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# Strata EV Charging Workshop

18 July 2023



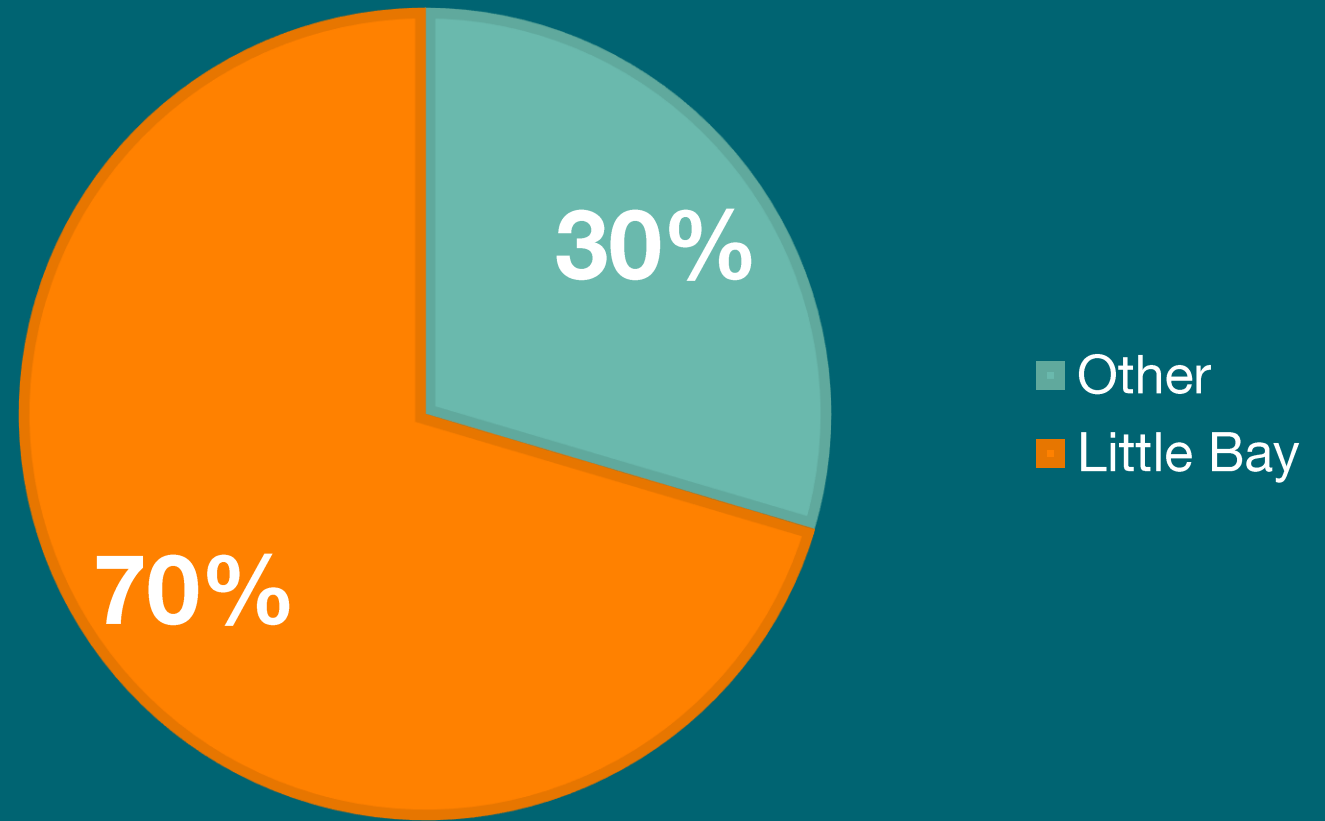
# Content

1. Who is here today?
2. Public EV charging
3. Sustainability Rebates
4. Wattblock (Brent Clark)
5. Case Study & Questions



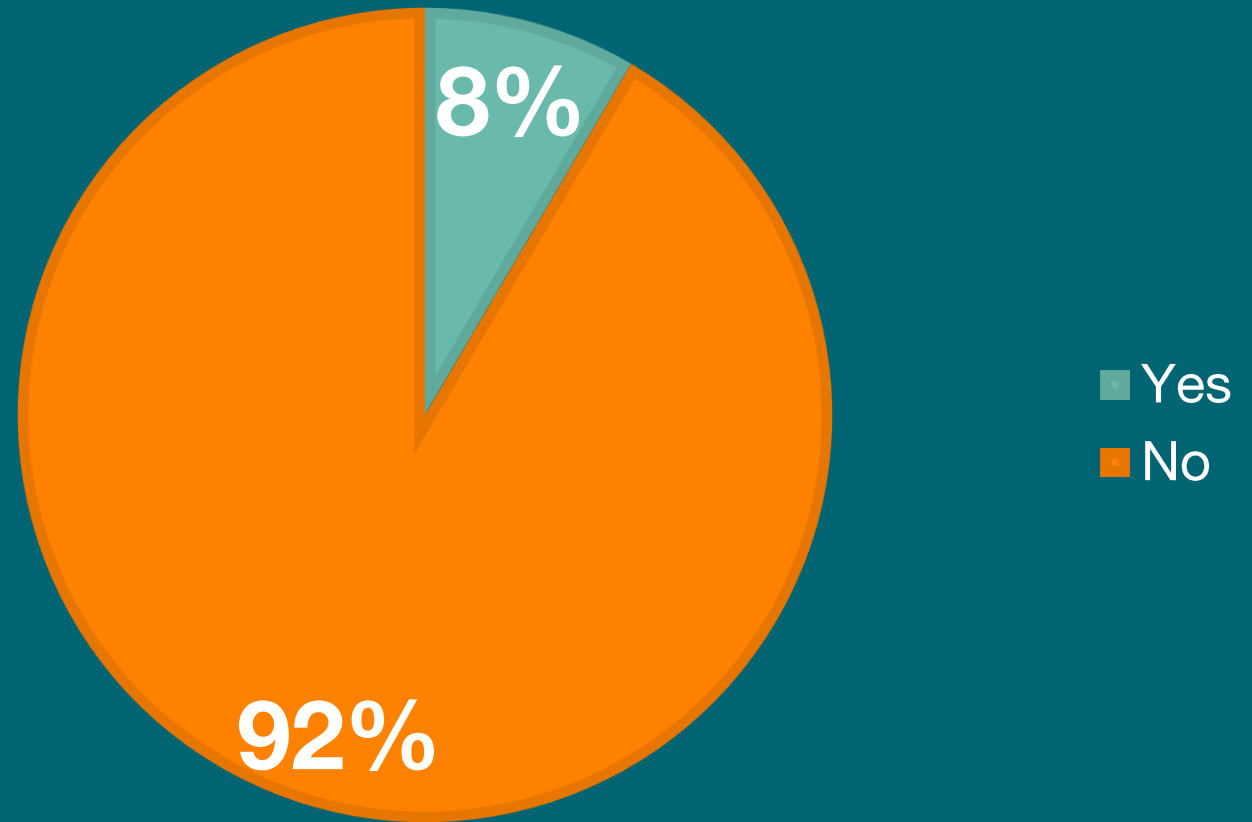
# Who is here today?

## WHERE IS YOUR STRATA?



# Who is here today?

## DO YOU OWN AN EV?



# Public EV Charging

## Slow (AC)

- 7 to 11 kW
- 4 to 6 hours

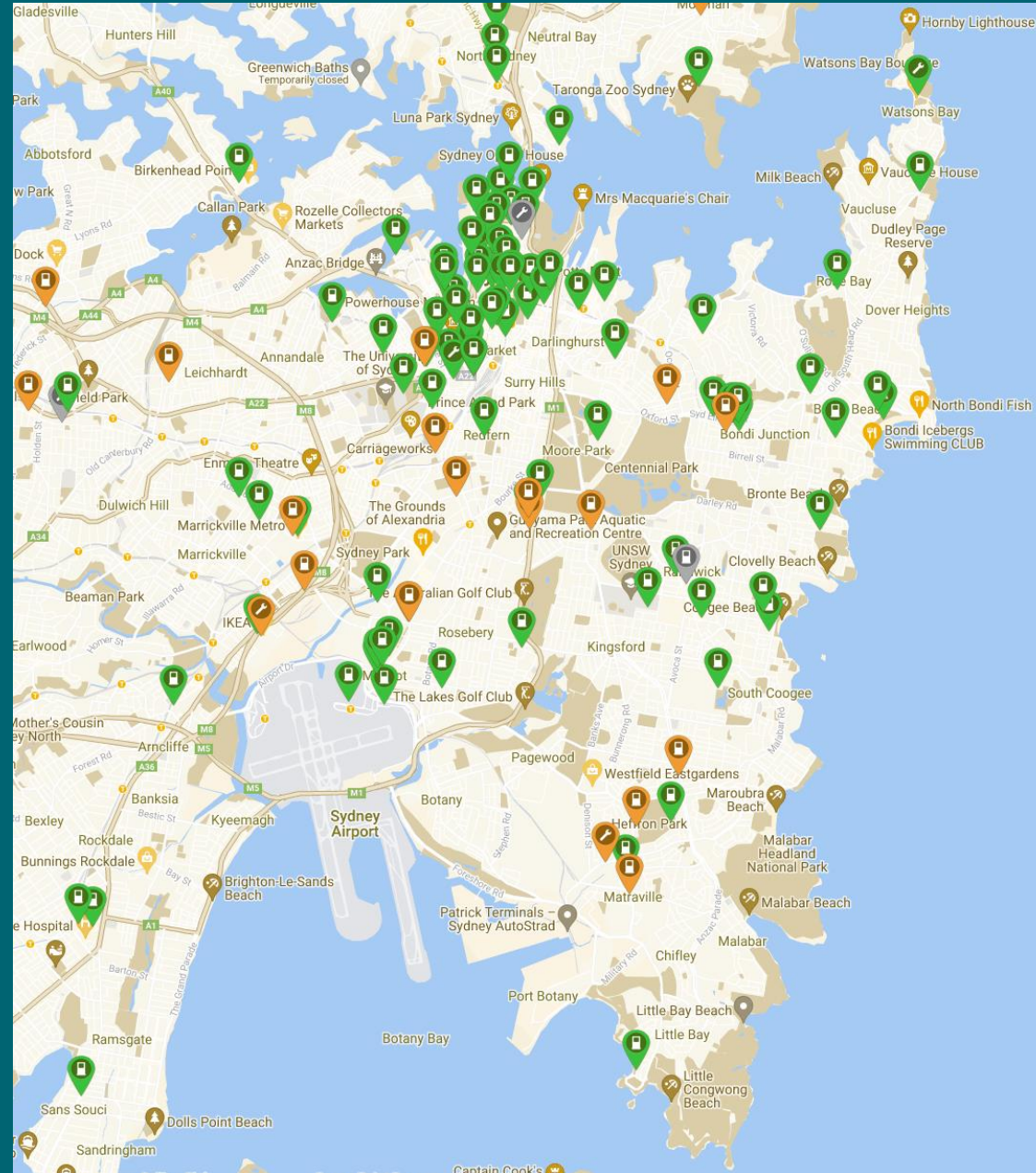


## Fast (DC)

- 25 to 350 kW
- 20 to 60 mins



# Public EV Charging



# Sustainability Rebates



Rebates for solar, batteries, EV charging, insulation, etc.

## Electric Vehicle Charging

**Household:** 25% up to \$250

**Apartment Block:** 25% up to \$5,000

**Business:** 25% up to \$1,000

[randwick.nsw.gov.au/sustainabilityrebates](http://randwick.nsw.gov.au/sustainabilityrebates)

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# Case Study & Questions





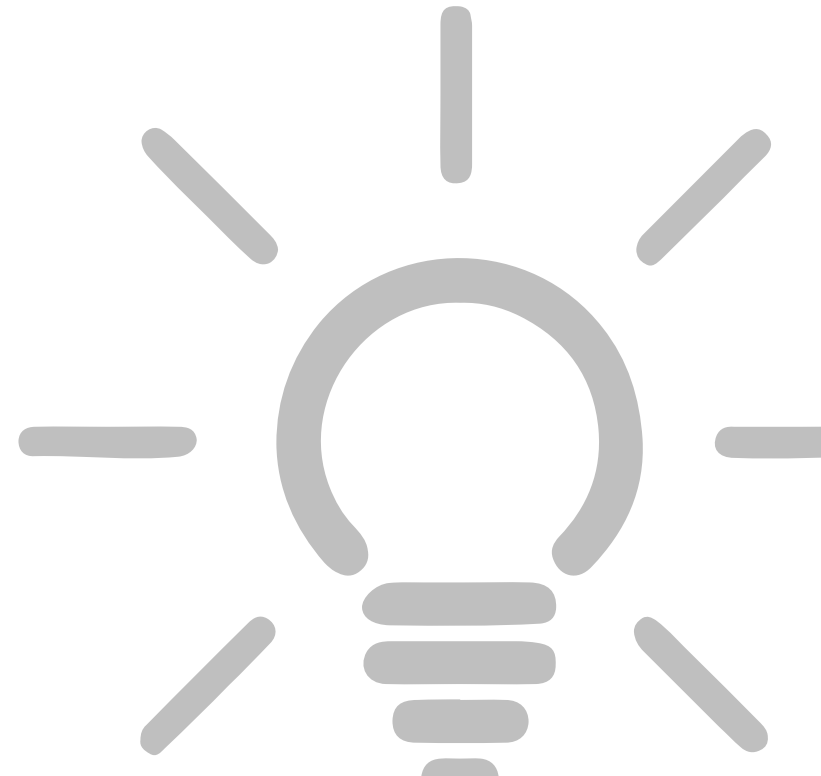


Randwick City  
Council  
a sense of community

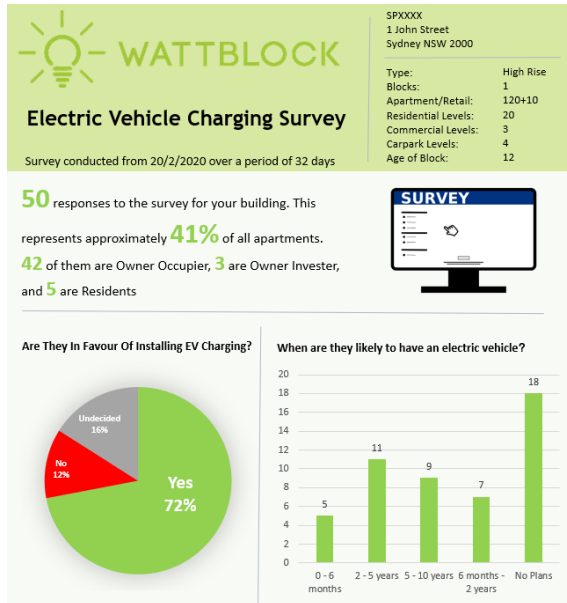
# Understanding EV Charging for Apartments

# Contents

1. Prerequisite projects for EV Charging
2. The Future of EV Charging in Strata
3. 9 Models for EV Charging in Strata
4. Conduit, Cable Tray and Flat cable
5. Wi-Fi for Chargepoints, EV's and mobile phone calls
6. Load balancing and billing system case studies
7. Planning a large scale infrastructure
8. Solar and battery powered EV charging
9. By-laws, End-user agreements



# Prerequisite Projects for EV Charging Installation



## EV Charging Survey

- What is the interest in buying EVs in the future?



