

Step by Step to NetZero

What range anxiety?
1,000 Kms
on a single charge



Step by Step to NetZero

Rules of Engagement

- Please join the webinar on mute with your camera OFF, which should be maintained during the presentation.
- Participants will be invited to ask questions. Please raise your hand using the icon on Teams or simply turn on your camera or use the chat function.
- The presenters may invite you by name to contribute to the session. Where possible, when responding, please turn on your camera so the participants know who is speaking.

Objectives for the Webinar

- Working with webinar participants to explore development of an EV Transition Plan
- Topics
 - All about chargers
 - Level 1 2 and 3 needs and uses
 - Power supply
 - Microgrids
 - Funding
 - Establishing an asset management plan
 - Understanding Optimum replacement
 - Funding Risk

Introduction

Grant Andrews

- 45 years experience working in the motor vehicle industry
- Combined with 30 years consulting to Local and State Government
- Passionate about financial modelling and innovation



John Ravlic

- Associated with Local Government for over 30 years as an executive and consultant
- Passionate about developing best practice service delivery to meet community needs



Questions and Answers

Use the chat function to

- make a point or
- ask a question or
- seek clarification.





Fleet & Depot EV Charging Solutions



| Topics

- Level 1 and Level 2 chargers for EVs (electric vehicles): their best features and what you need when setting them up at Council offices and depots
- Using renewable energy: when to recharge which assets at what times of day and night (this is an eye-opener)
- Level 3 chargers: what you need to know about rapid chargers (you'll be surprised)

| What we do

Gemtek Group are a leading EV charging & Energy Management specialist: we provide tailor-made electric vehicle charging solutions across a broad customer range, from commercial property managers, Corporate fleets, local & state government and Australian utilities.

Our partnerships with leading global equipment manufacturers and national service providers underpin our ability to deliver comprehensive charging and energy solutions, service coverage and network management expertise for commercial & industrial EV charging.



| Charging Levels Explained

Level 0 (Mode 1)

- Plugs into a standard household socket outlet with no intelligence or communication



Level 1 (Mode 2)

- Supplied from a 10A socket outlet with a cable typically supplied with the car ~2.7kW



Level 2 (Mode 3)

- Using dedicated EVSE with AC power output ranging from 3.7-22kW



Level 3 (Mode 4)

