



What single word describes the most important aspect of 'decarbonisation in fleet management' for you?

Wordcloud Poll



15 responses



14 participants





**Fleet Conference
& Exhibition**

MAY 23-24
ROSEHILL GARDENS
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AND FLEET AWARDS

An End-to-End Transition Framework for Fleet Decarbonisation

STEVE LEWIS

MANAGING PARTNER APAC

EVENERGI

What does “end to end transition framework” mean and what are the three things I hope you take from this presentation?

end to end transition framework

- What is the overall purpose?
- Where are we starting from?
- Who needs to be involved?
- What is required over what time-frame?
- The sector is still rapidly evolving
- We need a living plan that can evolve with technology and our needs
- A framework defines the process we are going to use to get there, it isn't fixed

KEY POINTS IN PRESENTATION

1. This is a major change exercise that needs integration across the organisation
2. Data and modelling are key to properly understanding needs
3. This ability to get started then adapt will be key to your success

There are a lot of key questions that need answers before complex fleets can begin their transition



- Which vehicle technology?
- When will it be available?
- What brands?

- What is the best charging strategy?
- AC vs. DC?
- Depot, home or public assets?

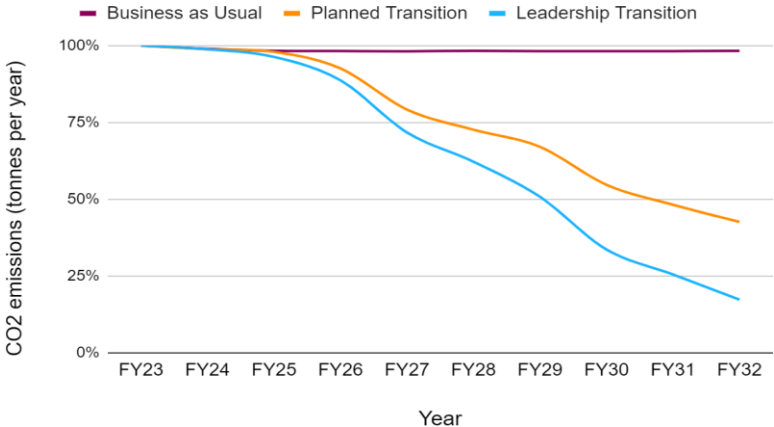
- What funding will be required?
- When are major infrastructure upgrades?
- When will TCOs beat BAU?

- Who will lead it?
- Who will be impacted?
- What retaining is required?
- What policies need changing

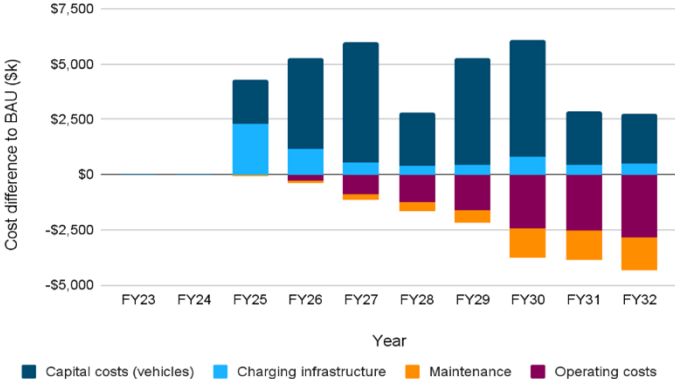
- How do I track vs. targets?
- What systems must integrate?
- How do I stay abreast of new technologies?

The vision must be compelling and include the goal, the ask and the framework for getting there

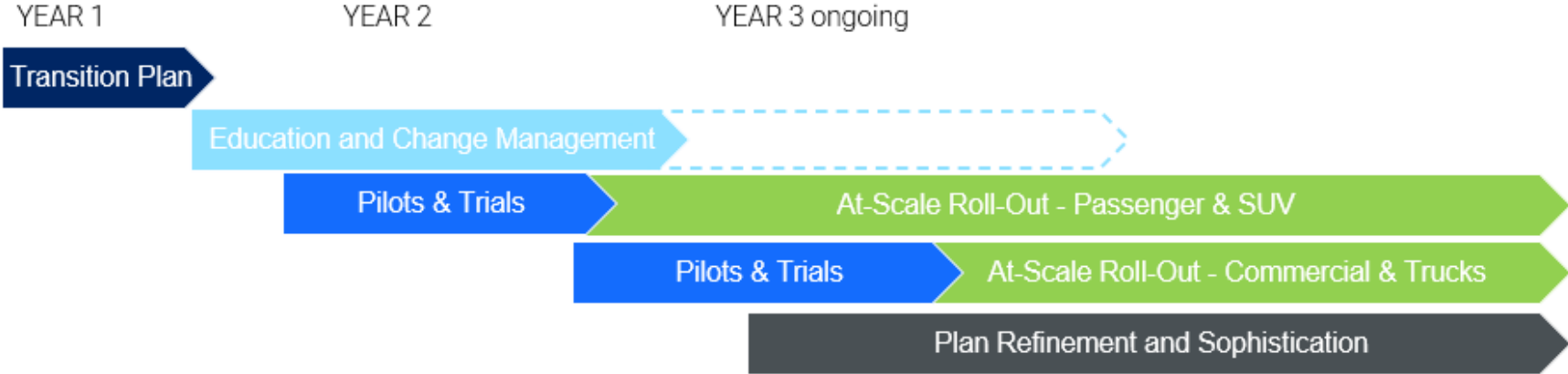
FLEET EMISSIONS REDUCTION TARGETS



YEAR ON YEAR COST DIFFERENCE COMPARED TO BAU



THE FLEET TRANSITION JOURNEY



Expect some hurdles, but don't put off starting



COMMON HURDLES/QUESTIONS

- Range anxiety
- Safety concerns from EV fires
- Higher upfront costs of EVs
- TCO gaps – especially trucks
- Electrical capacity for charging
- Access to maintenance & training
- Insufficient public charging network
- Charging times too long
- Charging reimbursements
- Model availability