## Understand the Maximum Load

- Feasibility Study
  - Electricity monitoring device
- OR
- Upgrade the electrical infrastructure

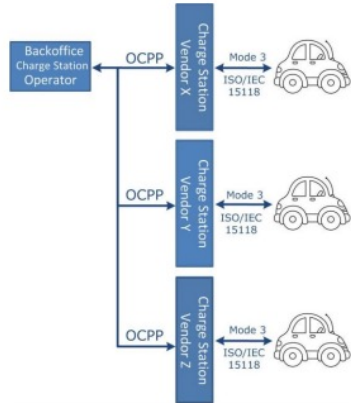


## Passing an EV Charging by-law

- Set a limit on the charging speed
- Allow more EV Chargers to be installed

# The future of EV charging in buildings

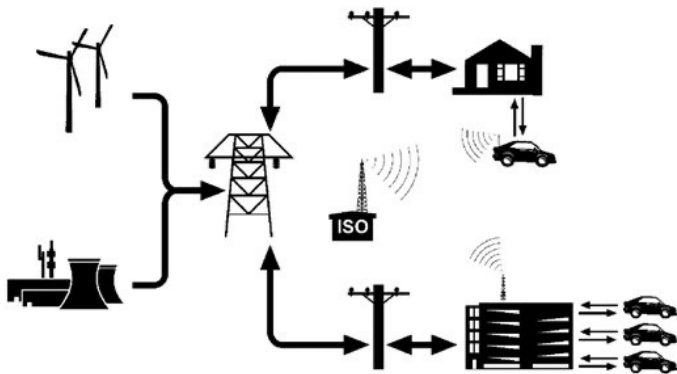
## Open Charge Point Protocol (OCPP)



## EV Carshare



## Vehicle-to-Grid (V2G)



## Solar and battery powered EV charging



# Power struggle: Doctor forced to sell electric car after his building denied access to power point



By [Sue Williams](#)

April 4, 2022 – 2.50pm

As a doctor regularly treating patients suffering the ill effects of floods, heat and bushfires, Dr Akhil Gupta is eager not to contribute to climate change himself.

But the 34-year-old is devastated after being forced to dump his electric vehicle for an old petrol car because the apartment block where he lives refused to allow him to use a power point in the garage to charge it, despite his offer to pay for the electricity.

## TALKING POINTS

- Dr Gupta, an endocrinologist and obstetric physician, had offered to pay a weekly fee to the Owners Corporation for the electricity – about \$10 a week – or to pay for his exact use if a meter was installed.
- The building manager said the strata insisted that Dr Gupta, a tenant, had to persuade the owner of his unit to pay for independent legal advice to draw up a bylaw.

Strata decommissioned this common area power outlet to stop tenant using it to charge his electric vehicle



— Opinion

# Resistance to EV charging is a power game in strata

Interest in electric vehicles is growing fast, so why are some strata schemes ready to pull the plug on plans for in-garage charging?

**Jimmy Thomson** Contributor



Apr 22, 2022 - 5:00am

Save Share

One of the more surprising issues as we recover from the various fires and floods of summer is not the growth in [interest in electric vehicles \(EVs\)](#) but the occasionally bitter resistance to strata residents having one and being able to charge it up.

## VANCOUVER SUN

News / Local News



# Vancouver strata wins against owner whose EV charger was shut off for nonpayment

*A Vancouver strata has won a civil case brought by a condo owner who says his electrical vehicle charger was unfairly shut off.*

Stephanie Ip

May 05, 2022 • 6 days ago • 3 minute read • 5 Comments

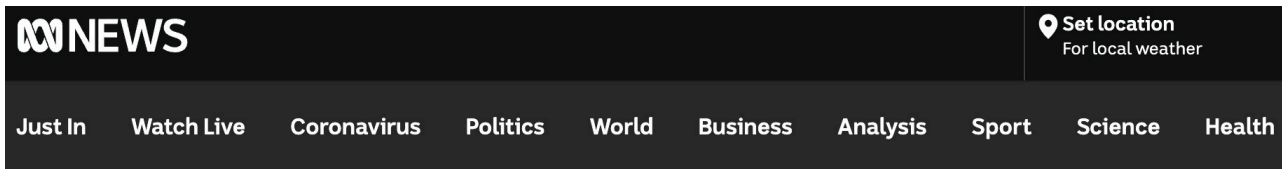
## THE AUSTRALIAN



### Plug 'n' pay technology in the slow lane

Slow EV legislation has left apartment dwellers caught between paying hundreds of thousands to upgrade their building, or paying for their neighbour to charge their Tesla.

# Article in ABC News this morning about EV owner in Darling Point



● **FLOOD WARNING** For the latest flood and weather warnings, search on [ABC Emergency](#)

## Lack of public charging facilities makes owning an electric car a challenge for Sydney residents



# Different EV charging scenarios for different size buildings

We are going to look at 9 different scenarios for EV charging in Australian strata today.

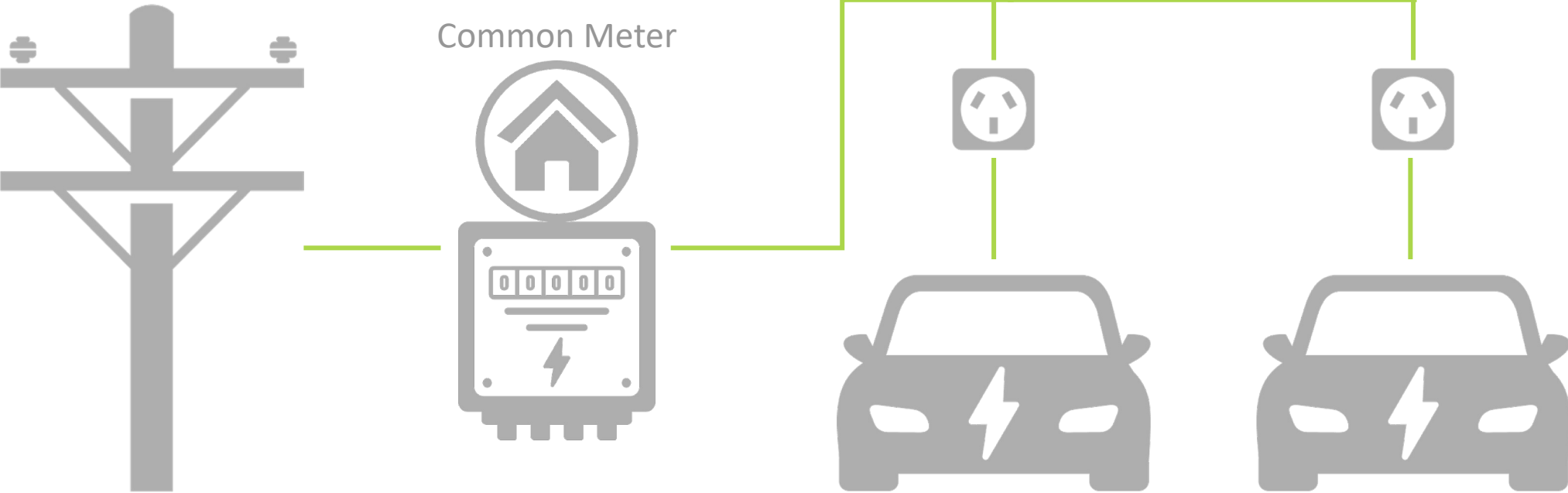
Not all our strata buildings are the same size and may need different solutions.

As a rough guide, depending on the size of your apartment building you may want to focus on a set of scenarios.

Strata Size in Lots	Percentage of Apartment Buildings	Percentage of Total Apartments	EV Charging Scenarios to focus on today
1-10	75%	28%	Scenarios 1 to 6
11-100	24%	49%	Scenarios 4 to 7
101+	1%	23%	Scenarios 4 to 9



1. Using a general power outlet in visitor carparking spaces connected to common area meter to charge EV's



# Power outlets can be used with an end-user agreement



10 amp power outlet  
EV, motorcycle, mobility scooter  
Peak 57c per kWh  
Shoulder 33c per kWh  
Off peak 21c per kWh  
Maximum 24 hours

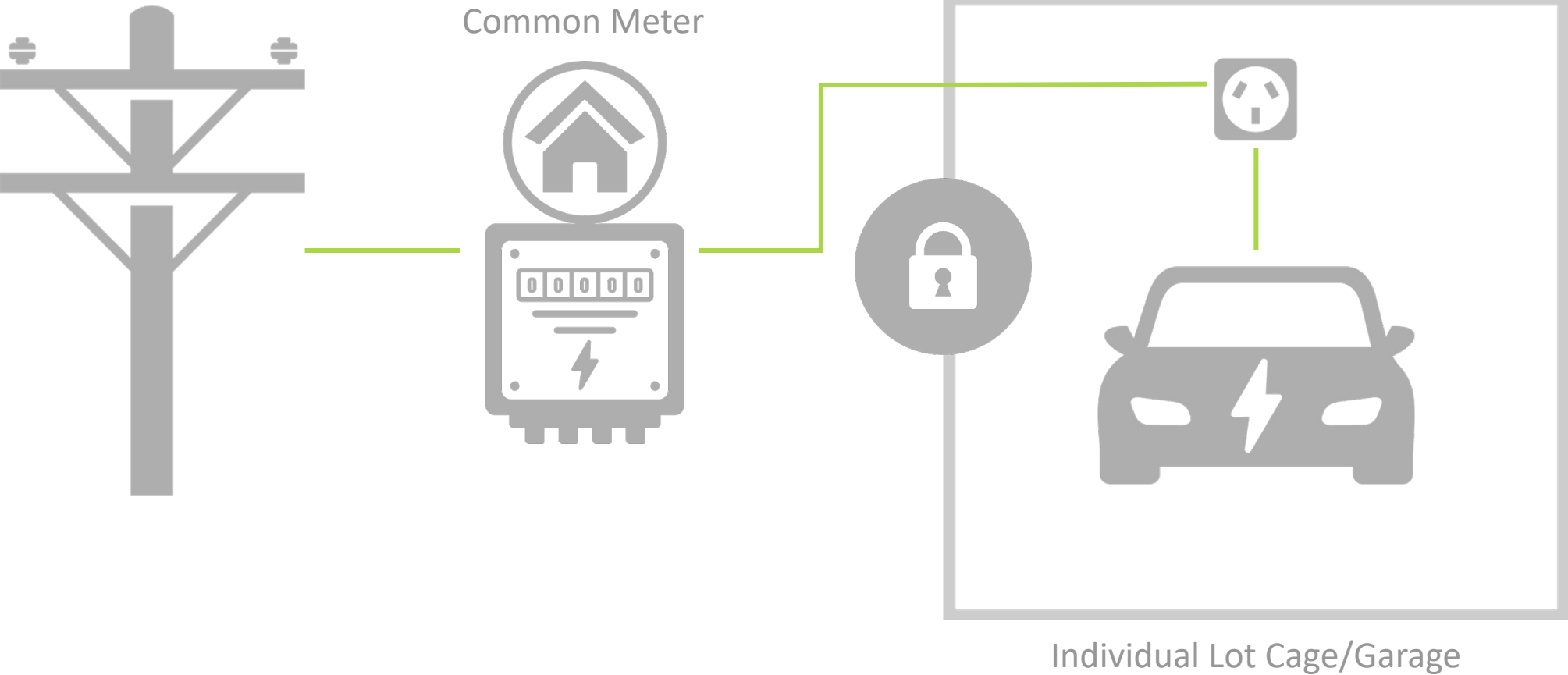


10 amp power outlet  
Electric Vehicle only  
41c per kWh flat rate  
Maximum 8 hours