- Using dedicated EVSE with DC power output ranging from 24kW-350kW



AC Charging vs DC Charging

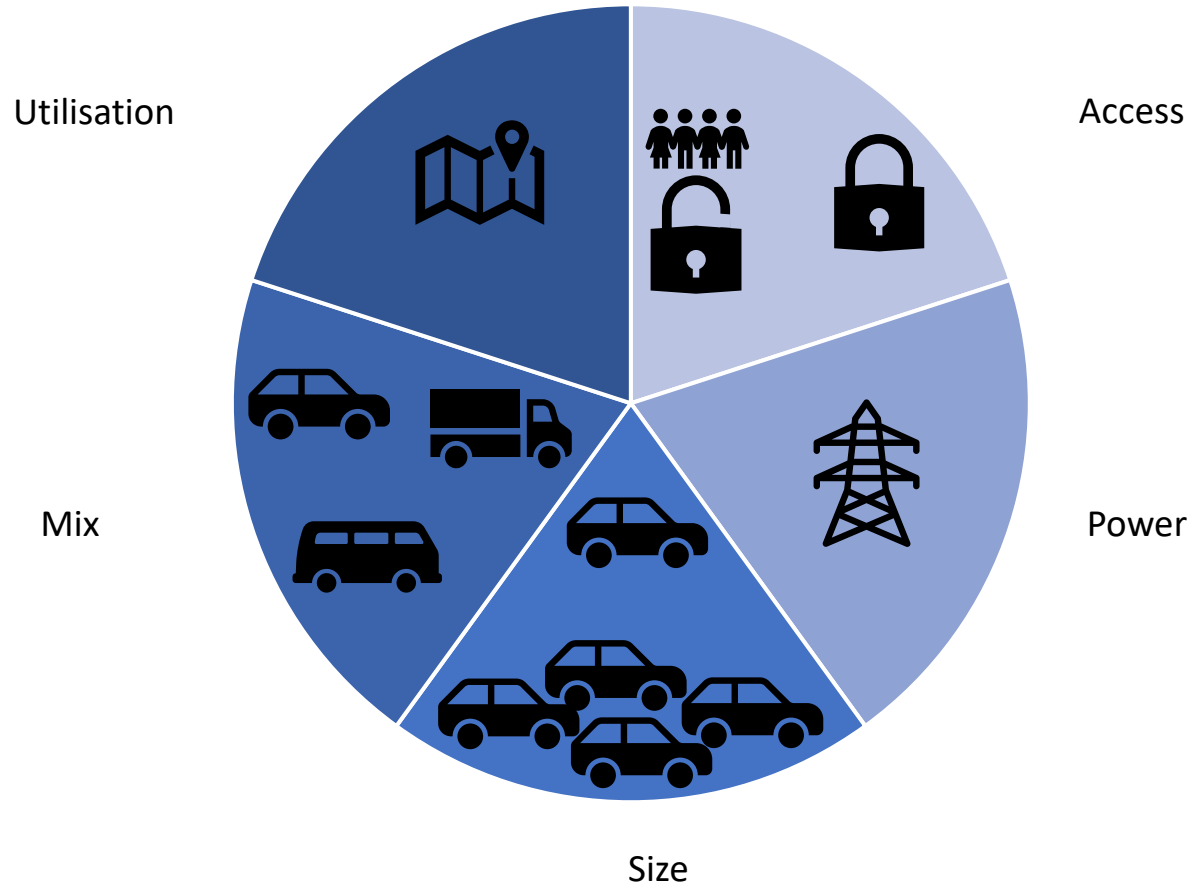
Charging speed

Because ultimately the only difference between charging with AC vs charging with DC is if the converter is housed inside the vehicle or housed separately, charging speeds are relative between the technologies.

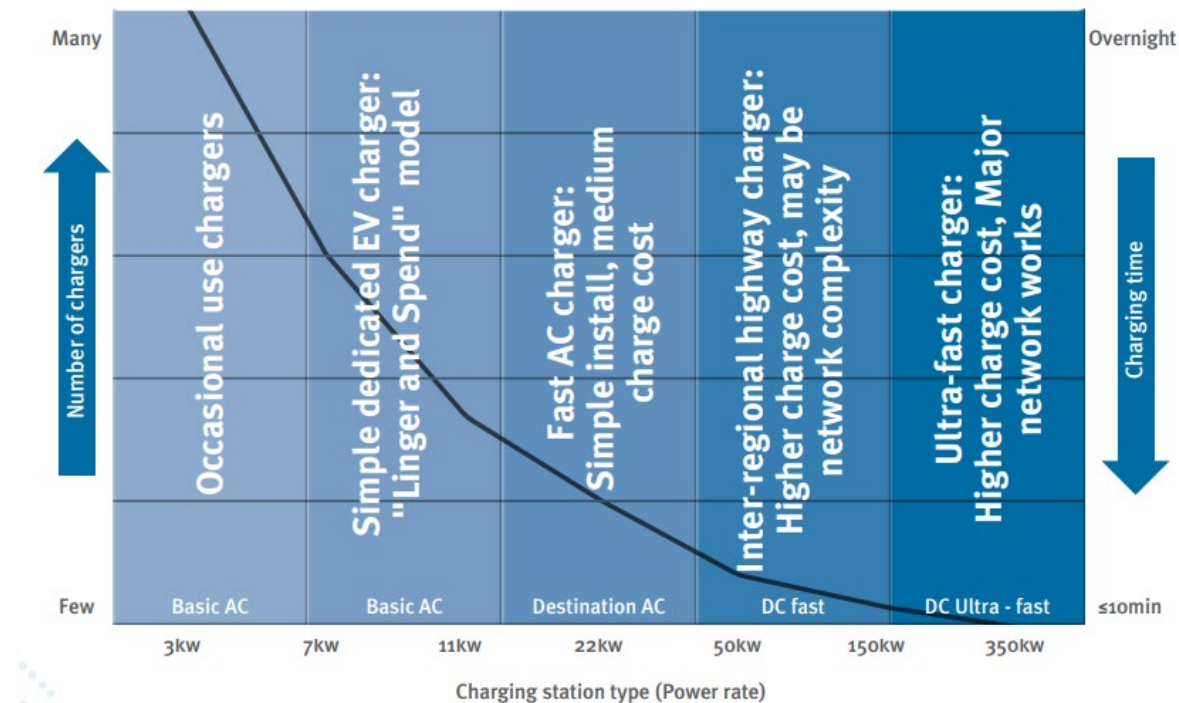
A rough guide to charging speed is that the kW rating of the charger equates to the km range delivered to the vehicle over a 10 min period. Factors such as battery condition, temperature, battery chemistry, state of charge, BMS limits, voltage and others will affect this figure.