NSW Government is building a comprehensive “how-to” resource covering these and more
<https://www.transport.nsw.gov.au/projects/electric-vehicles>



GETTING STARTED

1. Build the need with senior stakeholders
2. No regrets pilots
3. Collect data on your fleet's usage patterns (driving and parking)

Get help:

- NSW Gov OECC resources
- EV Fleet Incentives
- ARENA Driving the Nation Funds
- Free web-based guides and tools
- Software and advisors
- Fleet management services

The process for developing your transition framework and getting underway can be summarised into the following steps

STEPS IN THE END TO END TRANSITION PROCESS

- ① **Stakeholder** engagement and **change** management
- ② **Baseline** your fleet – understand what you have and **what you need**
- ③ **Model** the fleet – find the **easy wins**, identify the challenges, build the **phasing**
- ④ Identify the **charging solutions** and electrical capacity required to support fleet
- ⑤ Build up the **costs** vs. BAU – **scenarios** and options
- ⑥ **Grants** and other incentives to close TCO gaps (incl. FBT)
- ⑦ **Business case sign-off**, executive support and long-term budget funding
- ⑧ **Pilots** and trials – engage **champions**, find solutions that work, celebrate successes
- ⑨ **Reporting**, tracking of targets and keeping **stakeholders aligned** for the journey
- ⑩ Roll out at **scale** – by vehicle and use case type, sites/regions, start with easiest
- ⑪ Review and **adapt plan** constantly

1. Stakeholders & Change Management

Buy-In

- Senior leader support
- Drivers educated and keen to try
- Charging support

Real-World Insights

- Fleet data isn't the full story
- Seasonality and ad-hoc tasks
- Site circumstances

Help

- Find champions
- Align the team

EXAMPLE ENGAGEMENT ACTIVITIES

TRANSITION PHASE

Transition Plan

Education and Change Management

Pilots & Trials

STAKEHOLDER GROUP	SUGGESTED STAKEHOLDER ACTIVITIES									
	Kickoff workshop	Drive Days	EV Committees	Transition Modelling	Charging Solutions	TCO Calculations	Business Case	Software Demos	Vehicle Pilots	Charger Pilots
Senior Management	✓	✓	✓				✓			
Sustainability Mgrs	✓	✓	✓	✓			✓	✓	✓	
Finance	✓	✓	✓	✓		✓	✓	✓		
Fleet Managers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Drivers		✓	✓		✓			✓	✓	✓
Maintenance	✓	✓	✓						✓	✓
Asset Managers	✓		✓		✓		✓			✓
Grid Provider					✓					✓

2. Baseline the Fleet

Daily Energy Requirements

- Maximum typical day
- Extremes -> public charging
- Annual kms driven

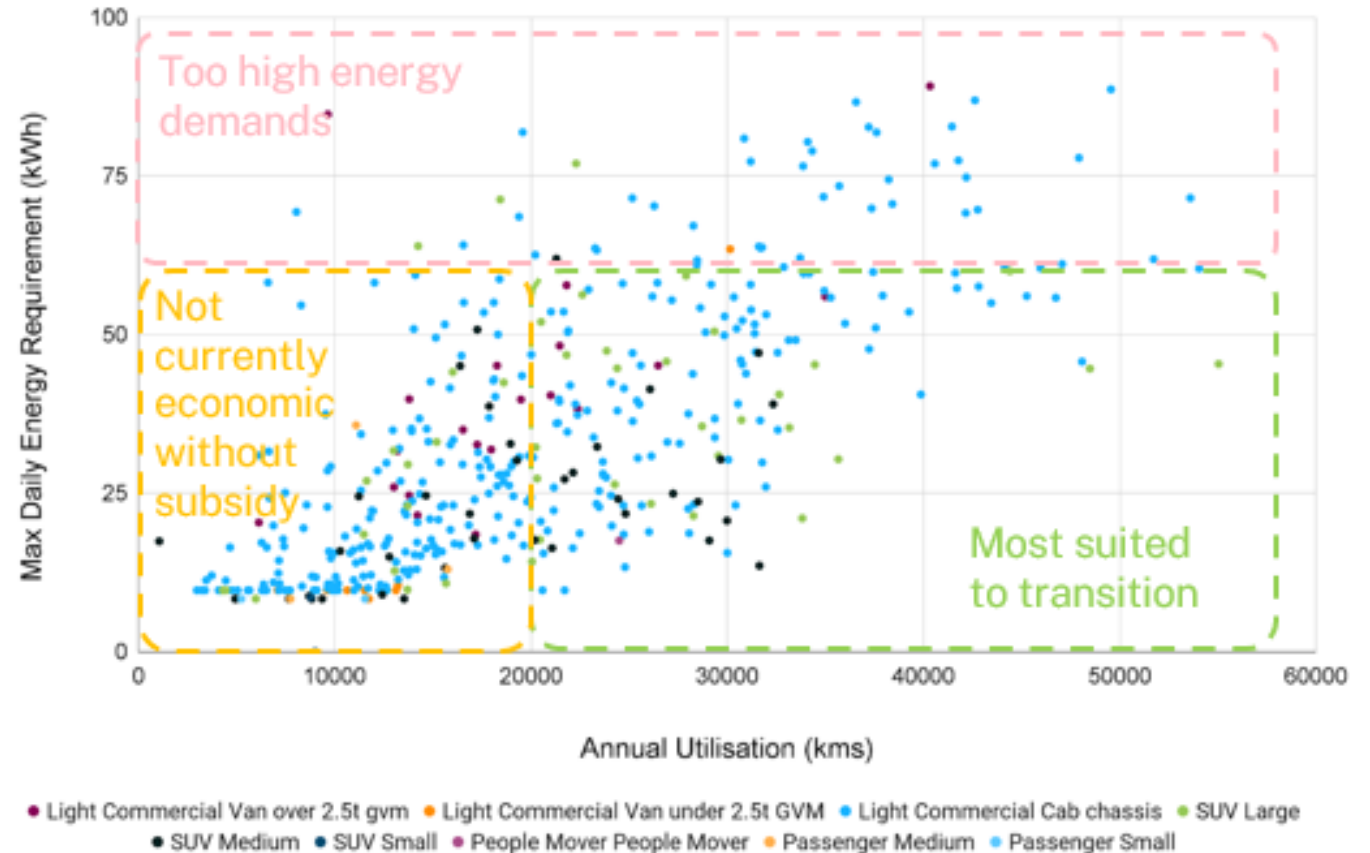
Parking/Charging Opportunities

- Destination charging as a priority
- Surveys and telematics
- Alignment to renewables

