargers, now being opened up to non-Tesla users, are at Fortitude Valley (4), Indooroopilly Shopping Centre (8) and Rochedale (8). The situation gets worse at peak times, like after work and holidays.

The most convenient option is to charge from your home. New strata title schemes being designed from 1 July 2023 need to provide for car park EV charging. For single-dwelling homes, a connection is straightforward and can be done by an electrician. For strata titles, the building has its own energy supply, and it is more complicated. Many existing strata title buildings will have difficulty retrofitting EV charging to an Energex supply and building switchboards never designed for that purpose.

Fortunately, the following analysis shows that Infinity has excellent Energex supply and for a moderate cost, can equip the building with a system that will enable lot owners to purchase and install fast EV chargers.

While slower charging eventually gets the job done, if you need to come and go longer distances to the Sunshine Coast, Gold Coast or on a trip, there will be insufficient time to get a full charge.

Because Infinity is blessed with a large electricity supply, and we are a premium building, we can offer a first-class high-speed charging infrastructure to our owners. This will in turn enhance unit value going forward.

Expected Demand

Carparks

63 apartments

152 carparks

Existing Use

Number of EVs December 2018: 2

Number of EVs December 2023: 2

Number of EVs December 2023: 9

Projected Use

Hamilton has one of the highest EV penetrations in the country.

While it is hard to predict exact uptake, we know that government incentives, Federal Government incentives and targets will drive EV adoption.

This analysis

Conversions

1 KVA roughly equals 1KW

1 KWH or Kilowatt Hour is 1 Kilowatt or power consumed over an hour

To convert between power, amps and voltage, use the formula $\text{Power} = \text{Voltage} * \text{Amps}$.

Infinity Electricity Supply Availability

The National Meter Identifier for our LPE Bulk Supply is: 3120296989-4. An enquiry to Energex was made. Our reference number is CX23HAR1059039Q. Energex came out to the site and assessed we had available supply.

We have a dedicated 1600KVA transformer SG1734708 in the basement. It was heavily provisioned as the Portside fire fighting pumps are on this transformer. 400KVA is being used, leaving 1200KVA free which is dedicated to Infinity.

According to Luke from Energex, who completed the capacity enquire with an onsite inspection, he believes we have a supply contract for 800 amps per phase. We would then have a circuit breaker for that 800 amps. 576KW. Given the transformer supply, we can apply to increase that if we need to in the future.

Analysis:

Given that our building is drawing around 100KVA, it means about 300KVA is coming from outside of Infinity. That still leaves $1,600 - 400 = 1,200\text{KVA}$ or roughly 1,200 KW currently limited to 800 amps per phase or 576KW by the supply agreement.

Load Profile

Energex can supply daily use but not instantaneous load information.

Here are some examples:

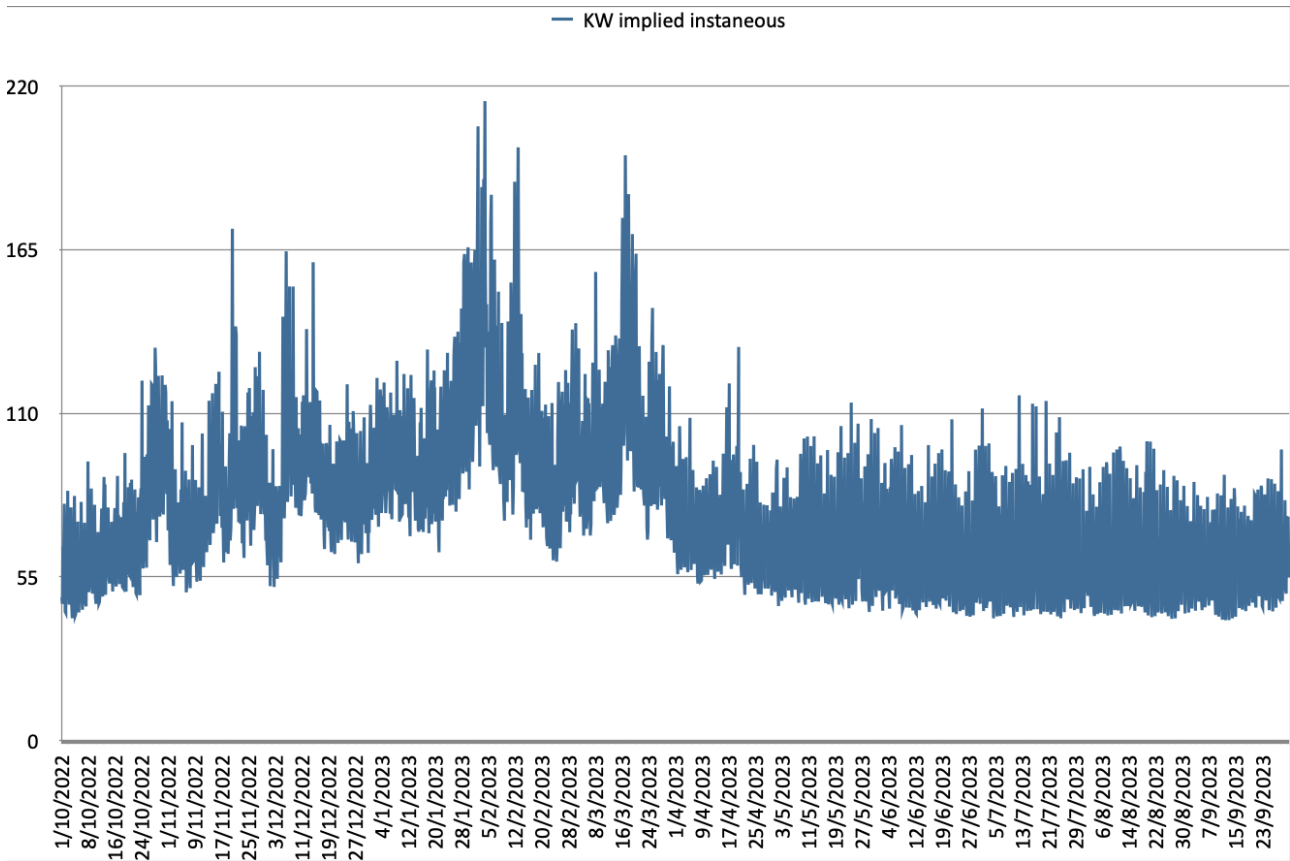
Jan 2020 1500kwh

Feb 2020 3082 KWH (highest reading)