Charger Power	7kW	11kW	22kW	24kW	50kW	75kW	90kW	120kW	150kW	180kW	360kW
Type	AC	AC	AC	DC	DC	DC	DC	DC	DC	DC	DC
Charging time (min)	10	10	10	10	10	10	10	10	10	10	10
Range delivered (km)	7	11	22	24	50	75	90	120	150	180	360

Technology Selection Considerations



EV Ecosystem Charging Curve



<https://www.statedevelopment.qld.gov.au>

| Level 2 equipment



Various sizes from 7kW 1 Phase 32A to 22kW 3 Phase 32A

Allow smart load management

Connect to a “Backend” that can monitor the network

Suitable for

Home charging

Workplace charging

Longer stay public charging applications

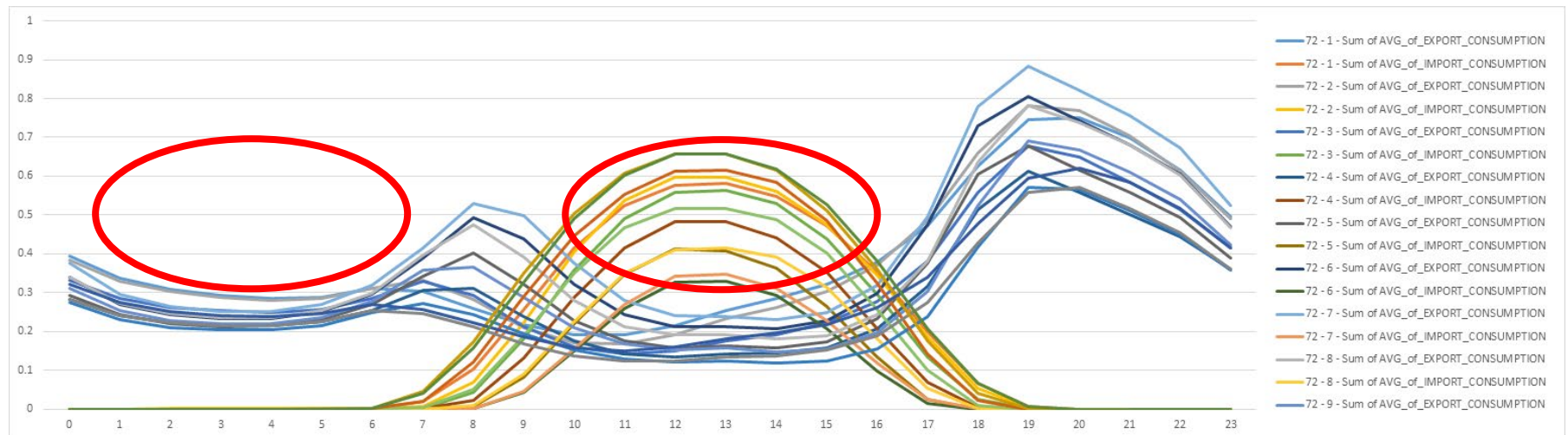
Small visual footprint

7kw charging is ample for Fleets & Work Place Charging

Where multiple vehicles are required to be charged, “Dynamic Load Management” is a must.

Smart Procurement will play a critical role, in the Success Ev Charging.

Western Powers Duck Curve – peak demand



<https://www.westernpower.com.au/community/news-opinion/the-duck-effect/>

Working with local communities and elders

We are Re-energising & empowering local communities by sharing their stories and their power with visitors, via integrated technology & unique branding and artwork, incorporating corporate and government partners.

Gemtek Group have an established commitment to procurement from indigenous owned businesses in our regions.





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CHARGERS
DIRECT

Uniqco Transition to Net Zero Fleets

Assessments, Microgrids and Funding

Our Mission

To drive rapid decarbonisation of the transport sector whilst substantially increasing demand for renewable energy.



The disruption of the energy landscape brings additional challenges to almost all segments

- **Utilities and Power Provider**
- **Companies and Industrial/commercial site owner**
- **Whole districts /areas and City Municipalities**

As power networks increasingly depend on renewables and distributed energy systems, controlling and optimizing those systems -- reliably and profitably -- is now a priority.

Mega trends shaping the future



Urbanization

68 % of the world's population is projected to be urban by 2050 ⁽¹⁾



Decarbonization

By 2050 wind and solar technology provide almost 50% of the total electricity globally ⁽²⁾



Digitalization

The number of connected devices worldwide will jump to 125 billion in 2030 ⁽³⁾



How to have resilient, sustainable and digital power?