Other Factors to Consider

- High profile fleet
- Easiest teams/use cases
- Natural replacement cycles

MAP OF DAILY ENERGY REQUIREMENTS VS MILEAGE



3. Model the Fleet

EV Suitability

- Required range and capability
- Local servicing options
- Preferred supplier lists

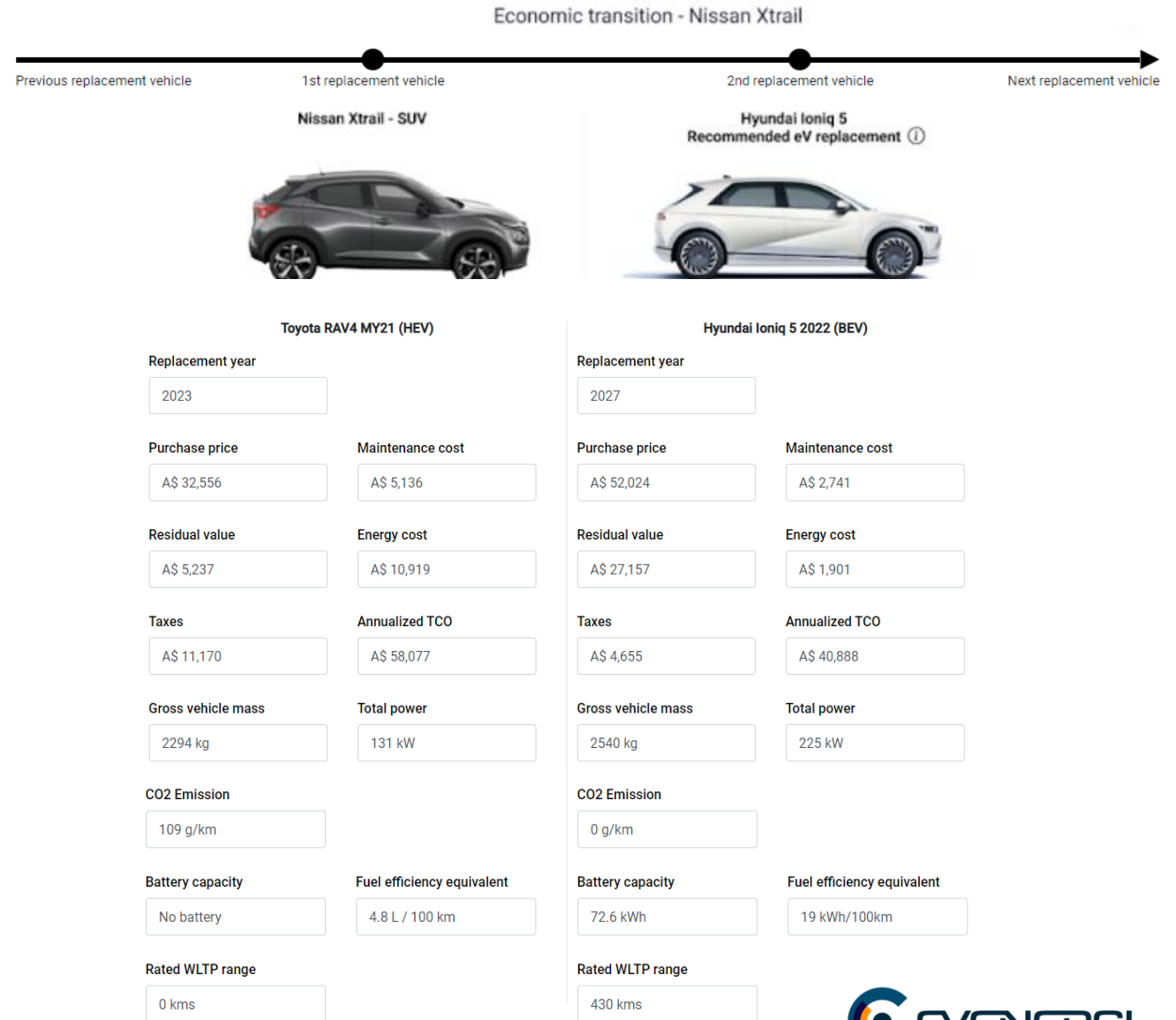
Phasing of the Transition

- EV availability in Australia
- Don't overload change in year 1
- Aligned to infrastructure build



Total Cost of Ownership (TCO)

- Purchase price parity
- Resale values of ICE and EVs
- Fuel standards and CO₂ taxes