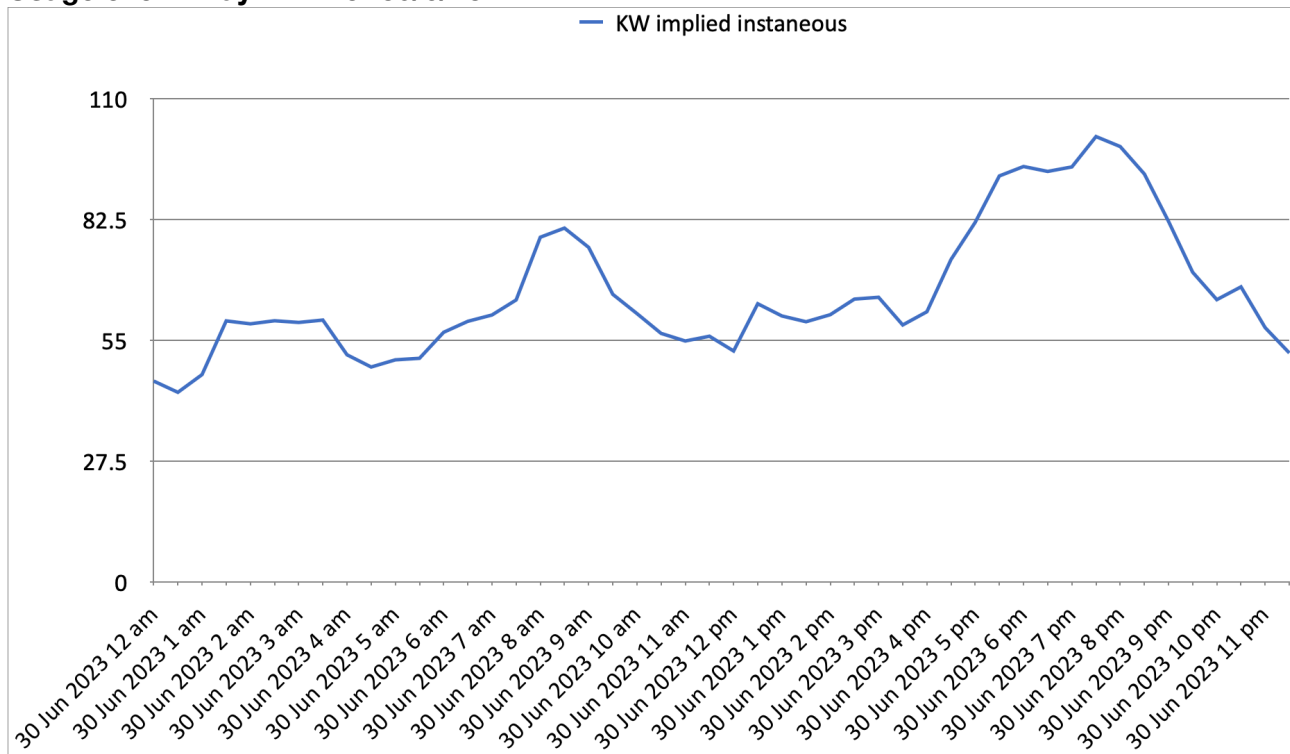
dec23 1795 KWH

LPE has supplied 30-minute interval energy consumption from 1/10/22 to 30/9/23. These reconcile with the daily numbers from Energex.

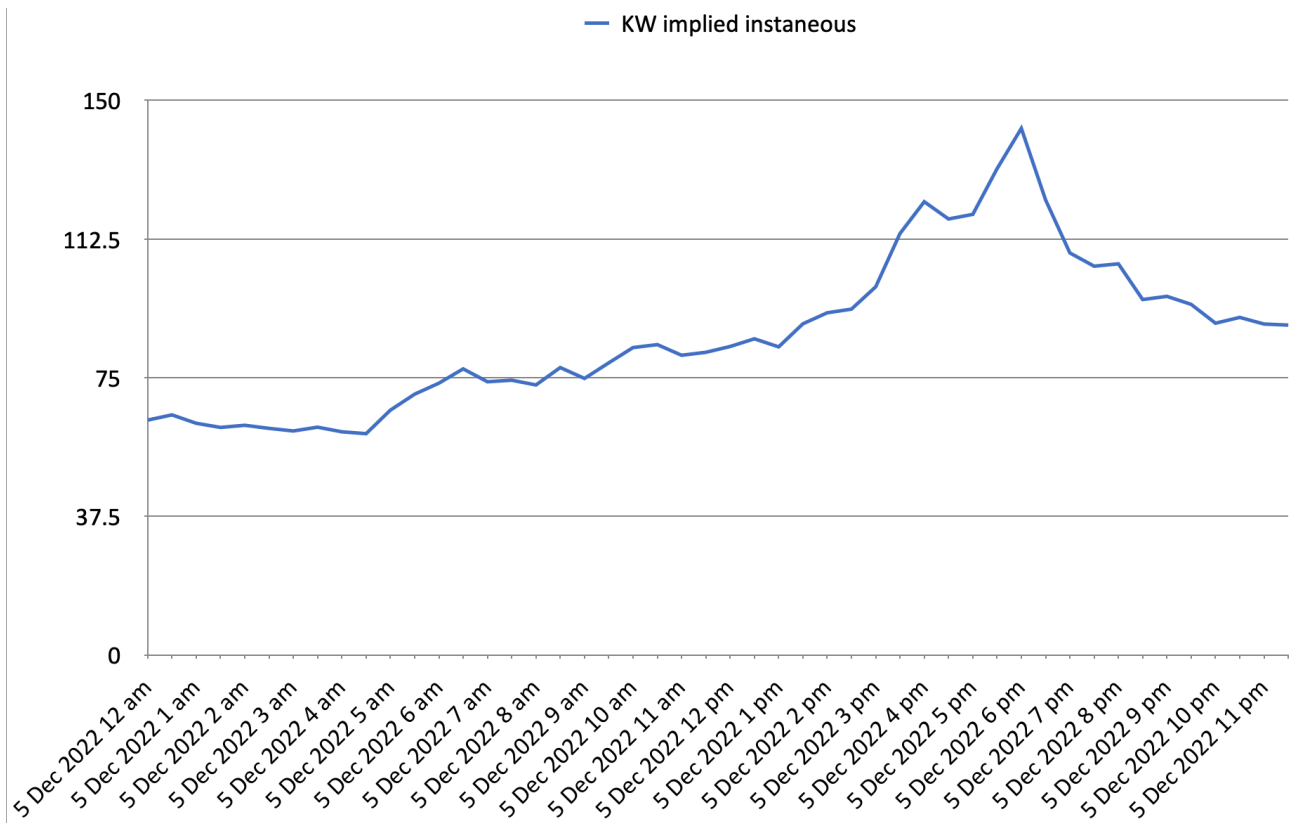
Usage over 1 year - October 2022 to September 2023