Distributed energy resources

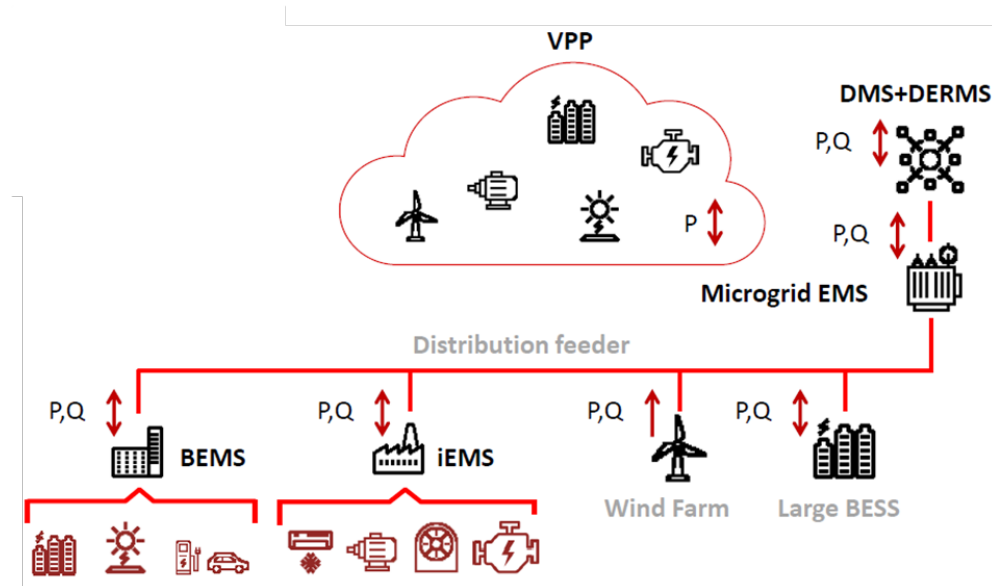
- Energy active assets like renewables or storage systems connected to the grid at distribution level or on the customer's side of the meter

Microgrids

- A Microgrid is a group with clearly defined electrical boundaries of low voltage Distributed Energy Resources (DER) and loads that can be operated in a controlled, coordinated way either connected to the main power network or in islanded mode
- Any Microgrid is ready to become a Virtual Power Plant (VPP)

Virtual Power Plants

- A virtual power plant (VPP) is a collection of power generator units, power storage devices and flexible power consumption units that is directed by a central control system.
- One of the most valuable service offered by a VPP is the Demand Response



«Power has to be produced where it is used»
Peter Lilienthal, CEO of HOMER Energy

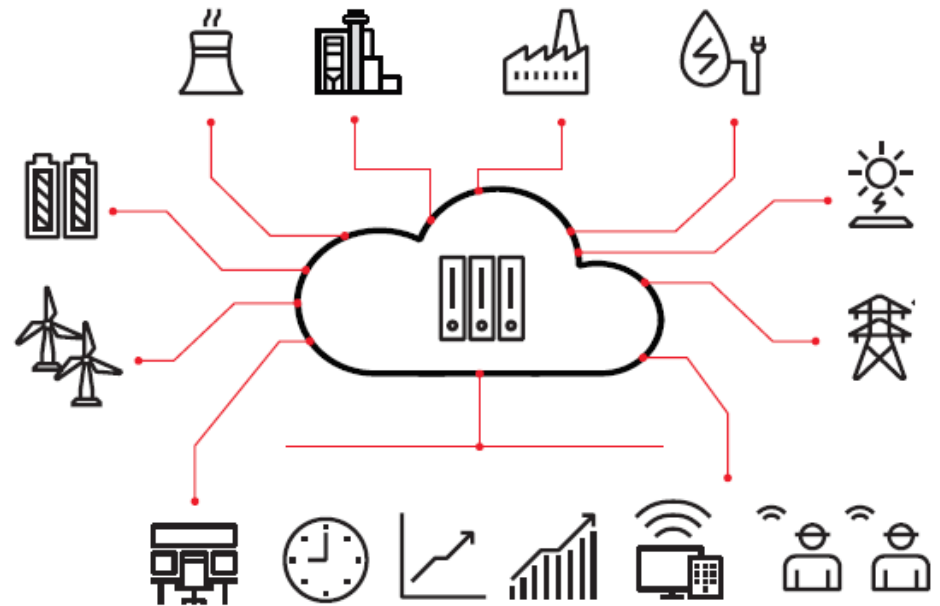


Managing a diverse decentralized network of energy resources is a huge challenge

• DER, Microgrids And Vpps

Aggregate and integrate decentralized generation, flexible loads and storage systems to enable cost-effective participation in energy markets

- **Control** and **optimize** from a central control system to create a Virtual Power Plant (VPP)
- **Combine** multiple, geographically dispersed DERs (from 10s to 1000s) into a single optimized entity
- **Plan** and **adjust** production dynamically thanks to forecasting
- **Trade** intelligently on the energy market
- **Implement** unique business models with a flexible architecture
- **Couple** electricity, gas, heating & cooling, water and e-mobility



Why microgrid market is booming?