BUILDING THE FLEET TRANSITION PHASING






Passenger vehicle and SUV options are growing at pace

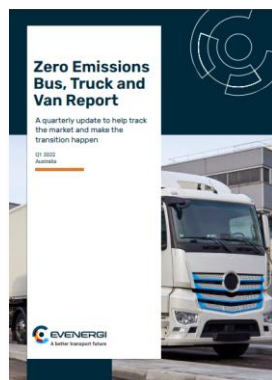
Class	Sub Class	Current Models (mass market)	Models Coming Soon in 2023	Additional Models Beyond 2023	Price Range*	Segment Comment
Passenger 	Light & Small	Mini Electric Nissan Leaf Cupra Born Honda e	Ora Goodcat, MG4 BYD Dolphin, Fiat 500e	Volkswagen ID.3 Peugeot e208	\$35,000 - \$77,000 Typical: \$55,000	An increasing range of EVs with more EV options coming in next few years
	Medium	Tesla 3, Polestar 2 BMW i4 Mercedes EQE, Audi e-tron, Taycan	BYD Seal Volkswagen ID.5	Peugeot e308	\$55,000 - \$200,000+ Typical: \$70,000	Currently Tesla Model 3 dominate but competitors arriving in 2023
	Large & Upper Large	Genesis G80 Hyundai Ioniq 6	Mercedes EQS BMW i7	Polestar 5, Rolls Royce Spectre	\$75,000 - \$350,000+ Typical: \$150,000	Entrants in the value end of this segment expected in coming years.
SUV 	Light & Small	MG ZS Hyundai Kona Kia Niro Mazda MX 30 BYD Atto 3, BMW iX1	Peugeot e2008 Genesis GV60 Toyota BZ4X Renault Megane E-Tech Subaru Solterra	Polestar 4 Volvo EX30 Citroen e-C4	\$45,000 - \$100,000+ Typical: \$70,000	Well represented with EVs with further options coming in next few years
	Medium	Hyundai Ioniq 5 Kia EV6 Volvo C40 & XC40 Mercedes EQA Lexus UX300e Tesla Model Y	Skoda Enyaq Genesis GV70 Volkswagen ID.4 Polestar 3, Audi S e-tron	Nissan Ariya Ford Mach E	\$70,000 - \$150,000+ Typical: \$80,000	Well represented with EVs with further options coming in next few years
	Large & Upper Large	BMW iX Tesla Model X	Kia EV9 Mercedes EQE & EQS	Mercedes EQB Volvo EX 90 Hyundai Ioniq 7	\$100,000 - \$200,000+ Typical: \$180,000	Entrants in the value end of this segment expected in coming years.

Utes and light commercial vehicles are starting to appear

Class	Sub Class	Current Models (mass market)	Models Coming Soon in 2023	Additional Models Beyond 2023	Price Range	Segment Comment
Light Commercial    	Vans <2.5 T GVM	Renault Kangoo	Mercedes Vito Peugeot e-Partner	ACE Cargo	\$60000 - \$90000 (Expected Kangoo & Vito prices)	Small segment with a few EV options
	Vans >2.5 T GVM	EC 11 LDV eDeliver9	Ford E-transit	Mercedes Sprinter Ford Transit Custom ACE Van Renault Master	\$100,000-\$120000 (E-deliver range)	An increasing range of EVs with additional EV options coming in next few years.
	Utes	LDV eT60 (2WD) ACE Yewt	JAC T9 Atlis XT	BYD Ute, ROEV Rivian R1-T Ford F150 Lightning Ram 1500 REV	\$93000 (LDV eT60)	Uncertainty about EV options in this segment before 2025/26. This could change as EV options are appearing overseas along with local retrofit options
	People Movers	LDV Mifa	Kia Niro Mercedes EQV	Volkswagen I.D Buzz Mercedes Vito Tourer	\$106,000-\$130000 (Mifa range)	Small segment with an increasing range of EVs with more EV options coming in next few years
	Light Buses		Joylong	TBC	TBC	Small segment with a few EV options

Heavy vehicle solutions exist, but are very use-case dependent

Class	Sub Class	Current EVs	Additional in 2023	Additional in future	Hydrogen	Segment Comment
Heavy Commercial   	Light <i>(GVM from 3.5 to 8 tonnes)</i>	Fuso eCanter SEA 300 range JAC N55 Foton T5	Hyundai Mighty Electric	Via Light/Medium Rigid Atlis XT Isuzu N Series Hino 300 Z EV	-	Rapidly increasing availability. More options likely in the next few years from other manufacturers.
	Medium <i>(2 axles and GVM > 8 tonnes)</i>	SEA 500 range Volvo FL Volvo FE	-	XOS MDXT Reveroa (reefer) Mercedes eEconic (TBC) Scania, Mercedes, DAF, MAN and Mack have products in overseas markets	-	More options likely in the next few years.
	Heavy <i>(3+ axles or 2 axles with GCM > 39 tonnes)</i>	-	Janus Electric (retrofit)	XOS HDXT Volvo FH (TBC) Volvo FMX (TBC) Mercedes eActros (TBC) Tesla, Scania, DAF and Kenworth have products in overseas markets.	Hyundai XCIENT (TBC) Pure Hydrogen/H2X Hyzon	Heavy duty BEV trucks being launched now overseas. Hydrogen options in early phases of development, targeted to long haul applications.

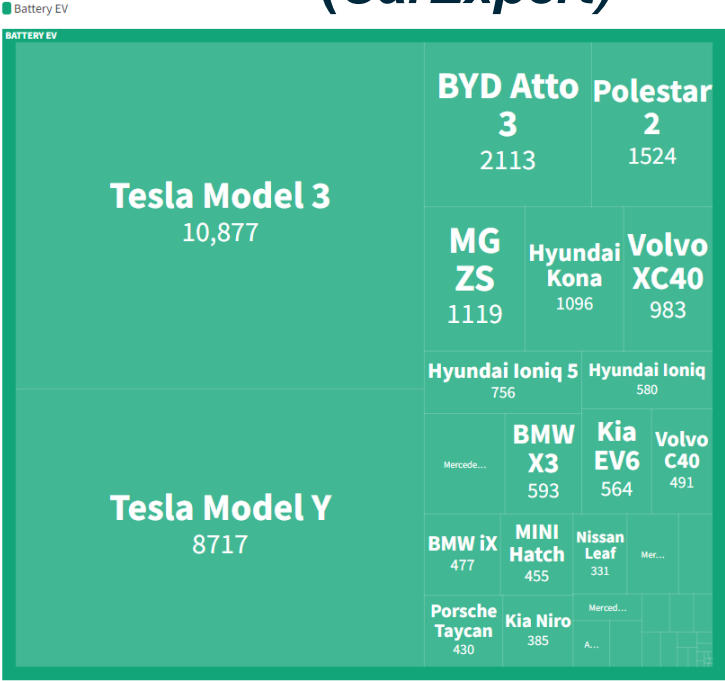


- Everergi produces a free zero emissions bus, truck and van report bi-annually
- Sign up and download the full report for all the latest information