10 amp power outlet  
Motorcycle only  
\$1.76 per hour  
Maximum 4 hours

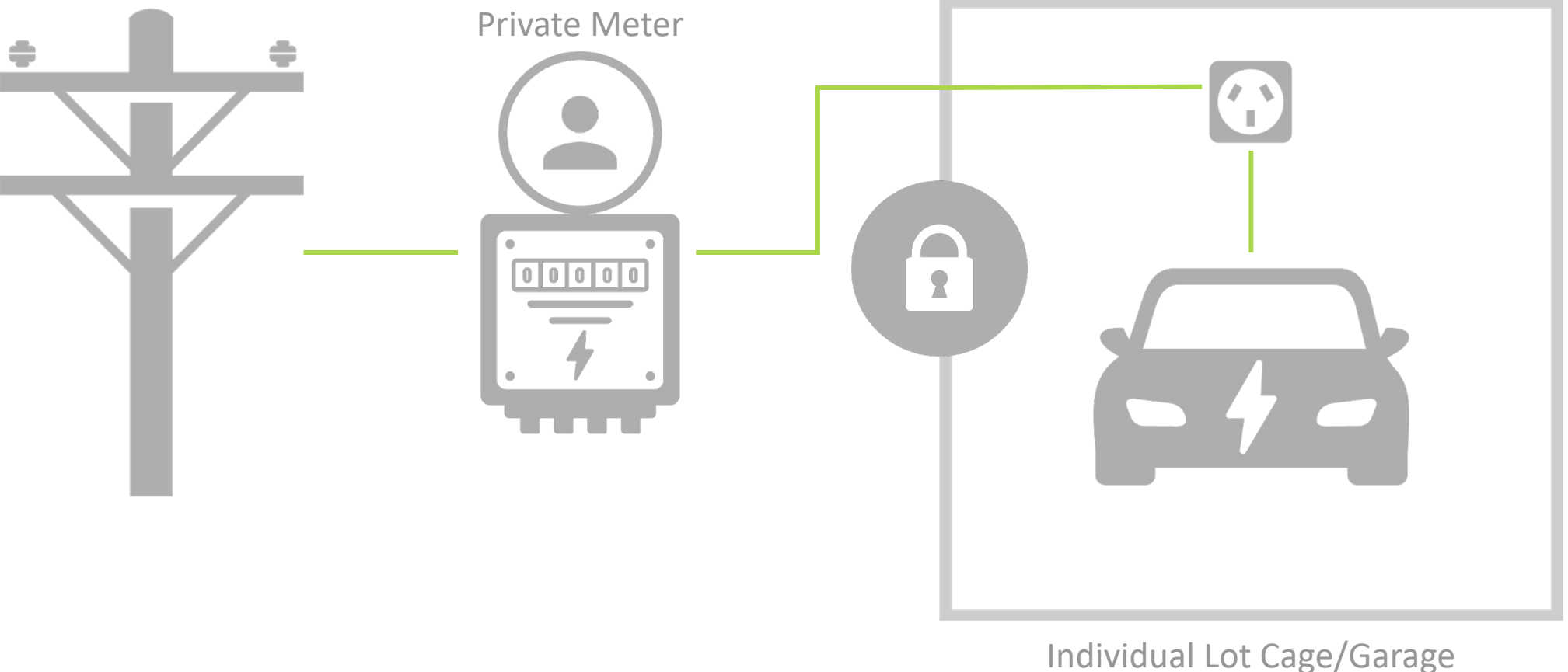
2. Using a general power outlet in an individual lot cage/garage which is connected to common area meter to charge EV



# Milsons Point – using plug-in power meter on GPO from Bunnings



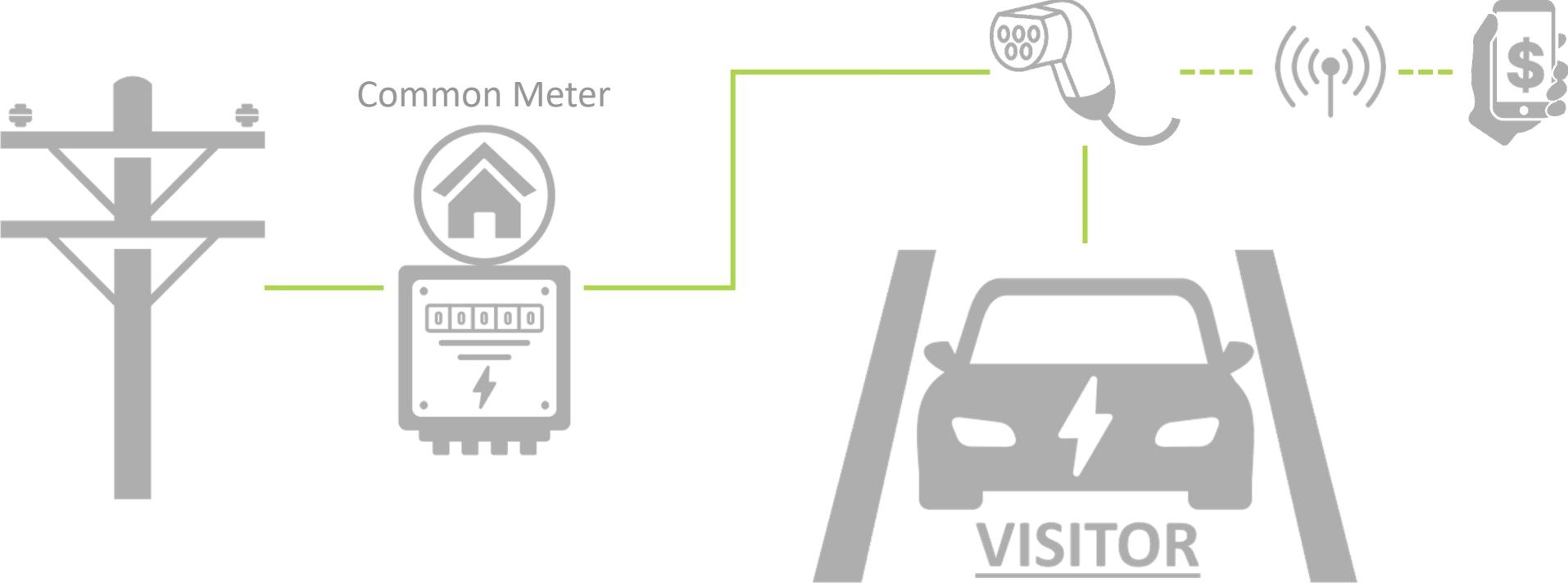
3. Using a general power outlet in an individual lot cage which is connected to private lot meter to charge EV



# Townhouse complex in North Sydney has power outlets in individual parking cages connected to townhouse sub-board



# 4. Using a chargepoint in a visitor car parking space to charge electric vehicle with billing via smartphone app or RFID card

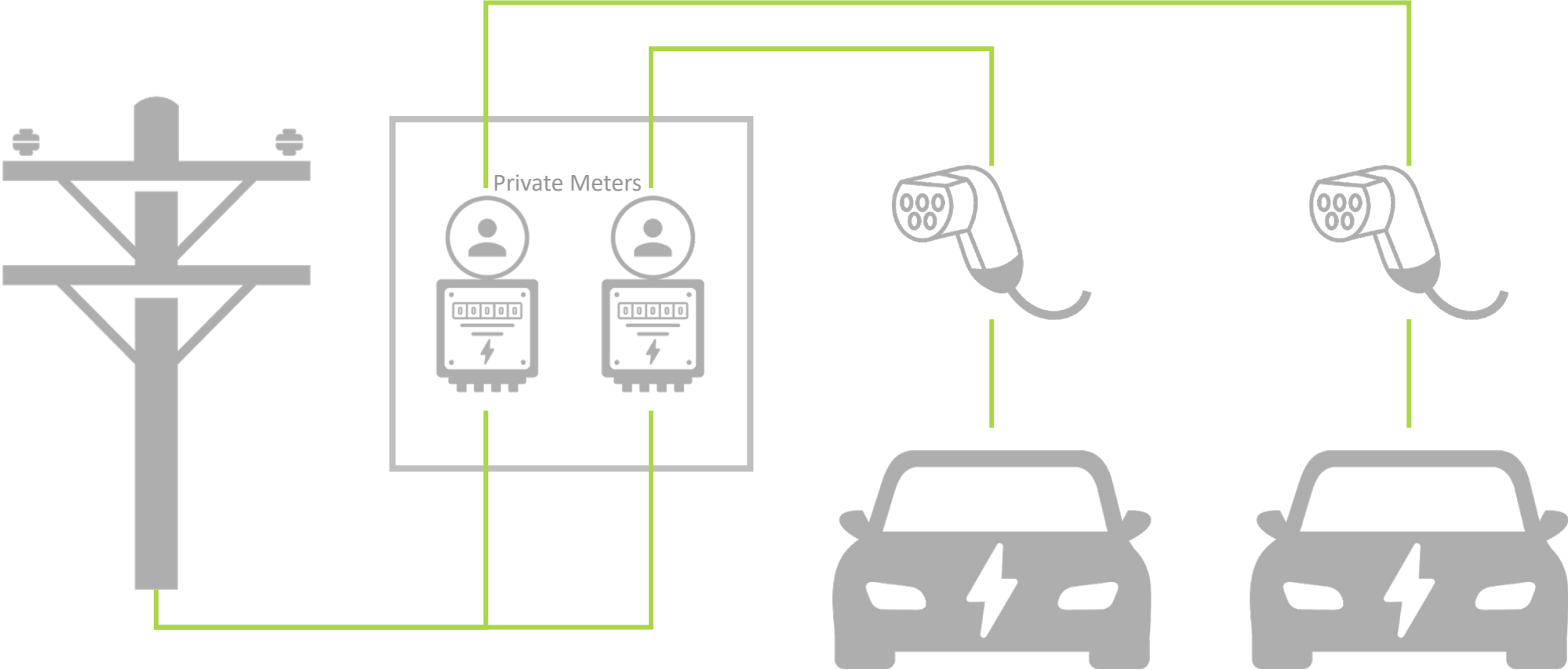


# Darlinghurst – charging in visitor spots, bollards, booking system, pay with credit card

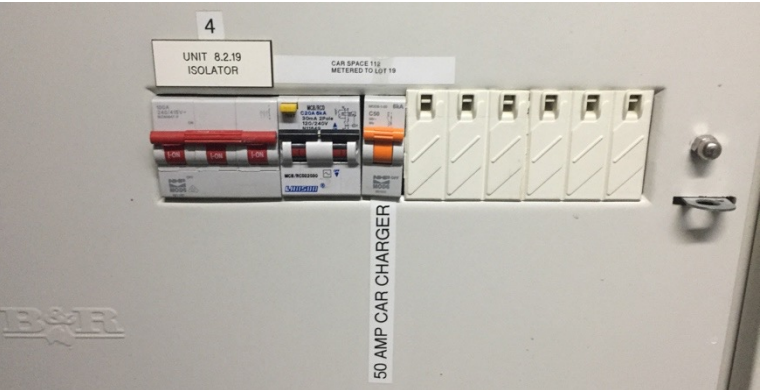




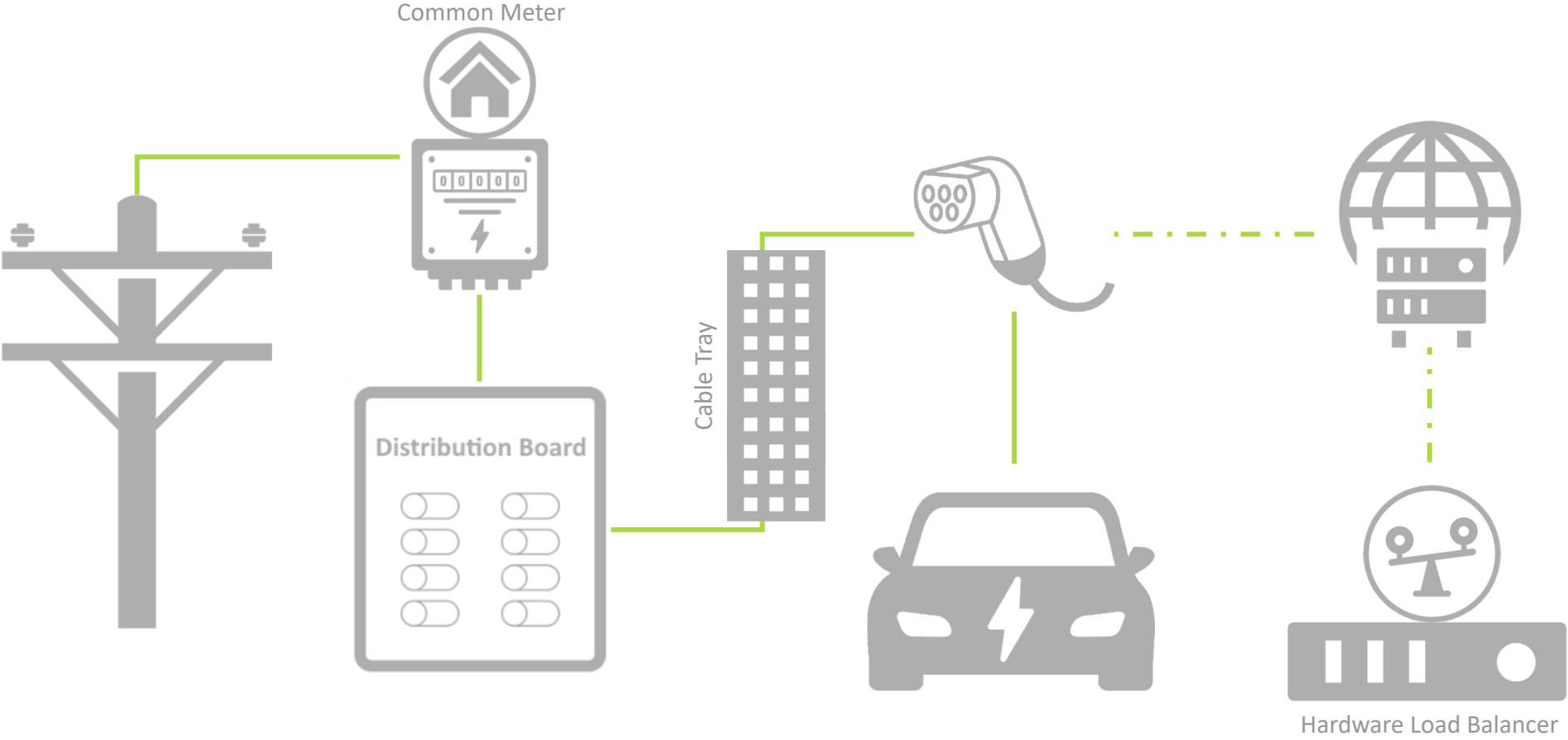
5. Using a chargepoint in individual lot carspace connected to an individual apartment meter located in carpark area