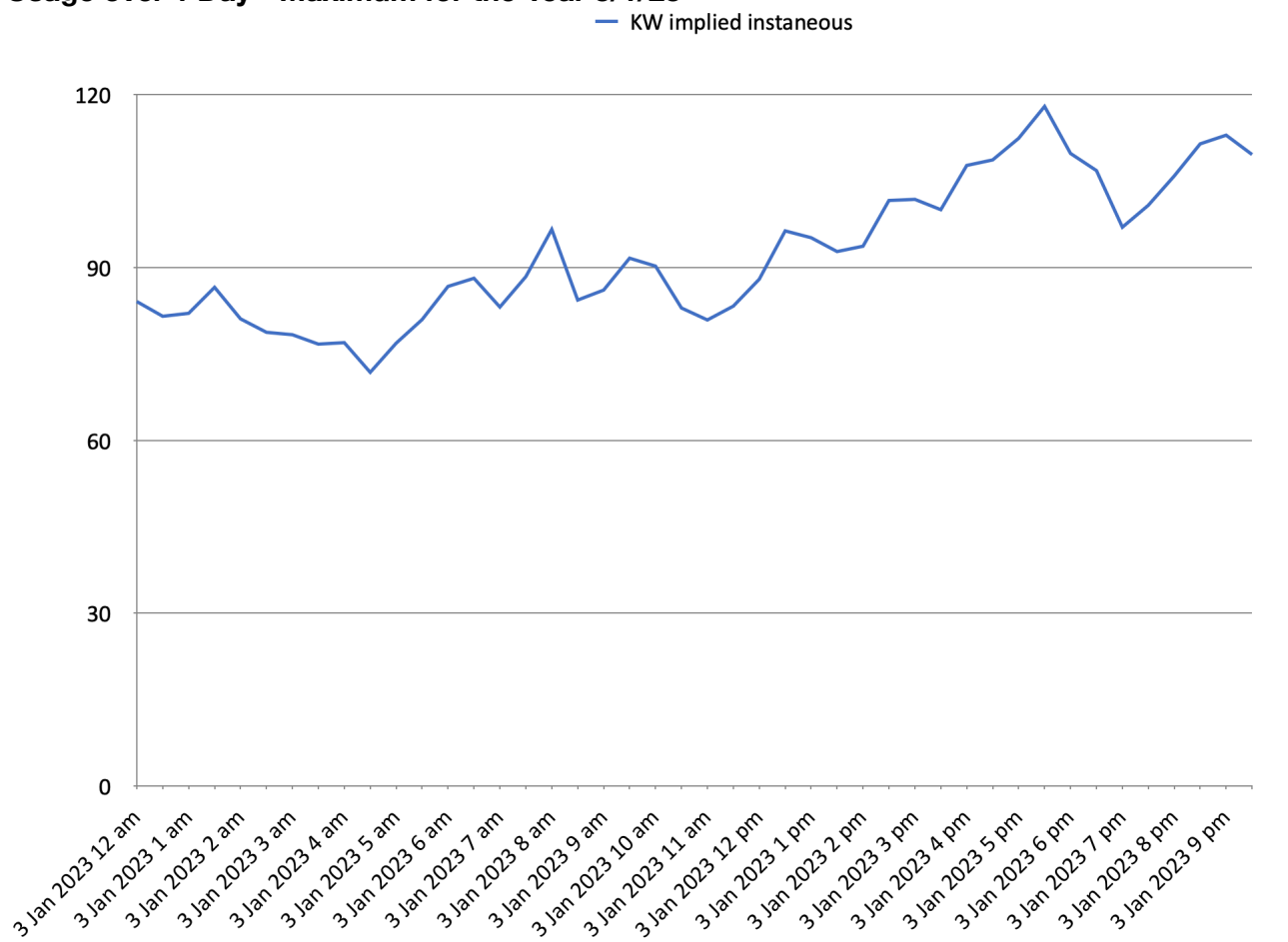
Usage over 1 Day - Winter 30/6/23



Usage over 1 Day - Summer 5/12/22



Usage over 1 Day - Maximum for the Year 3/1/23



Available Electricity for Car Chargers

We know from Energen that we have 1,200 free KVA or roughly 1,200KW. That will go up and down a little depending on our load profile above. But that is a lot of free capacity and more than enough for EV charging in Infinity.

Because the transformer is in our basement the free capacity is available to us and not to other buildings.

Load Management Charging Power Capacity/Calcs

Option 1 - Fast 3 phase system

B1 250 amp per phase. $3 \times 250 = 750$ amps

B2 250 amp per phase. $3 \times 250 = 750$ amps

Total amps = 1500.