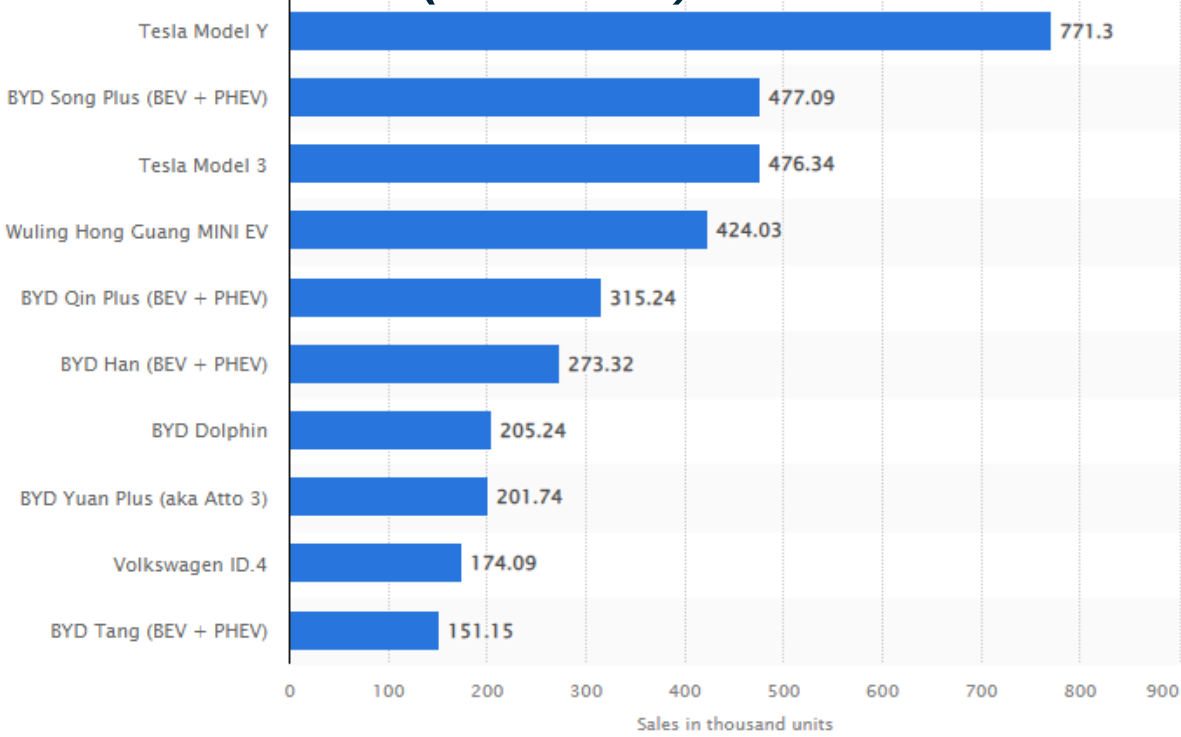
everergi.com/btv-report/

It is very likely that a change in the regular brands in the fleet will be needed, at least in the short term

EV SALES – AUSTRALIA 2022
(CarExpert)



EV SALES – GLOBALLY 2022
(Statistica)



- Tesla and BYD dominate EV sales domestically and abroad
- The transition may require you to get approved suppliers lists updated
- You may also have to consider locations of new dealerships for servicing

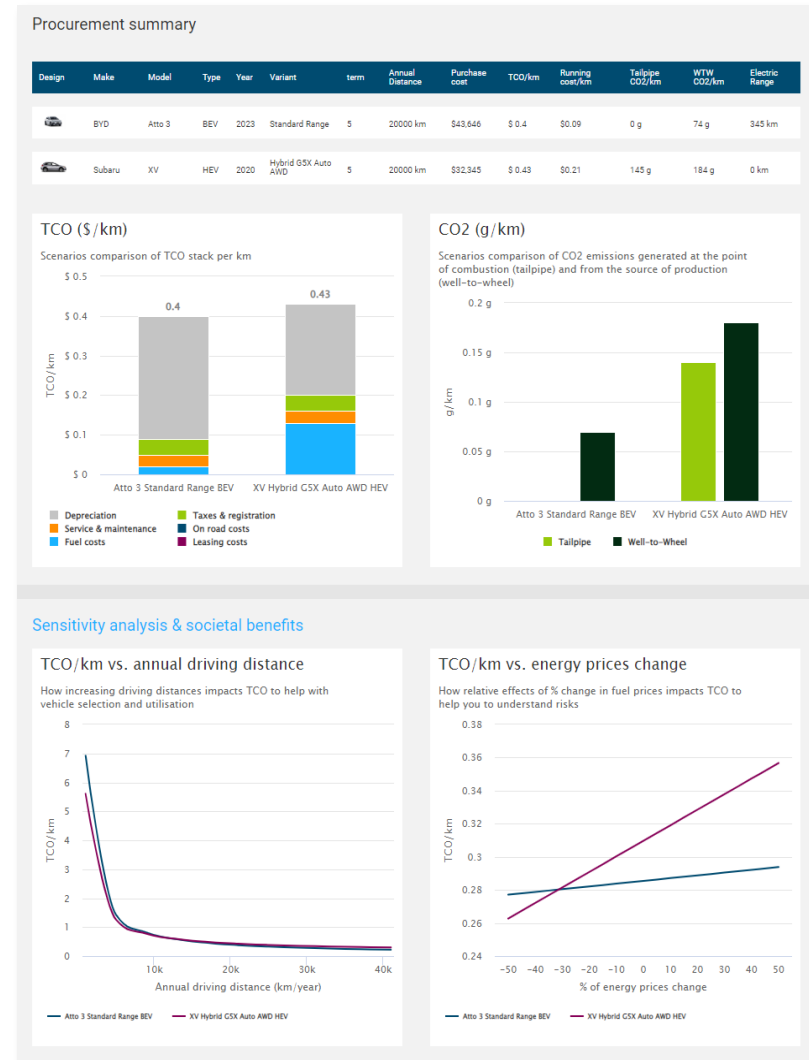
TCO is a common concept for fleet managers but the disruption EVs are/will cause add new factors and complexity

$$\text{TCO} = \text{Vehicle Costs} + \text{Running Costs}$$

$$= (\text{Purchase} - \text{Resale}) + (\text{Fuel and Maint.})$$

- EVs have dropped in price circa 20% in China since October 2022
- Battery degradation studies indicate a usable life of 200,000 – 300,000 kms
- How to predict fuel and road tax levies?
- Some free and paid tools are available to help with TCO calculations