- DER, Microgrids And Vpps

Lower costs, modularity, cloud and VOR

Declining DER costs

- Solar already achieved grid parity, level while Li-ion batteries will achieve \$500/kWh by 2025, 30% less than today. In parallel, e-mobility and V2G applications will increase storage availability

Standardization

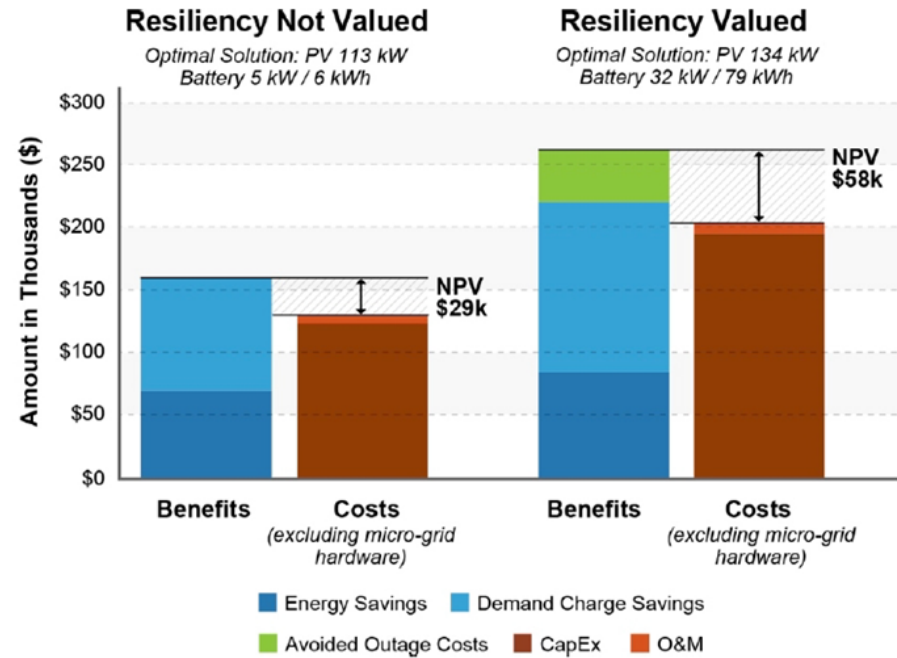
- Microgrid component vendors are moving from cookie-cut configurations to plug&play modules, thanks to global definition of application standards in AC and DC electrical architectures

Cloud and edge computing

- The ideal format is to have device controls that autonomously smooth frequency and voltage while a higher level of tertiary controls looks out over a longer horizon of decision-making, accommodating forecasts on weather, loads, and market prices

Value Of Resiliency

- According to NREL, at the same capital expenditure cost of a plant based on 2.5MW diesel backup genset, a microgrid with 2MW of solar and 500kWh of BESS grants 80% more time of power autonomy



Example about how Resiliency improves a Microgrid investment KPI like the Net Present Value (NPV)



Focus on microgrids during emergencies

No more blackouts

- **Storms**

- In the Gulf Coast every year 1.3 million people go out of power due to seasonal storms

- **Wildfires**

- In December 2017, a Thomas fire due to powerlines burned 281,893 acres impacting more than 1000 structures in California

- **Earthquakes**

- In February 2011, a 6.3-magnitude earthquake struck New Zealand. In Christchurch, over 80 percent of the city (approximately 160,000 customers) lost power

- Sandy storm cut off power to more than 8.5 million customers in 21 States of the USA
- More than 57,000 crews of workers across North America were deployed
- If a similar event happens again during pandemic time like COVID19, it would be not easy to manage help from outside
- Corona-recession will reorganize investment priorities looking at service continuity, especially for critical power plants like:
 - hospitals
 - banks
 - datacenters



- 1. Data Collection** (including incentives eligibility evaluation, initial analysis, site audits)
- 2. Systems Sizing Analysis** (including project cost estimates and financial projections)
- 3. Financial Analysis** (including cost/benefit analysis, financing options, and development of cash flow pro formas)
- 4. Review of Findings** (including a discussion of next steps)



What for a building microgrid?