# Pyrmont – charging on private apartment meter located in apartment meter room



6. Using a chargepoint in individual lot carspace connected via cable tray and distribution board to common meter to charge EV. Data cable connects chargepoint to networking box for billing and hardware load balancing



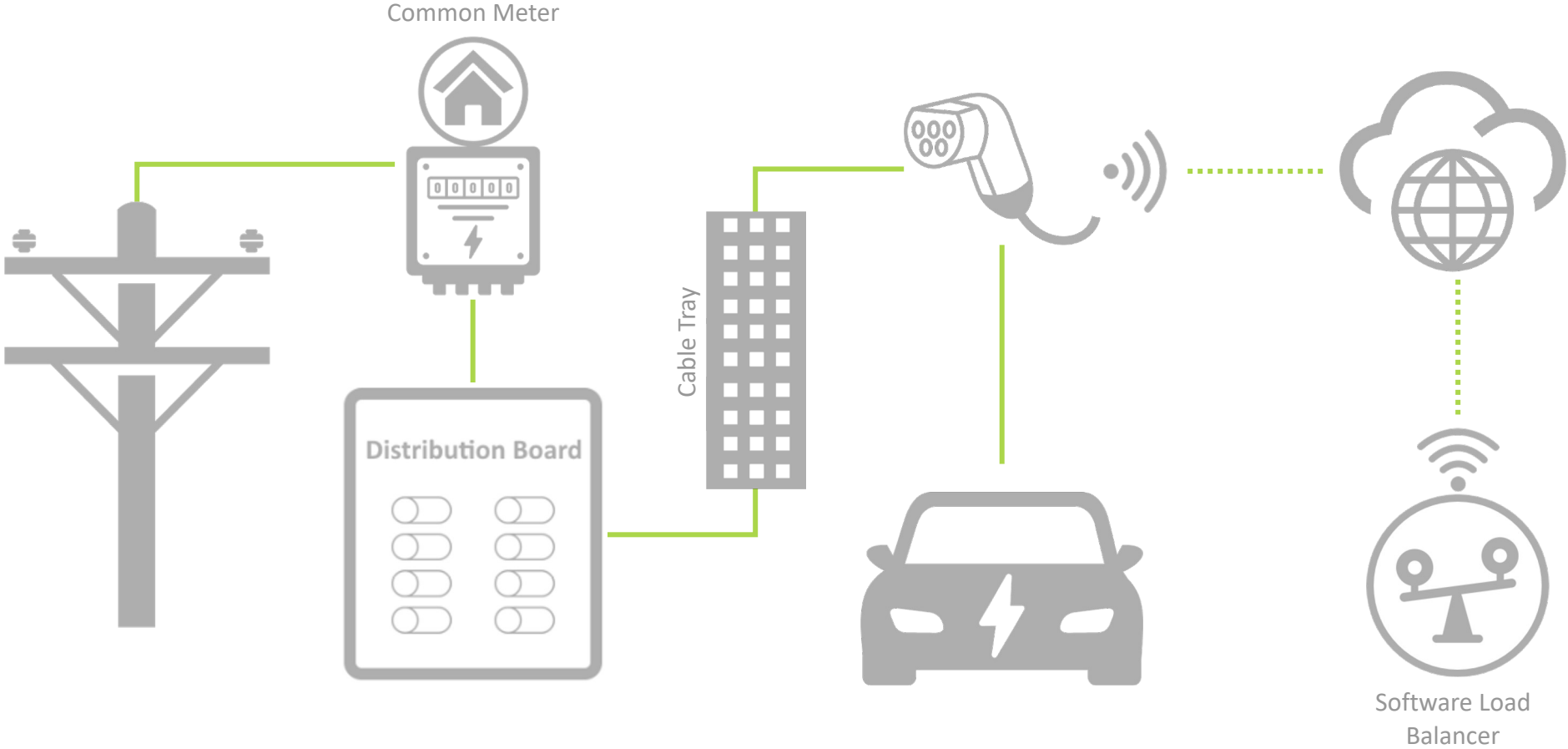
What does a new distribution board look like in the carparking area?



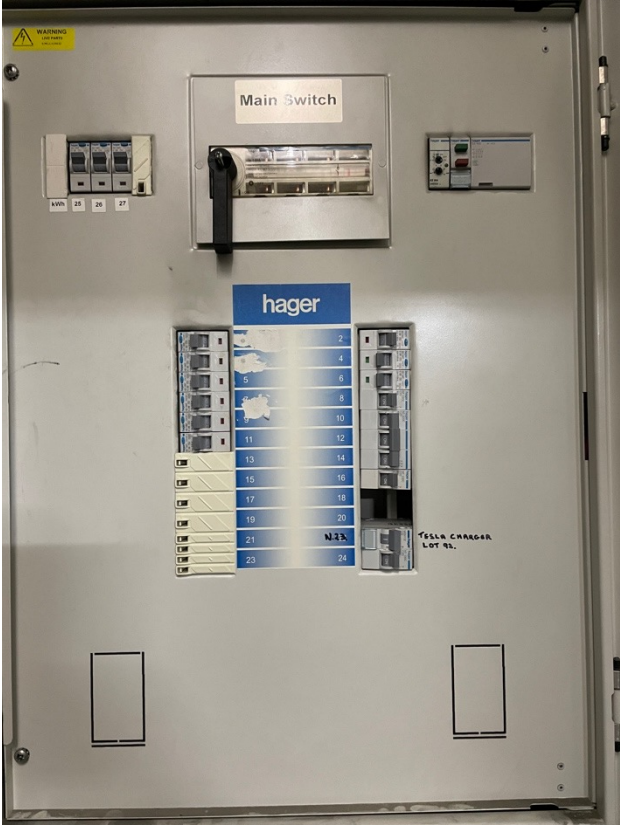
What does a cable tray look like passing every carspace?



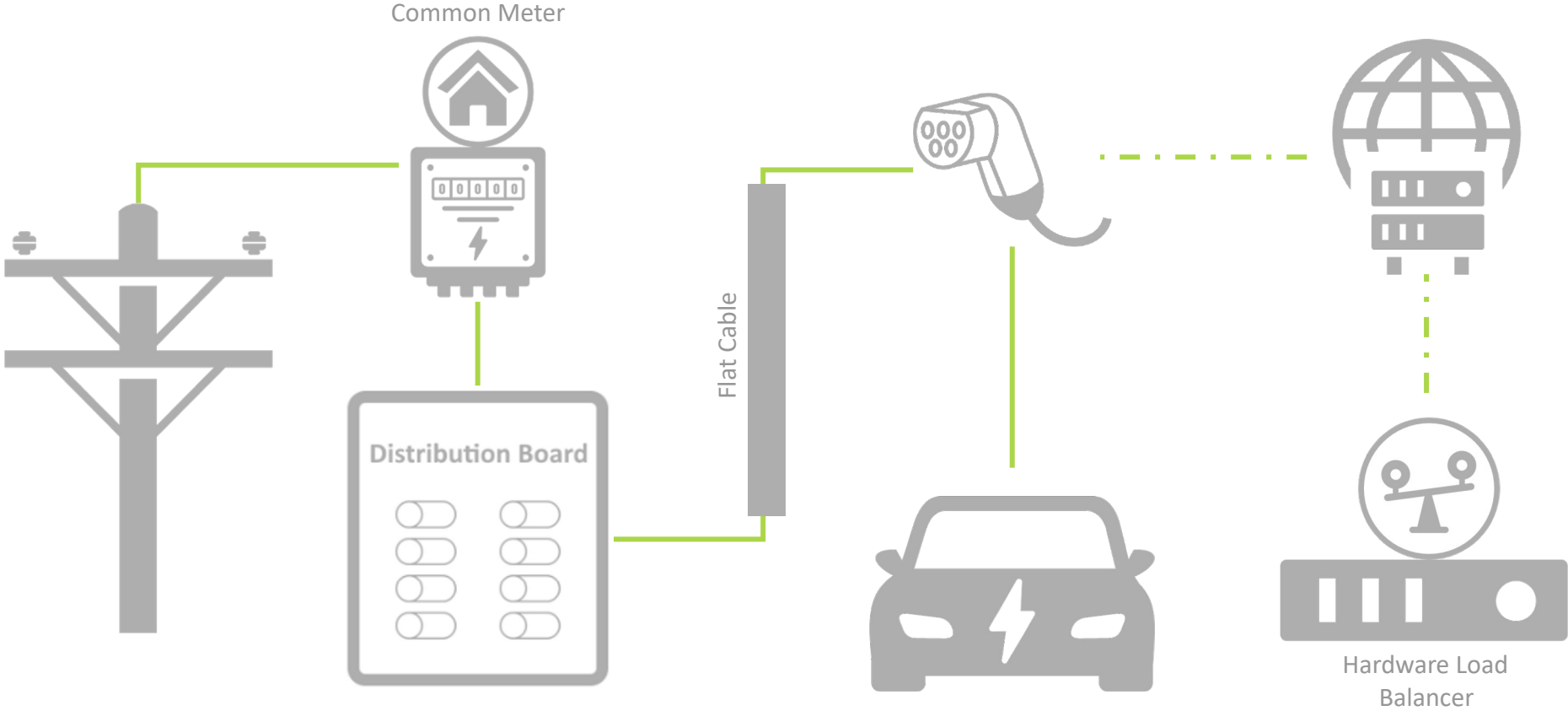
7. Using a chargepoint in individual lot carspace connected via cable tray and distribution board to common meter to charge EV. Wi-Fi for data connectivity for billing, software load balancing and software updates into EV



# Sydney CBD – charging off house distribution board located in carpark area



8. Using a chargepoint in individual lot carspace connected via flat cable and distribution board to common property meter to charge EV. Data cable connects chargepoint to networking box for billing and hardware load balancing