EXAMPLE TCO REPORT



4. Charging Solutions

Destination Charging

- The new mindset for refuelling
- Usually aligns to off-peak & solar
- Low cost AC charging (excl trucks)

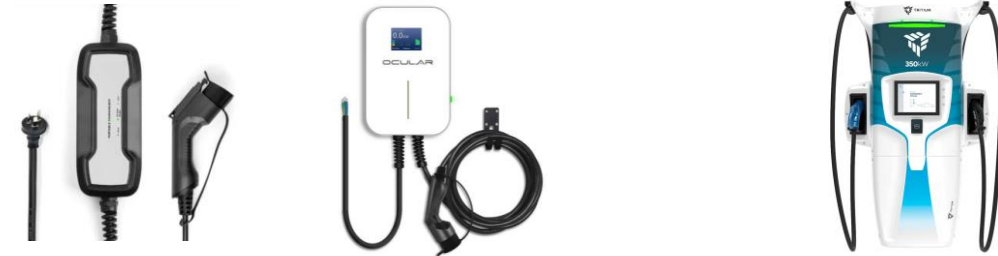
Home Charging

- Vehicles still need to be garaged
- FBT and policy implications
- Spreads load and avoid upgrades

Public/Shared Charging

- Essential for long trips and fleets without a destination charger
- Shares costs of DC chargers
- DC networks to your community

OVERVIEW OF CHARGER TYPES



	AC Charger			DC Charger		
Power level	Level 1	Level 2		Level 3		
Common name	Socket Charger	AC Smart Charger		Fast Charger		Ultra-fast Charger
Power	2.3 kW	7.4 kW	22.1 kW	50 kW	120 kW	> 350 kW
Time to charge (100 km range*)	> 8 hr	2 hr 42 min	54 min	24 min	10 min	< 10 min
Cost per charge point	\$0 - \$500	\$2,500 - \$5,000	\$3,000 - \$7,000	\$80,000 - \$200,000 plus		

*For vehicle with driving energy efficiency of 20 kWh/100 km

AC charging will be more economical per charge, but you need a location and the downtime to take advantage of this

EXAMPLE CALCULATIONS OF IDEAL CHARGER SELECTION

Vehicle	Daily kms	Efficiency kWh/km	Energy Req'd	Charging Time and Estimated Cost per Charge			
				7kW	22kW	50kW	250kW
Cost per Day				\$3	\$4	\$80	\$105
Passenger Car	50	1.5	7.5	1 hr	18mins	10 mins	<5 mins
Courier Van/Ute	200	3.5	70	10 hrs	3 hrs	90 mins	<30 mins
Small Truck	150	6	90	13 hrs	4 hrs	2 hrs	30 mins
Bus	300	13	390	60 hrs	19 hrs	9 hrs	2.5 hrs
Heavy Truck	150	20	300	45 hrs	14 hrs	7 hrs	2 hrs

Ideal for destination charging
 Ideal for on-route charging

Indicative values only

Driving distance and efficiency figures based on Everergi real-world fleet modelling

Charger costs based on \$3k and \$4k and a 4 year lifespan for a 7kW and 22kW charger respectively and \$100k and \$200k and a 8 year lifespan for a 50kW and 250kW charger respectively

5. Costs & Scenarios

Scenarios to Understand Options
 Cost of a more rapid transition
 Sensitivities & risks

Total Cost Modelling
 Vehicle, charger and infrastructure
 Capex and Opex impact vs. BAU
 Year on year budgets

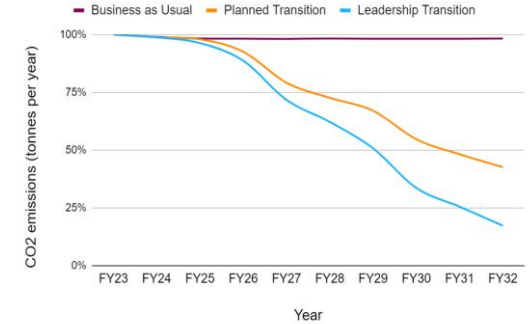
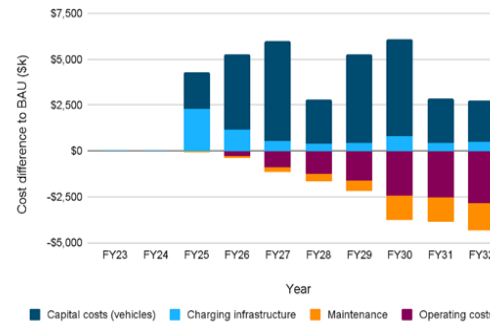
Sense Check Your Numbers
 Focus on the early years
 Model availability?
 Sites can be prepared in time?

OVERVIEW OF A SCENARIO OUTCOMES

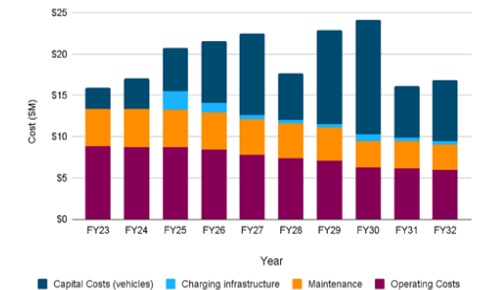
Overall financial summary NPV 2023 to 2032

Capital costs	BAU	Leadership transition	Difference
Vehicle capital expenses	\$44.2M	\$73M	\$29M
Vehicles operating expenses	\$87.2M	\$75M	-\$12.2M
Vehicles maintenance expenses	\$45.8M	\$40M	-\$5.8M
EVSE & charging capital expenses	-	\$6.6M	\$6.6M
Total	\$177M	\$195M	\$18M

YEAR ON YEAR COST DIFFERENCE COMPARED TO BAU



LEADERSHIP TRANSITION



6. Grants & Incentives

Take Advantage of Current Help

- Rebates on costs
- Offers to close the TCO gaps
- Funds to support trials & charging

FBT Changes

- \$3-5k pa impact if private use
- Less need for utes in fleets

Fuel Efficiency Standards

- Will this translate to a premium on ICE?