Energy efficiency

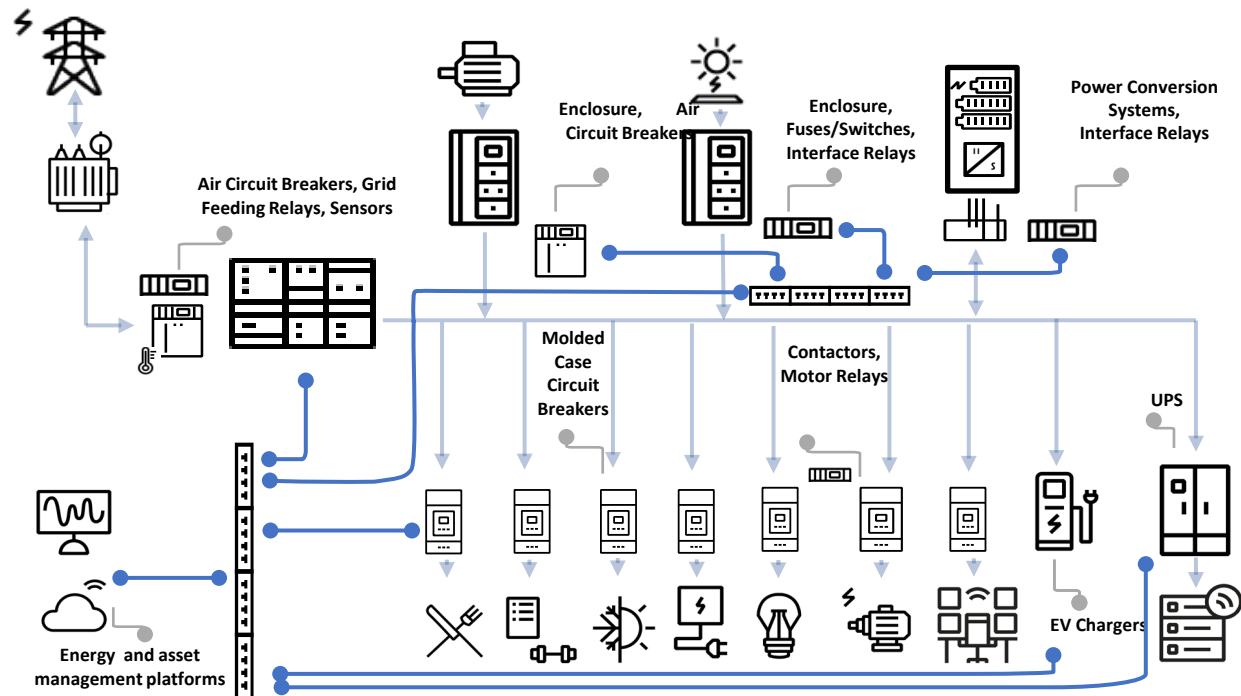
Monitor power flows and assets ensuring data-based improvement actions for energy saving and condition alerting in «green standard» approved energy cloud platforms.

- Peak shaving to save up to 20% in the bill
- Predictive maintenance to reduce 33% of Opex costs

Continuous operation

Islanding in case of fault on the distribution grid and keep 100% of critical power running.

- Certified interface protections with the grid
- Adaptive protections with full selectivity
- Fast load shedding based on P & F measures
- Transfer switching to backup gensets
- UPS for servers full time supplied
- BESS as virtual generator in island-mode



What for a community microgrid?

Eco-friendly

Maximize the prosumer use of sustainable DER sources like solar rooftops, community solar power plant and centralized CHP system.

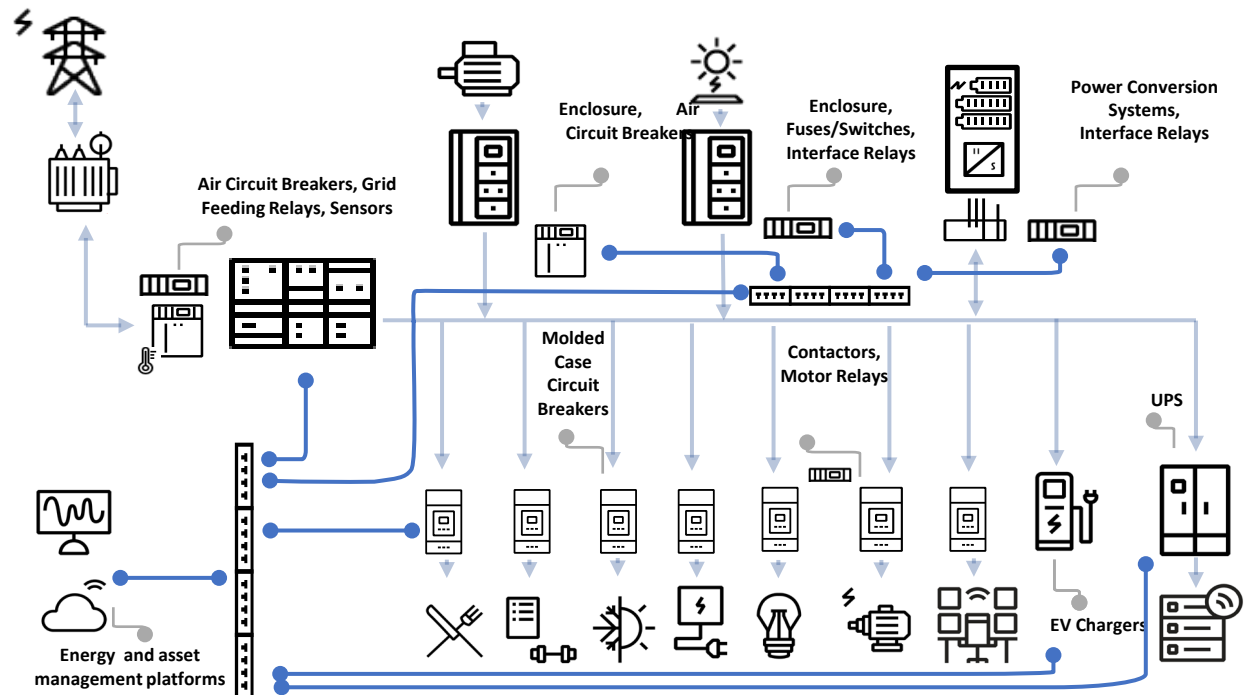
- Slow and fast e-vehicle charging satisfying all needs
- Real time monitoring of power exchange with the utility grid to allow energy trading for VPPs