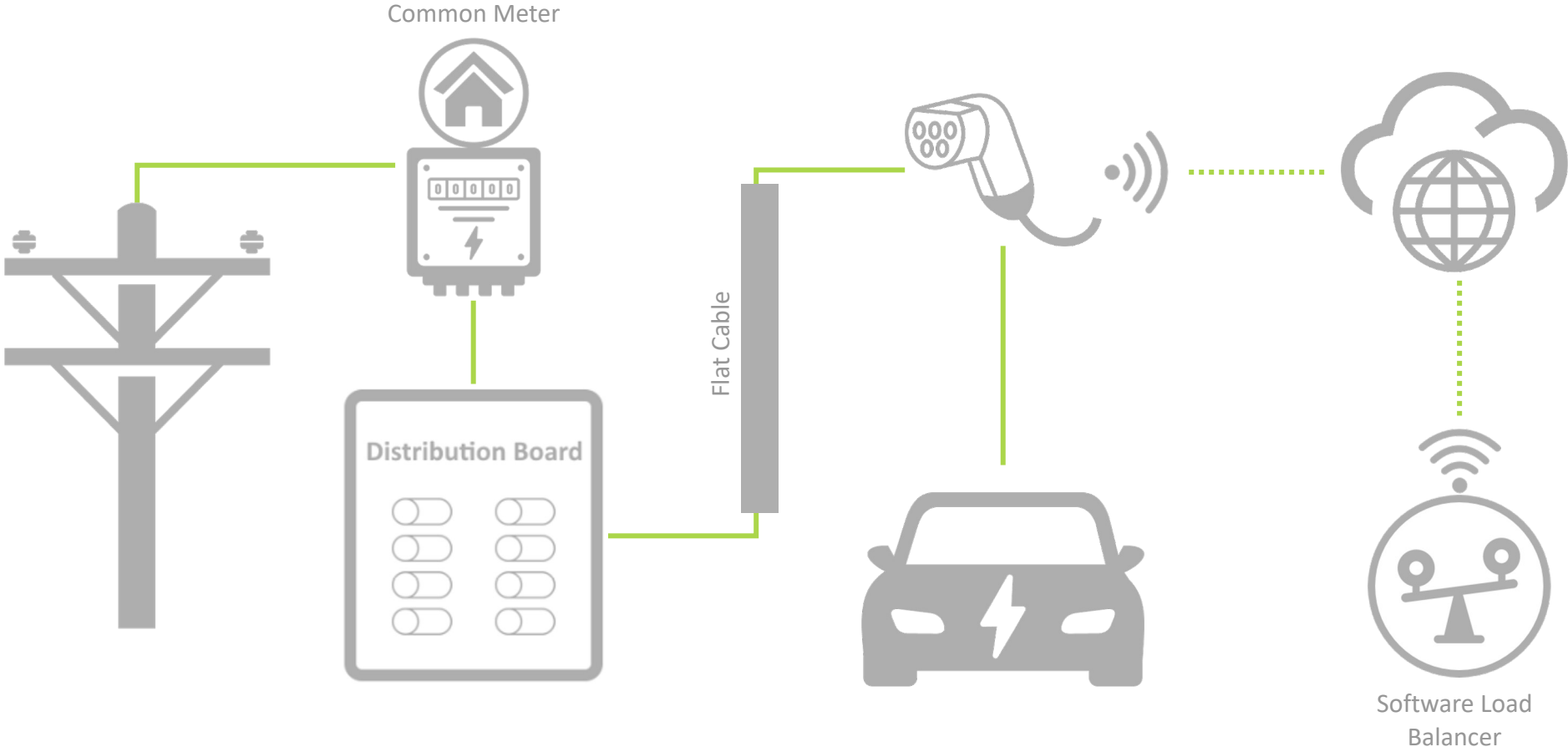




# Flat cable



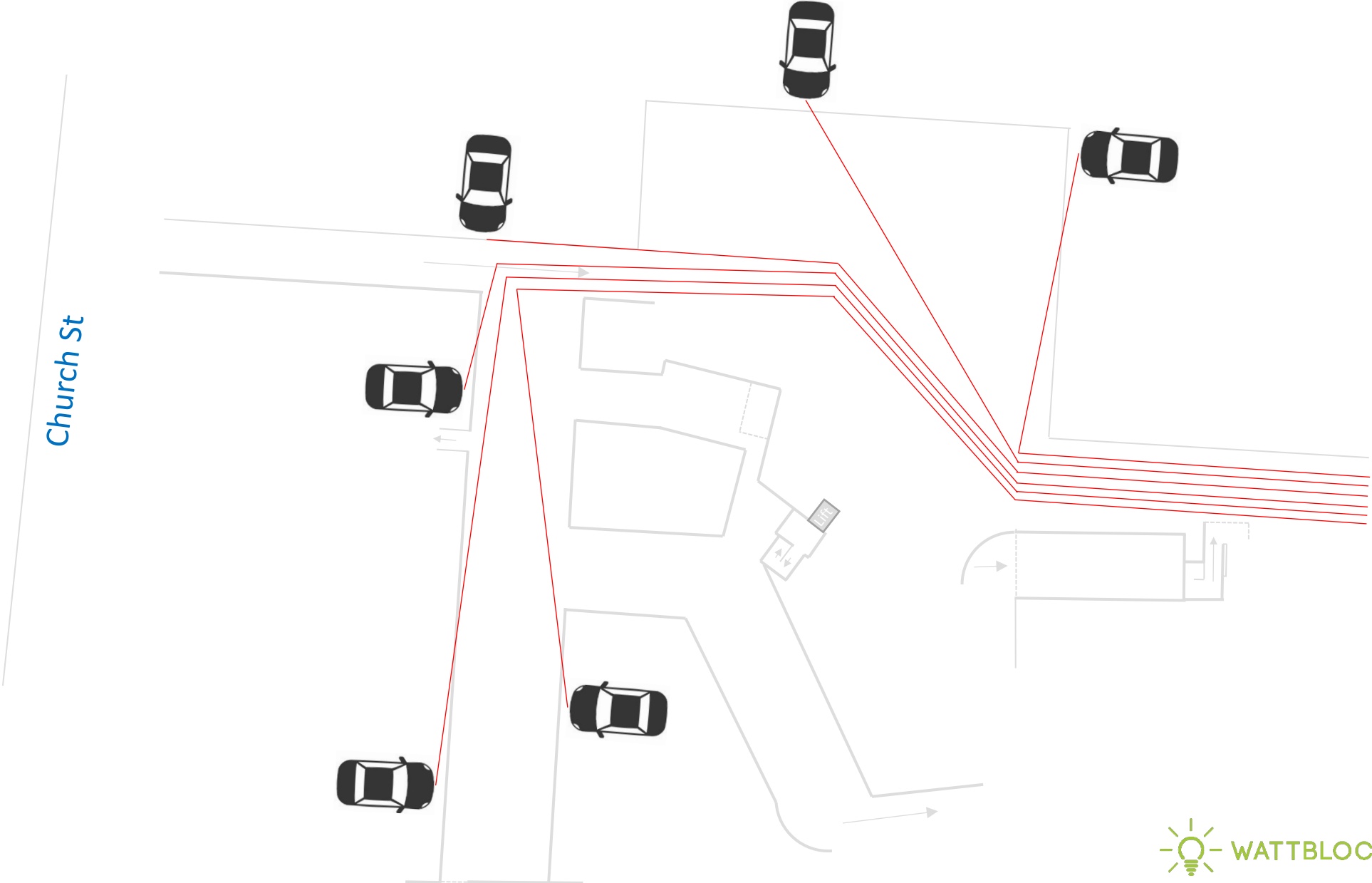
9. Using a chargepoint in individual lot carspace connected via flat cable and distribution board to common property meter to charge EV. Wi-Fi for data connectivity for billing, software load balancing and software updates into EV



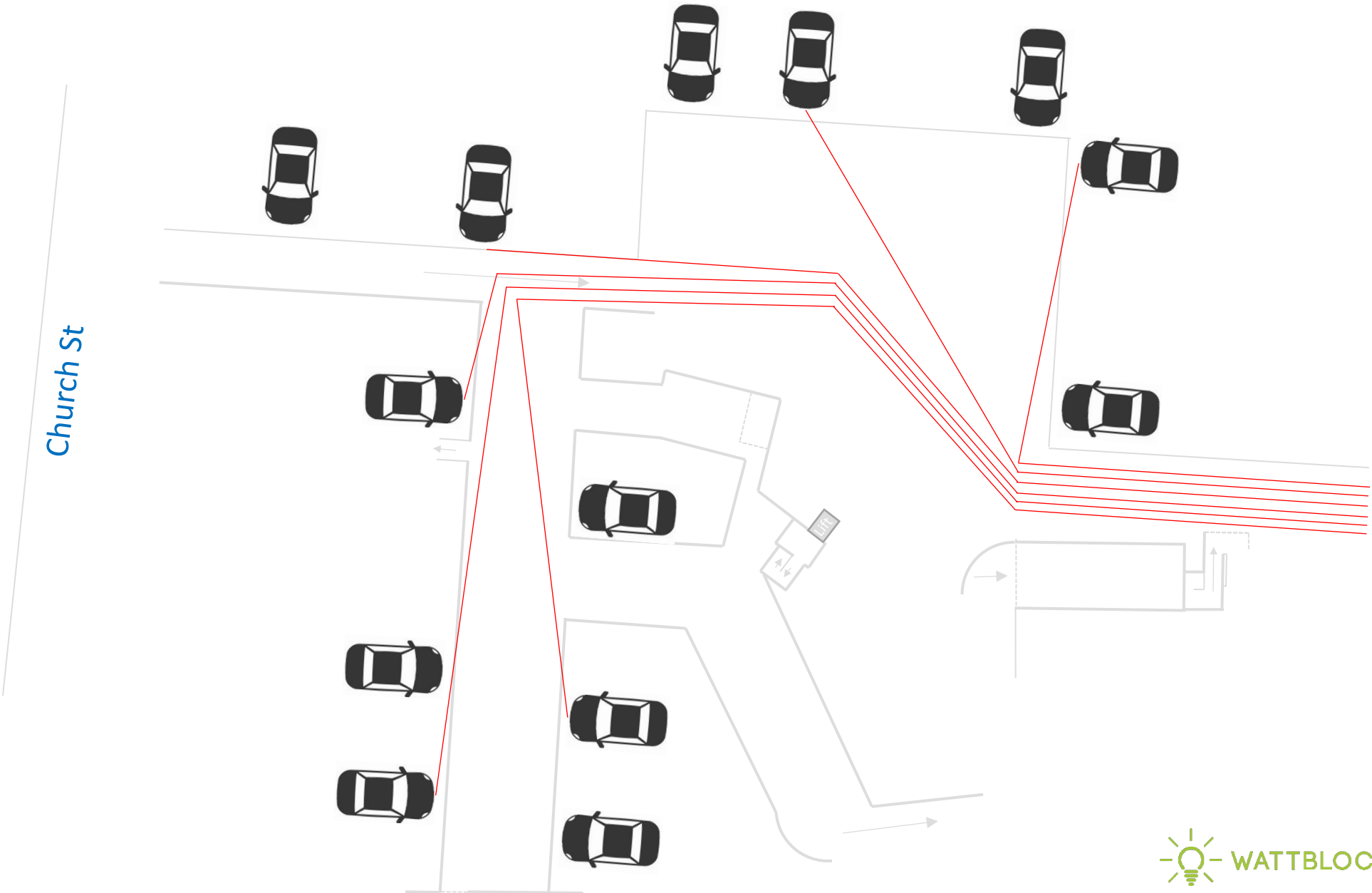
# Zinc Alexandria



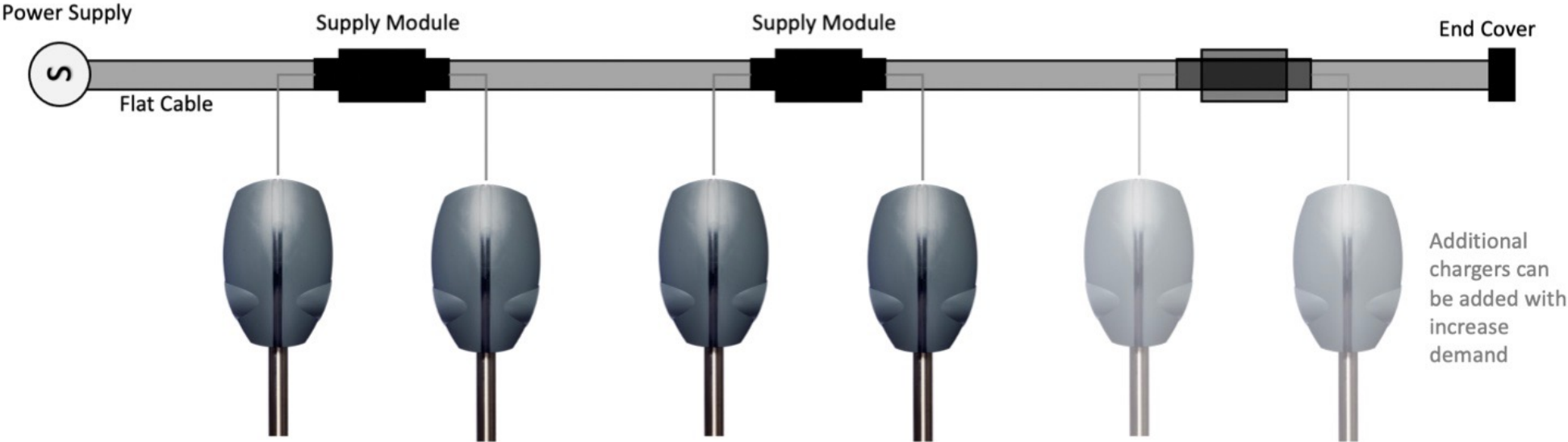
# EV charge stations grow, meaning more conduit to nearest board