OVERVIEW OF AVAILABLE GRANTS*

Incentive	NSW	ACT	NT	QLD	SA	TAS	VIC	WA
Rebate/tax incentive on purchase	✓	✓	✓	✓	✓	✓	✓	✓
TCO gap fleet incentive	✓							
Public charging network incentives	✓	✓		✓	✓	✓	✓	✓
Destination charging incentives	✓		✓			✓		
Zero interest loans on EVs	✓	✓		✓	✓		✓	
FBT exemption on EVs (< \$84,916)	✓	✓	✓	✓	✓	✓	✓	✓
Future Fuels Fund - Heavy vehicles	✓	✓	✓	✓	✓	✓	✓	✓
Future Fuels Fund - Charging solutions	✓	✓	✓	✓	✓	✓	✓	✓

* Best attempt to summarise multiple, not always comparable policies and incentives. Apologies for any incentive missed!

7. Business Sign-Off

Make it Formal to Drive Ownership

- Present to the senior execs
- Personal commitments to plan
- Regular snr exec reviews
- Must be a business priority

Make it a Public Commitment

- Senior exec commitments
- Goodwill earned on intentions
- Excitement is infectious



8. Pilots & Trials

Replace Fear With Knowledge

- Drive days, rentals, rideshare

- Start with easy wins

- Make success stories

Solve Current Challenges

- Don't put EVs into nothing roles

- Test vehicles & charging solutions

- Test charge mgt software

- Trial partnerships to solve issues

Build New Behaviours

- Finding and using public chargers

- Planning ahead for parking

- Sip electrons, don't guzzle fuel

EXAMPLE TECHNOLOGIES TO PILOT

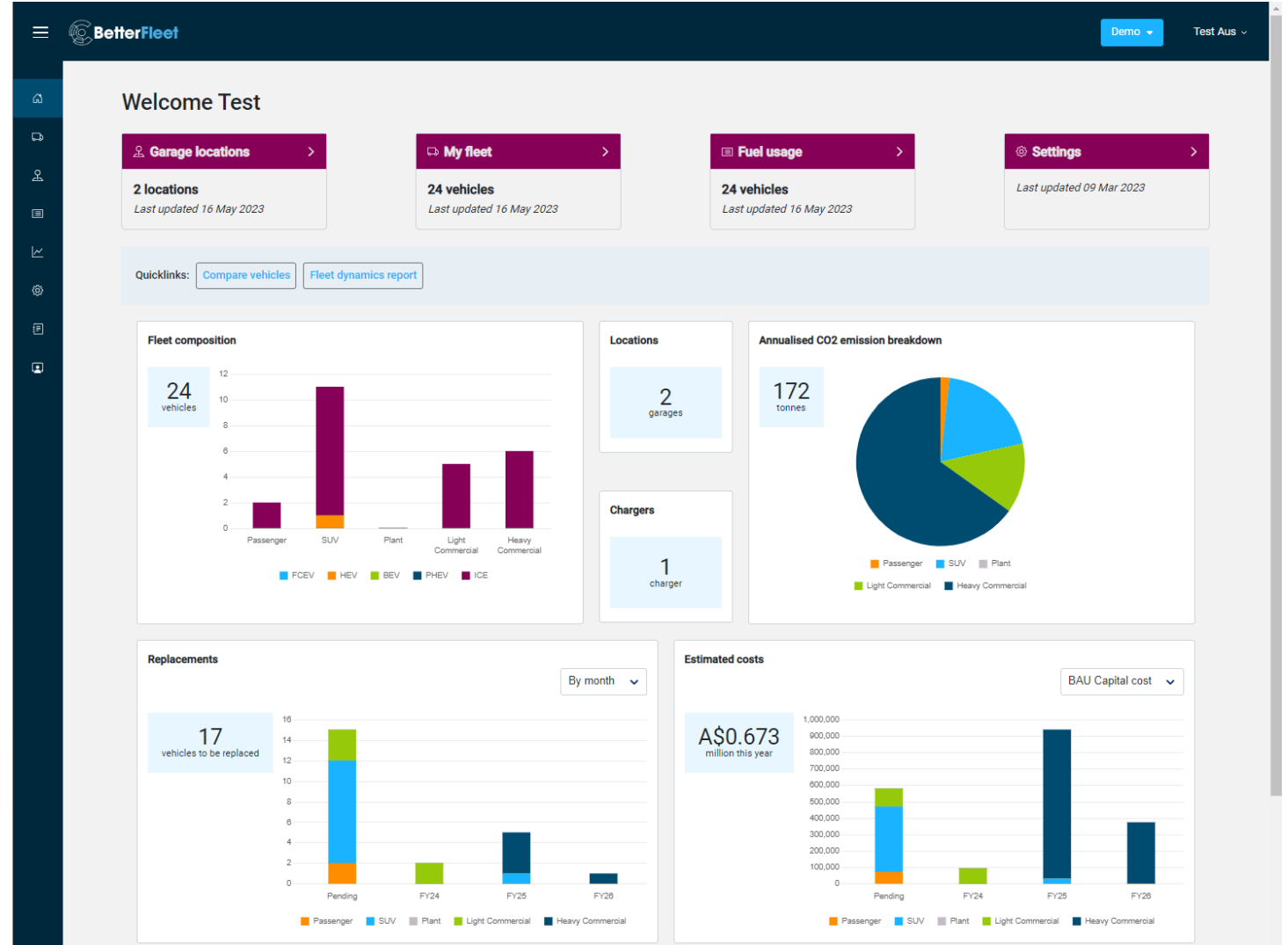


9. Reporting

Progress vs. Targets on Transition
Hold accountability to numbers
Keep the focus on solving issues