System supporter

Guarantee reserve as an aggregated power plant for balancing system services

- Minute2hour power management up to single load, to answer automatic demand response requirements
- Millisecond2second power change based on frequency

Smart districts, Neighborhoods



Capital Expenditure (CAPEX)

Asset Finance

Operational Expenditure
(OPEX)

1. Service Level
Agreements
2. Uptime is the name of
the game, especially
with OPEX Models.

Four main aspects to fund

1. Hardware
2. Installation
3. Software
4. Maintenance





User & usage data management



Component Selection



Scheduling & Integrations



Charging Station Management



Energy & Load Management



EV Driver Interface/App



Payment Gateway



Operator Dashboard



Questions?



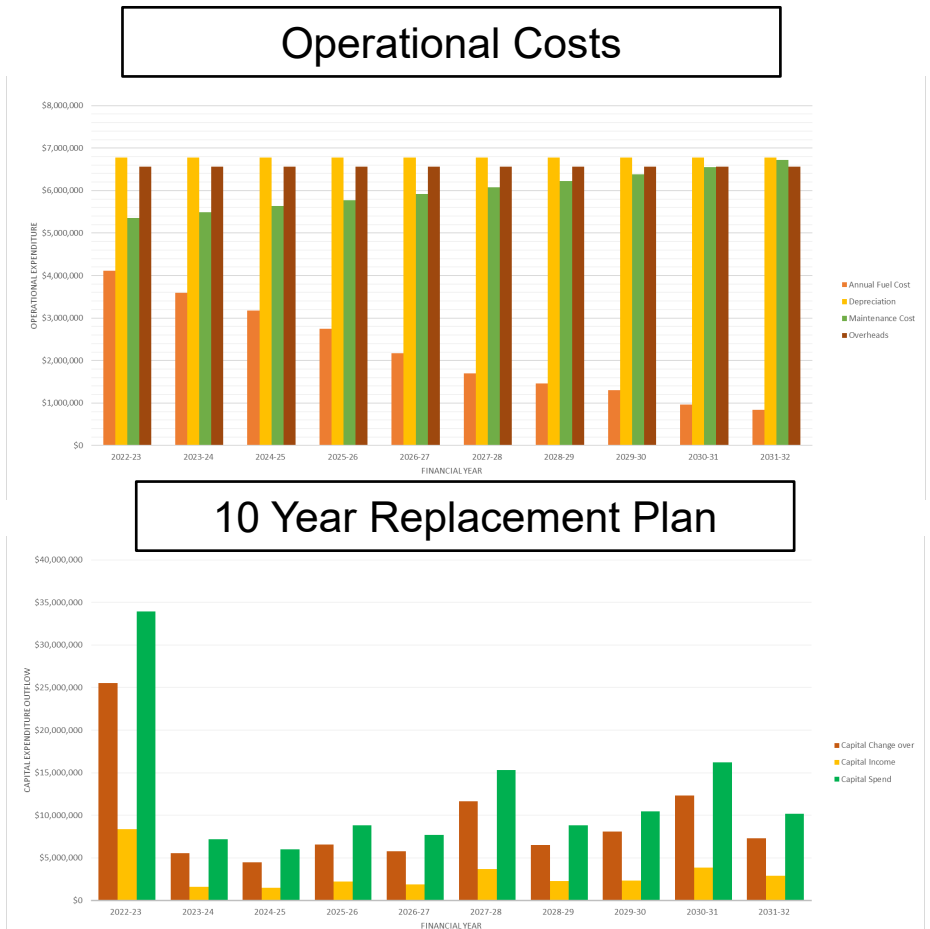
What is a Fleet Asset Management Plan?

Councils have strategic asset management plans for roads, buildings and strategic services.

Fleet Asset Management Plans compliment these Plans.

- Levels of service are defined
- Demand management (how many and what type of vehicle)
- Current list of assets
- Lifecycle management plan
- Risk management
- Data and information management
- Financial summary – operating costs
- Funding
- Improvement
- Asset performance review

The objective of an asset management plan is to take a long-term view of the financial impact on an organisation