# EV's continue to grow, causing risk of spaghetti!

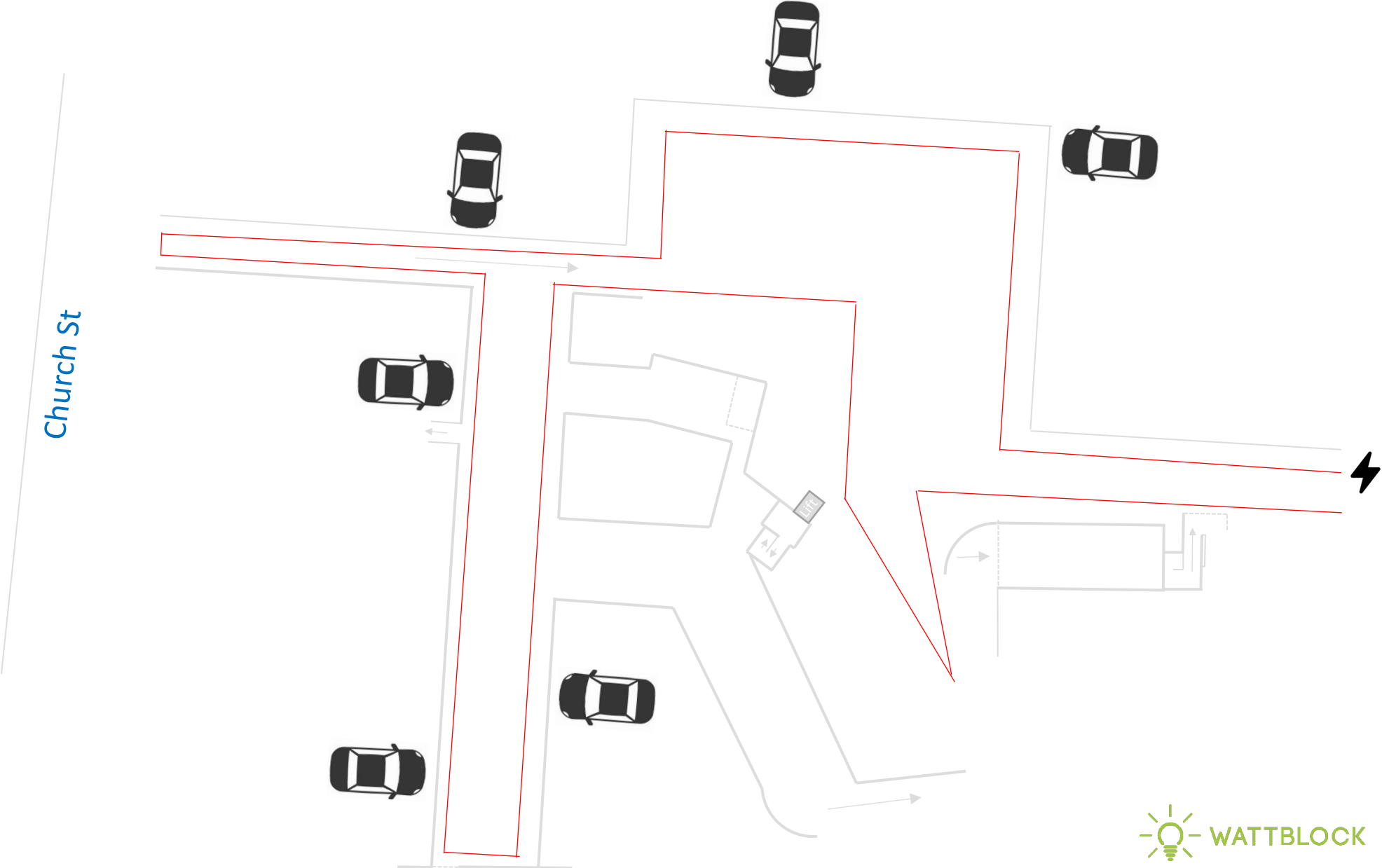


# Install flat cable passed every vehicle in one project

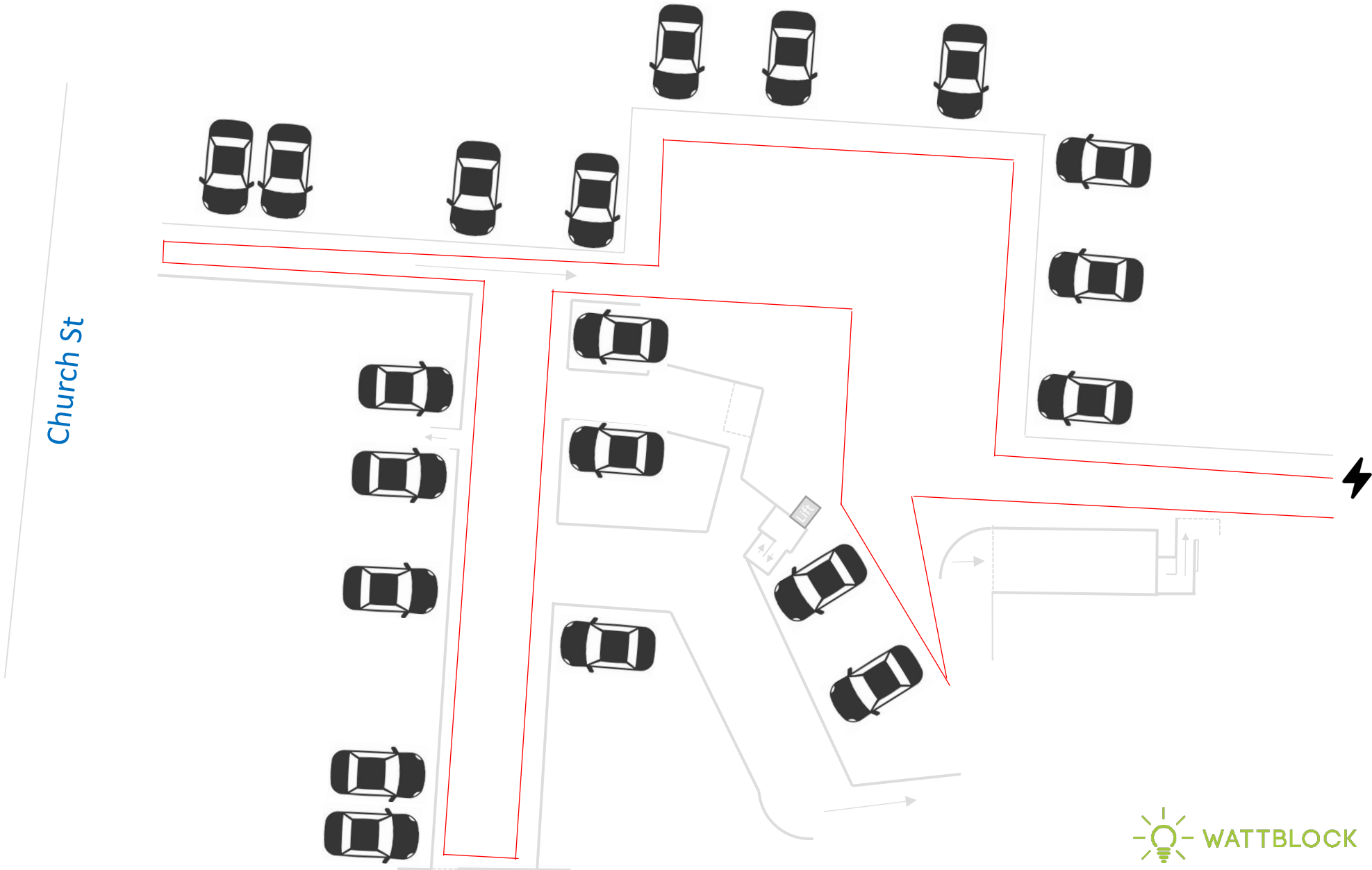


Source: Karchagers

# Step 1: Initial Installation of 'Flat cable'

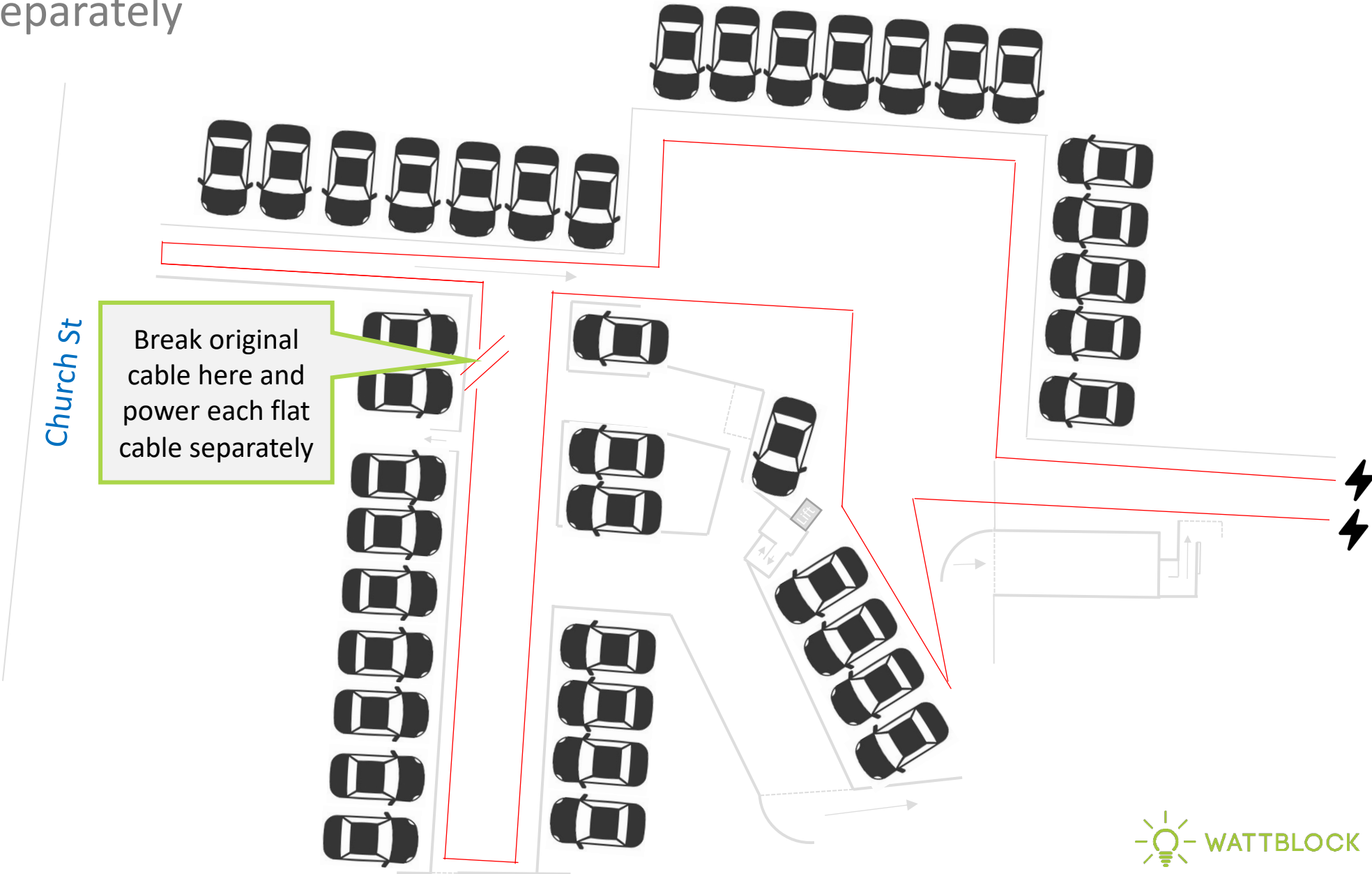


# Step 2: Increase EV's charging on flat cable to 20





Step 3: To support 40 EV's, break flat cable & power each end separately



# Advantages of Flat Cable/busway/busduct for strata EV charging

- 1 Developed in Europe and popular in Norway where over 92% of new vehicles sold are electric
- 2 Recently installed in Australia at Zinc in Alexandria. Mirvac to follow
- 3 Can be used indoors or outdoors
- 4 Average 'last mile' cable run of 2m for installing an additional charger
- 5 Reduces labour time to install an additional charger from 2-4 hours down to 30 minutes
- 6 Can be installed between rows of cars which are parked 'back to back'
- 7 Reduce the materials cost of preparing a strata apartment building for EV readiness by up to 50%



Source: Karchargers

# Wi-Fi for carparking areas

Uses include:

- Wi-Fi connected chargepoints
- Electric vehicles downloading software updates e.g. Tesla, Mercedes etc.
- Mobile phones
- Modern Wi-Fi connected security camera systems e.g. Google Nest



Wi-Fi router in main switchroom



Wi-Fi repeater on roof of basement carpark

# Altair – Potts Point



- 165 carspaces
- 6 x 30 pole 3 phase distribution boards
- Cable trays passed every carspace
- EV Box chargers
- Karcharger's Dynamic Load Balancing (DLM) hardware + software load balancing system using Wi-Fi and zone Raspberry Pi's
- Wi-Fi connectivity to EV Box chargers
- Owners Corporation subsidizes long cable runs

# Altair – Site photos

Cable tray  
passes every  
carspace



EV Box chargepoints only have electrical connectivity.  
Communications connectivity to EV Box chargers is via Wi-Fi



Karcharger's Dynamic Load Balancing (DLM) hardware installed in main switchroom. Load balancing can be managed on a per circuit level i.e. not globally

# Richmont - Pyrmont



- 106 carspaces
- EV chargepoints in ALL 12 x visitor carspaces
- 3 x 160 amp, 70 pole distribution boards
- Cable trays passed every carspace
- 10 x Tesla Generation 3 chargepoints with Wi-Fi connectivity and software load balancing
- 2 x Chargefox chargepoints with CORE hardware load balancer and 3 network boxes and ethernet connectivity
- Online booking system for visitor spaces

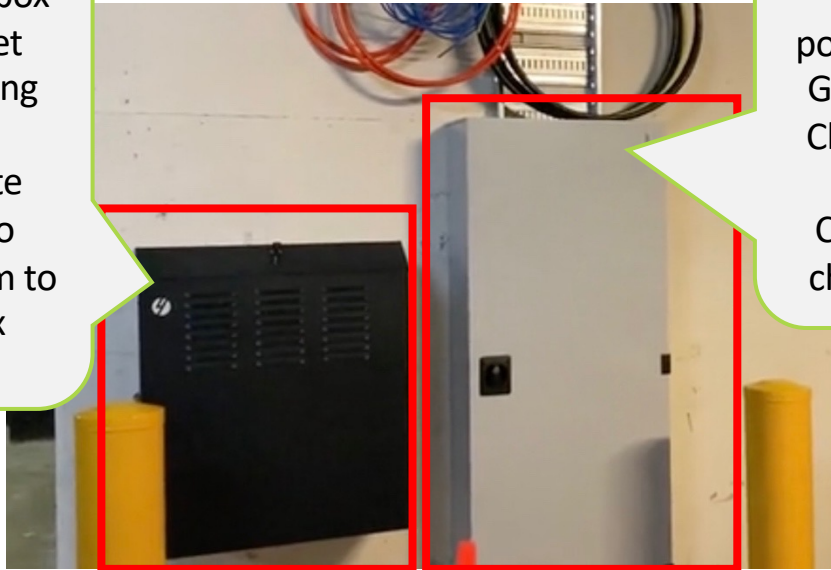
## Richmont – Tesla Generation 3 Wallchargers



Mark Muntz uses one of the charging points at The Richmont in Pyrmont, Sydney. “Looking long-term, I think it’s the only way to go.” **Louise Kennerley**

# Richmont Chargefox Network Box and EV Charging Distribution Board

Data networking box for ethernet cables coming from Chargemate chargers to connect them to Chargefox network



Electrical Distribution Board which provides power to Tesla Generation 3 Chargepoints and Chargemate chargepoints



Chargemate charger connects to ethernet data networking box connecting to Chargefox network