Max Power Consumption = $1500\text{amps} \times 240\text{v} = 360\text{KW}$

Option 1 - Slower 1 phase system

B1 160 amp per phase. $3 \times 160 = 480$ amps

B2 250 amp per phase. $3 \times 250 = 480$ amps

Total amps = 960.

Max Power Consumption = $960\text{amps} \times 240\text{v} = 230\text{KW}$

Adding our existing peak annual building usage of 220KW from the load profile above, we then have either 580KW or 470KW respectively. Both of these loads are

Both of these power consumptions fit available supply.

Fast Charger - Quote: Evergreen Electrical

22KW Three-Phase Charger System

Charge Time:

50% charge for a 75KWH battery EV in 1.7 hours.

100% charge for a 75KWH battery EV in 3.4 hours.

Number of Supported Chargers:

2 * 96 pole system will support 192 single-phase chargers or 64 three-phase chargers. The system can be expanded later with an auxiliary board on each level if needed.

Prices:

Body Corporate Install Cost \$92,087.72 (Quote 11261, without the Wifi networking option)

Resident Cost: Tribus Charger 22KW \$3,468.93. Allows 20m of cabling from the switchboard.

Extra length is charged at \$95/hr + materials.

Annual sub: \$148.50

Note that a single-phase charger for a cost of \$2,552.74 can also be installed with this system.

7.4KW Single-Phase System

160amp same as Planit Charge so calculations are the same as Planit Charge

Charge Time:

50% charge for a 75KWH battery EV in 5 hours.

100% charge for a 75KWH battery EV in 10 hours.

Prices:

Body Corporate Install Cost \$90,095

Resident Cost: Tribus Charger 7.4KW @ \$2,552.74. Allows 20m of cabling from the switchboard.

Extra length charged at \$95/hr + materials.

Annual sub: \$148.50

Fast Charger - Quote: Planit Charge

22KW Three-Phase Charger System

Charge Time:

50% charge for a 75KWH battery EV in 1.7 hours.

100% charge for a 75KWH battery EV in 3.4 hours.

Number of Supported Chargers:

2 * 96 pole system will support 192 single-phase chargers or 64 three-phase charger. The system can be expanded later with an auxiliary board on each level if needed.

Note: This system is limited to 60 chargers due to the limitation of the load management system.

Price:

Coming in January

22KW Three-Phase Charger System

Charge Time:

50% charge for a 75KWH battery EV in 5 hours.

100% charge for a 75KWH battery EV in 10 hours.

Number of Supported Chargers:

2 * 48 pole system will electrically support 96 single-phase chargers or 32 three-phase charger. The board can be expanded later with an auxiliary board on each level if needed.

Note: This system is limited to 60 chargers due to the limitation of the load management system.

Prices:

Install: \$90,932 for a system to do 18 chargers. Additional licenses \$2,500 for each extra 6. Max capacity 60.

Per Charger: \$5,035

Homegrown Trickle Charger: GPO + Meter

Uses the GPO charger supplied with your electric vehicle. Involves installing a regular power outlet (GPO) at your car space connected via a meter to the community supply.

This is a stop-gap option that provides a solution without the Body Corporate needing to spend any money so that the expenditure can be deferred for a year or two. On the other hand, some people may prefer the low cost of this option and may be happy with it as a permanent solution.

Later, if a fast charging system is installed, the GPOs can either be removed or repurposed for running fridges trickle-charging internal combustion cars and so on. Note that anyone with a garage door already has an unmetered GPO at their car park.

10 amp GPO.

2.4KW charging rate

Supply Capacity:

The community supply has 63 amps * 3 phase = 189 amps for each of B1 and B2. This equates to 90KW of total community supply. That runs community items like lights and the lobby airconditioners, unmetered car park doors and similar. This whole supply is not available to EV charging, although what has been connected so far has not tripped the circuit breakers.

Charge Time:

50% charge for a 75KWH battery EV in 15.5 hours.

100% charge for a 75KWH battery EV in 31 hours.

Prices:

Owner cost only. Fed hundred dollars to install cabling and meter.

Meter: \$140

Cabling: Depends on distance from power. Dermot's was under \$400 total.

Charger: A GPO charger comes with the electric car.

Relies on:

Disconnecting *Lot 147's* charger. It is running at 24 amp 3 phase, using 72 amps when in use. See photo below from a charging session I did on it in December 2023 and note the number 3 in a circle, meaning 3 phase and the 24 amps.