Optimum replacement and disruption cost

Optimum replacement key drivers

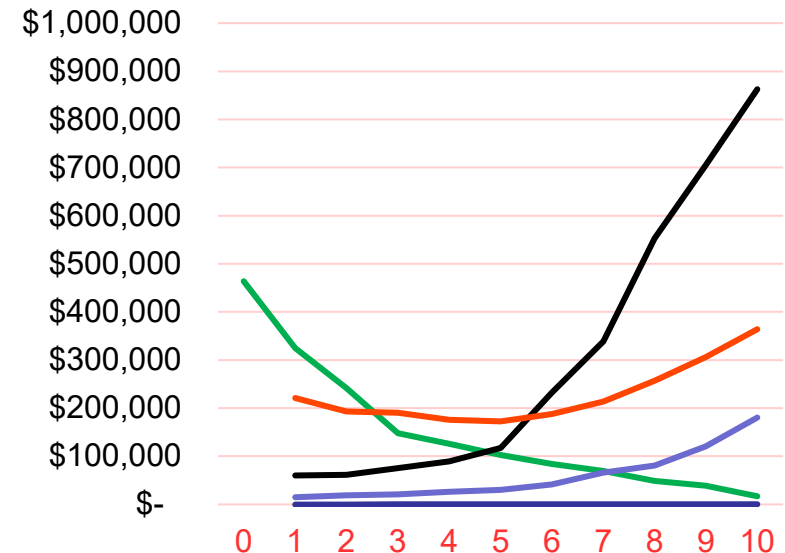
- Purchase cost
- Resale value
- Maintenance cost
- Downtime/Disruption cost

A case study

- Waste Collection Vehicle
- 1700 engine hours per year
- Purchase value \$463,000
- Disruption & Rental per day \$2,500

Years	Resale Value	Days Down	Maintenance Cost	Disruption Cost	Average Cost	Optimum Replace
0	\$ 463,800					
1	\$ 324,660	10	\$ 15,000	\$ 60,180	\$ 221,170	
2	\$ 241,269	10	\$ 18,500	\$ 61,383	\$ 193,154	
3	\$ 147,656	12	\$ 20,500	\$ 75,133	\$ 190,251	
4	\$ 125,508	14	\$ 25,800	\$ 89,408	\$ 175,749	
5	\$ 102,415	18	\$ 29,800	\$ 117,253	\$ 172,424	<<<<<
6	\$ 83,570	35	\$ 41,500	\$ 232,552	\$ 187,651	
7	\$ 69,259	50	\$ 65,900	\$ 338,862	\$ 213,556	
8	\$ 48,907	80	\$ 80,400	\$ 553,023	\$ 256,744	
9	\$ 38,800	100	\$ 120,500	\$ 705,104	\$ 306,296	
10	\$ 16,961	120	\$ 180,500	\$ 863,048	\$ 363,962	

Optimum Replacement



- Resale Value
- Days Downtime
- Maintenance Cost
- Disruption Cost
- Average Cost

Step by Step to NetZero

Plant Replacement Program

The Program details the council's needs over the coming ten years. The Program should be populated with items that are:

- critical to the council's service delivery
- it's all about business use
- **private use of fleet is a distraction**
- aligned with NetZero ambitions

The Plant Replacement Program details:

- Items to be replaced annually over the ten years;
- Funding requirements for each year.

Due to the dynamic nature of fleet utilisation the Plant Replacement Program must be reviewed and updated annually.

NetZero Ambitions

- Most Councils have adopted some NetZero ambitions.
- What do the council's NetZero ambitions mean for Fleet.
- Translate the council's NetZero ambitions into achievable Fleet targets and timelines.
- It will be risky to commit to:
 - specific technology;
 - trucks and plant;
 - targets without confirmed sources of renewable power.

Replacement of Fleet and Plant does not rank among the priorities dominated by community infrastructure requirements.

Therefore, assets due for replacement are always being deferred.

Step by Step to NetZero

The European Union will ban the sale of all fossil fuel-powered cars by 2035. Australia's lack of fuel efficiency standards means more polluting cars get "dumped" here. Major car companies want Australia to introduce stricter vehicle performance standards.

2030 EV Projections

Labor's pre-election climate change modelling predicted electric vehicles would account for **89%** of new car sales by 2030. The former government's projections were **29%**.

Experts are doubting the Government's ability to reach the projections based on the policies it took to the election, which included:

- modest tax cuts on electric vehicles;
- more money for EV chargers; and
- **75% EV target by 2025** for commonwealth vehicles.

EV Strategy

Calls for mandated emissions targets in Australia's automotive sector are growing.

Energy Minister Chris Bowen has left the door open to mandating vehicle emission standards to accelerate the uptake of electric vehicles.

New policies would be considered under the government's plan to **roll out a national electric vehicle strategy** in this term.

The Government would not be able to meet its climate change goals unless it introduced vehicle emission standards to expedite the phasing out of petrol cars.

Summary

- The world around us is moving towards NetZero by 2050
- Chargers and Renewable Energy
- Distributed Energy
- Microgrids
- Virtual Power Plants
- Fleet Asset Management Plans
- Plant Replacement Programs
- Optimum Replacement and Disruption Cost
- Vehicle Performance Standards



**If you're not working on achieving NetZero,
you're asleep at the wheel!**