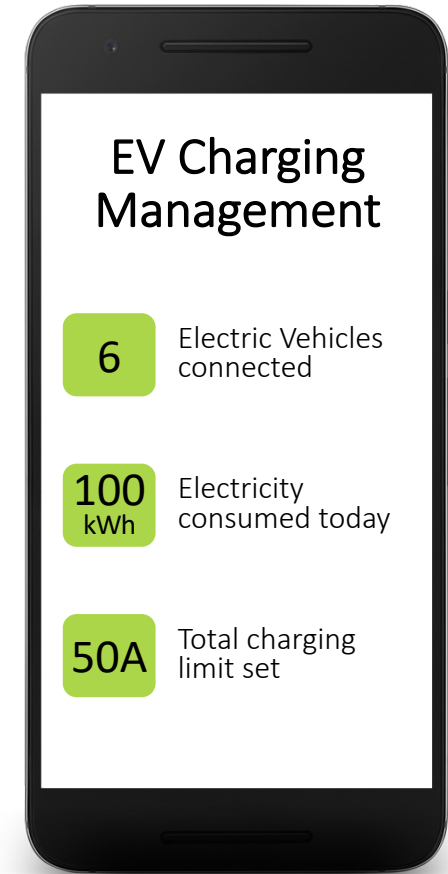
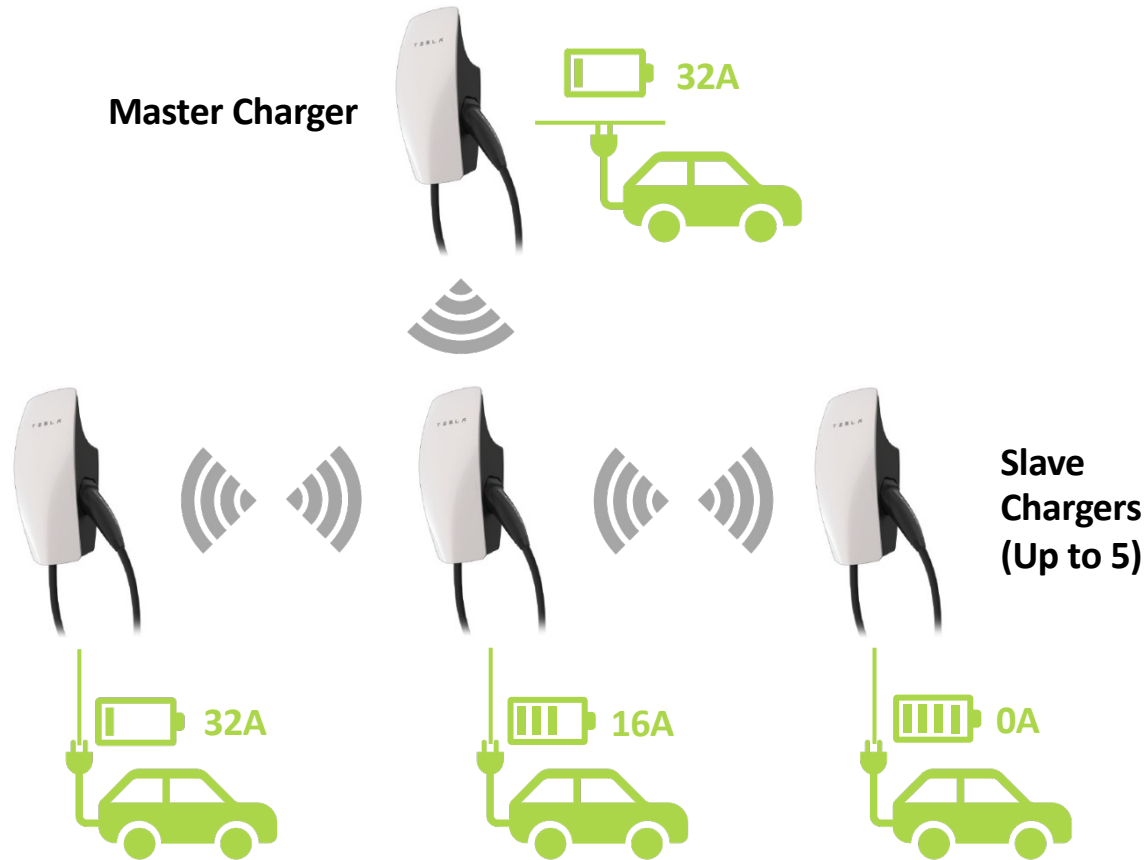


Tesla Gen 3 charger connects to Wi-Fi i.e. does not need to connect to data networking box

Each floor of carpark has an ethernet communications box for data connectivity to Chargefox chargepoints and a 70 pole three phase distribution board for electrical supply and two yellow bollards to protect the equipment from cars driving into them.

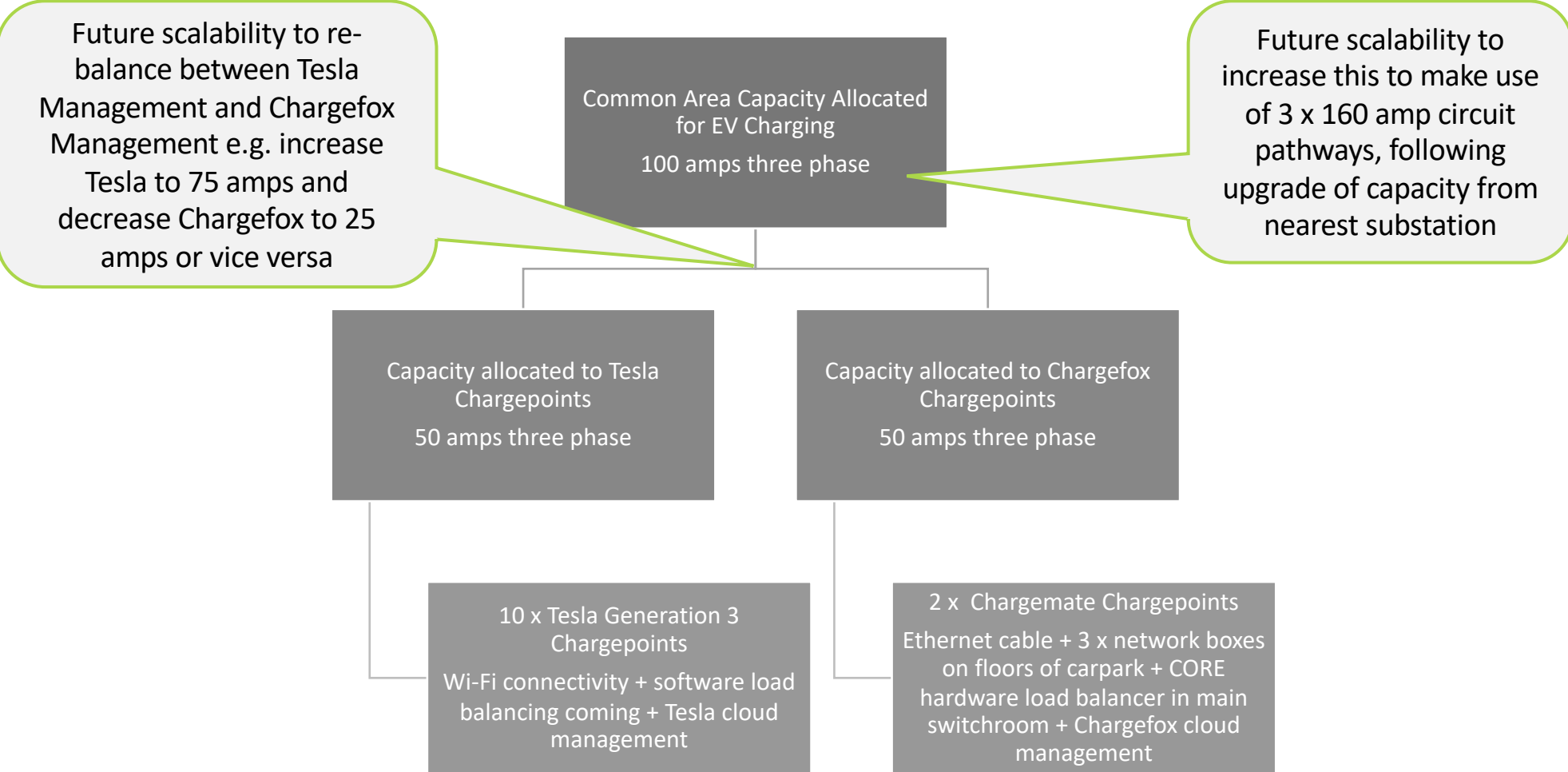


# Tesla Generation 3 Wallchargers at Richmond

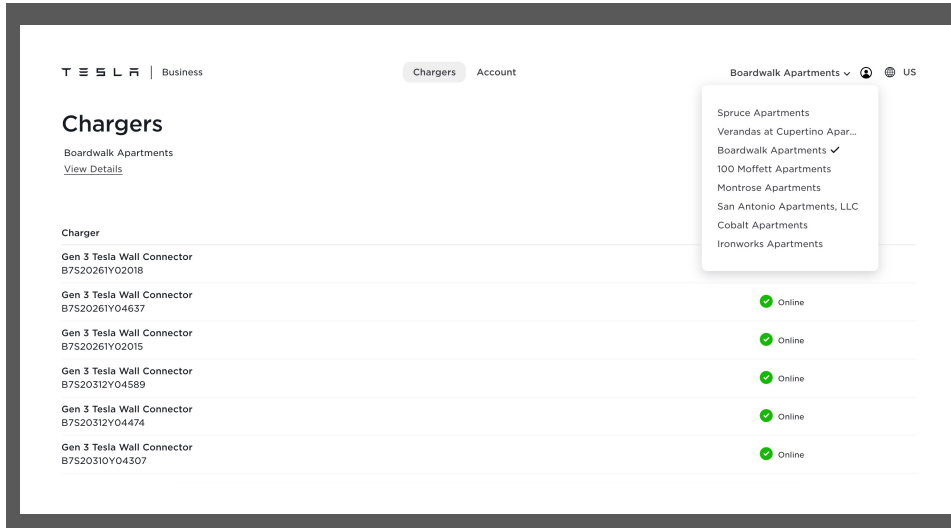


Assumed the capacity limit for EV Charging is 50A per phase 3-phase. There is no physical difference between Master & Slave charger

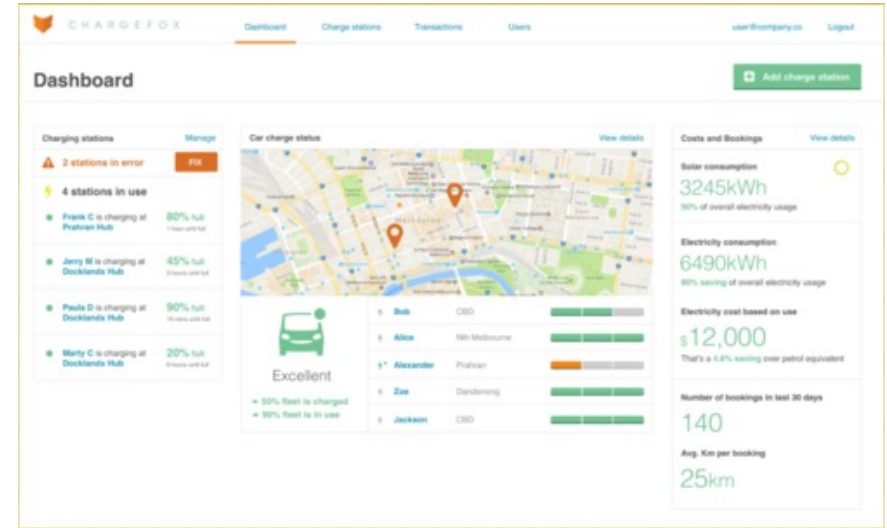
# Conceptual View of Richmond Load Balancing Architecture



# Richmont is Futureproofed with 2 different EV billing and management systems

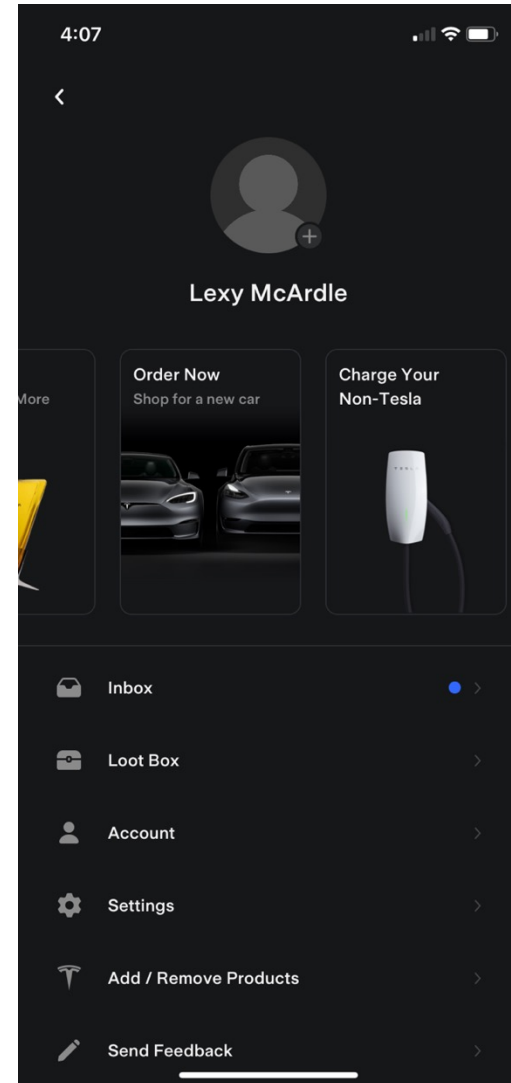
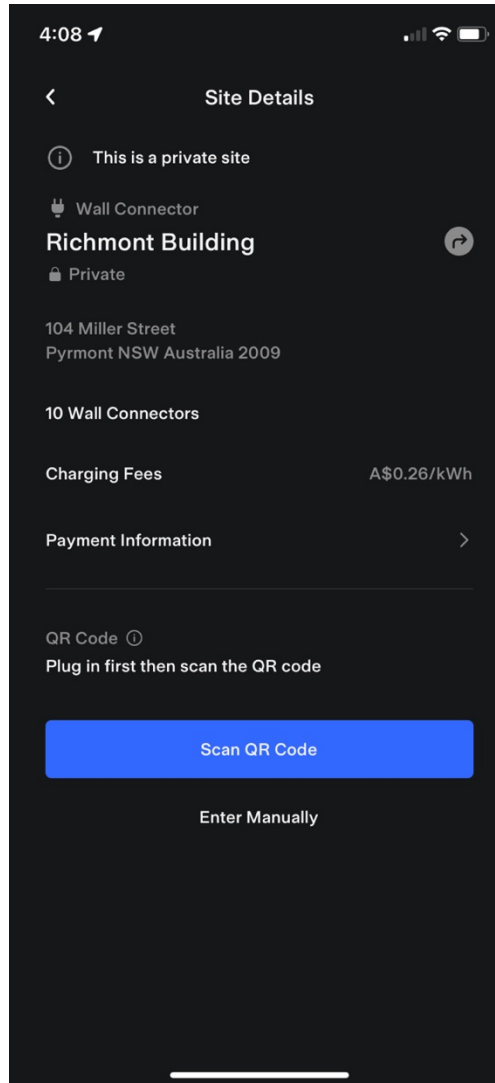
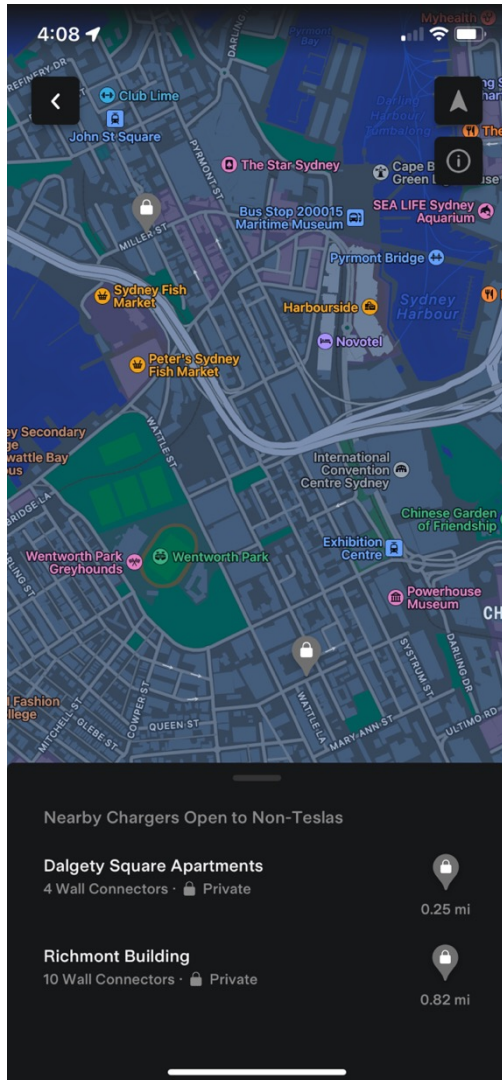


- Tesla Management System providing billing and cost recovery via mobile phone app
- Small credit card transaction fee per charging session
- No billing and load management fees per carspace levied on the EV owner



- Chargefox Management System providing billing and cost recovery for the Owners Corporation
- \$330 per carspace per annum for billing and load management fees on top of electricity costs for EV Owner

# Richmont EV Owners can use Tesla App even if they drive other EV's



# EVSE Ocular/Exploren/CSIRO Load Balancing

EVSE is another local Australian software company which has done R&D in the EV load balancing space with both online (Wi-Fi) and offline (ethernet) models in conjunction with CSIRO.

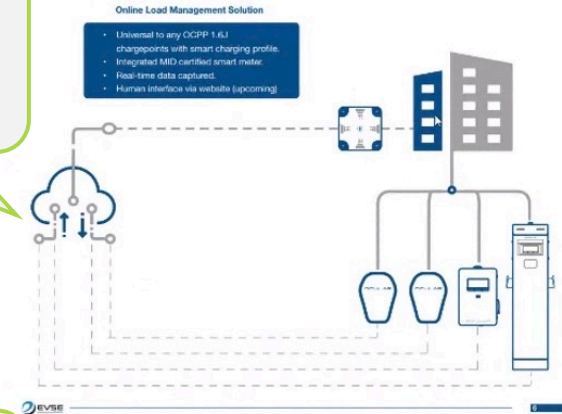
Ocular are Australian designed chargepoints.

Exploren is Australian developed EV Charging billing and management software.

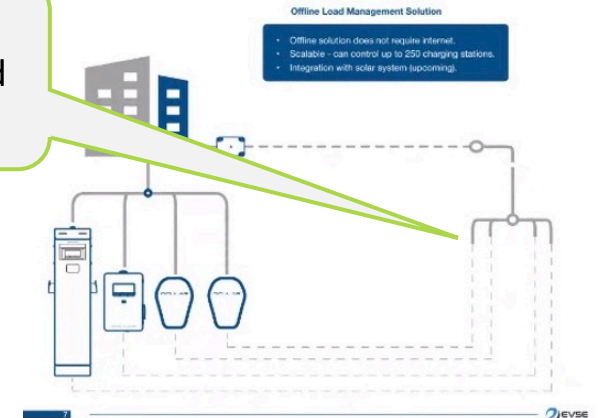
Exploren supports the Ocular and Schneider EV chargers which are OCPP1.6j compatible.

R&D extended to situations where a solar system is available, to divert excess solar generated onsite into EV's which are charging, rather than sending it into the grid as solar export or feed-in

Using Wi-Fi and the cloud for **online** load balancing



Using Wi-Fi and the cloud for **offline** load balancing



# Shared Ocular EV Chargepoint at Amarco apartments, Rhodes



# Planning a large scale EV charging infrastructure project

Level 1



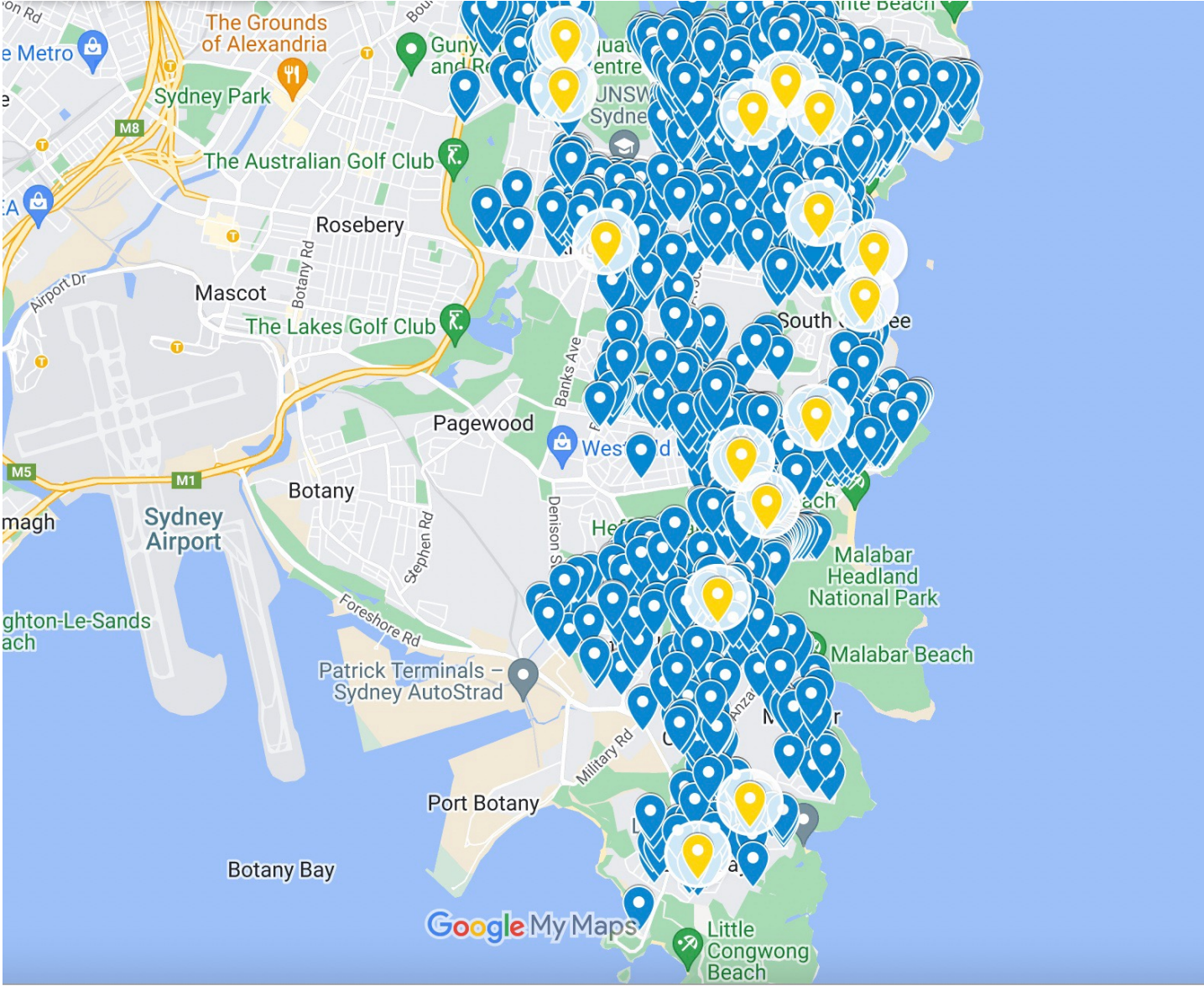
If your apartment building carpark has 800 carspaces, more planning is required!

# Solar powered EV charging in at least 7 strata buildings in Sydney

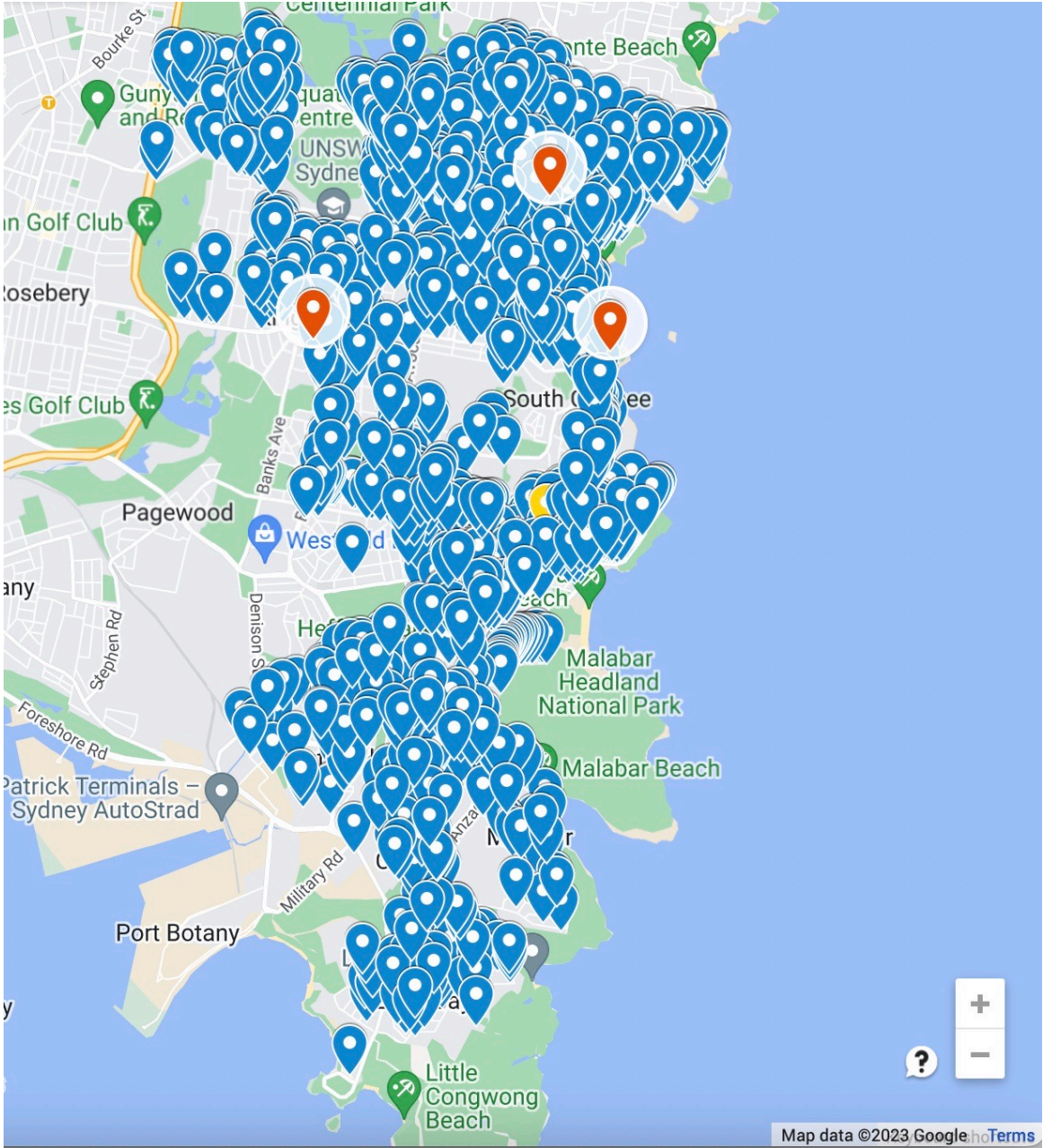




# Solar is already installed in a number of Randwick Strata Schemes



# Batteries are starting to get installed in Strata Schemes in Randwick



# By-Laws, End User Agreements

1. End User agreement with an owner occupier or tenant to use a power outlet in the carpark area, doesn't require motion at an AGM/EGM or a by-law (uses s.117 of the NSW strata schemes management act)
2. By-law for charging in visitor carparking spaces may include timeframes e.g. 4 hours
3. By-law for charging in individual lot carparking spaces:
  - a. Minimum OCPP 1.6j and above or Tesla Generation 3 and above chargepoints OR only buy chargepoints from one supplier
  - b. Bond for make good after uninstall after selling apartment
  - c. Conduit run from nearest house distribution board paid for by Lot Owner but then becomes property of the Owners Corporation and is leased back e.g. \$1 per year
  - d. Cap on charging speed e.g. single phase 16 amps or single phase 32 amps
4. Policy document for lot owner engaging own electrician to sign-off on install
5. NSW Government application for co-funding of EV charging infrastructure in strata schemes with over 100 carspaces. \$10m co-funding available to up to 125 stratas.

# Further information



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**Wattblock**

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<https://www.youtube.com/c/WattblockAu/videos>



<https://www.wattblock.com/ev-charging-training.html>

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# Case Study & Questions