GHG Emissions Tracking
Sustainability reporting
Marketing

Charging Event Tracking
Expense reimbursement
Public vs. depot charging ratios
Support partner negotiations



10. Roll Out at Scale

Start With the Easy Parts

- Passenger and SUV
- Focused commercial and heavies

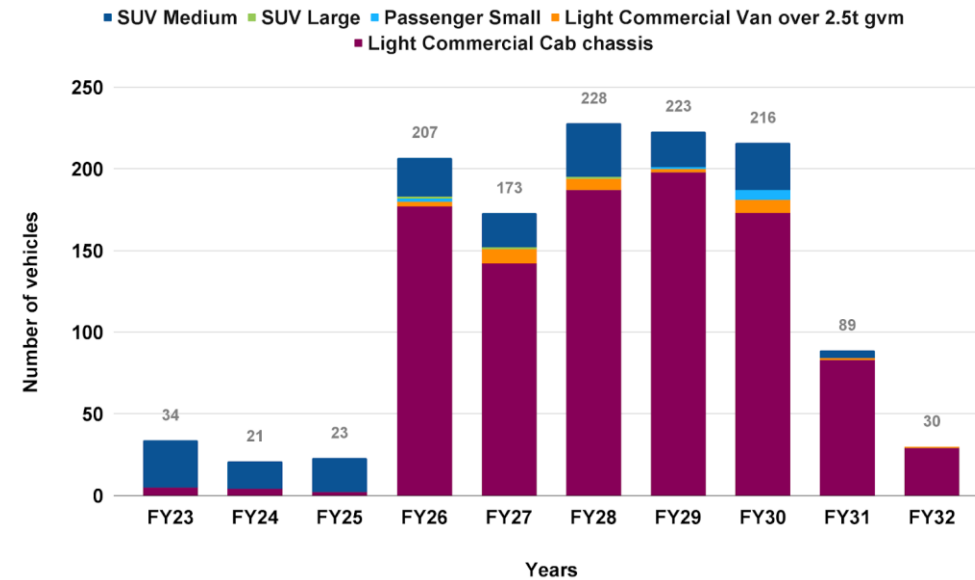
Ensure Co-ordination With Chargers

- Allow for infrastructure upgrades
- Regular tracking Transition
- Planners, Procurement, Property

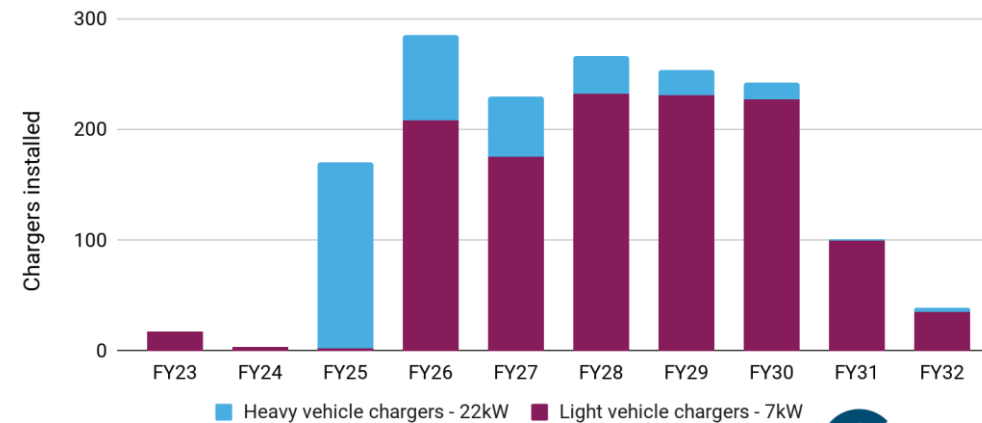
Stay Close and Adapt

- Expense reimbursement
- Public vs. depot charging ratios
- Support partner negotiations

EXAMPLE EV ROLL OUT PLAN



Charger installation by year (economic)



11. Refine and Adapt

New Battery Technologies

- More range and cycles
- Lower costs and weights
- Growing supply chain

Fuel Cell Options Maturing

- Vehicles entering market (Heavy)
- Expanding supply chain
- Strong government support

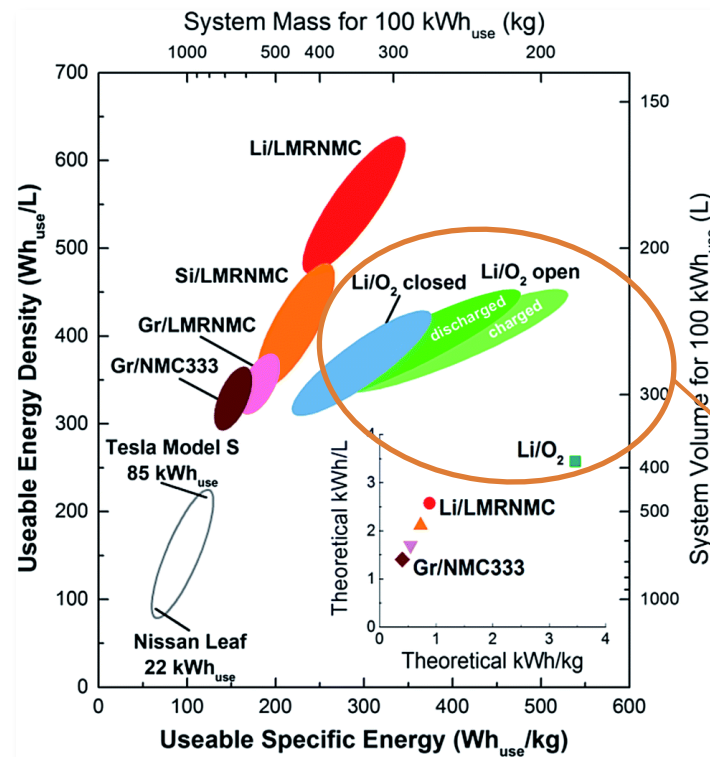
Public Charging Options

- Rapidly expanding network
- Solutions for commercial fleets
- Pantograph and wireless charging

Autonomous Vehicles



\$62/kWh – less than half today's prices



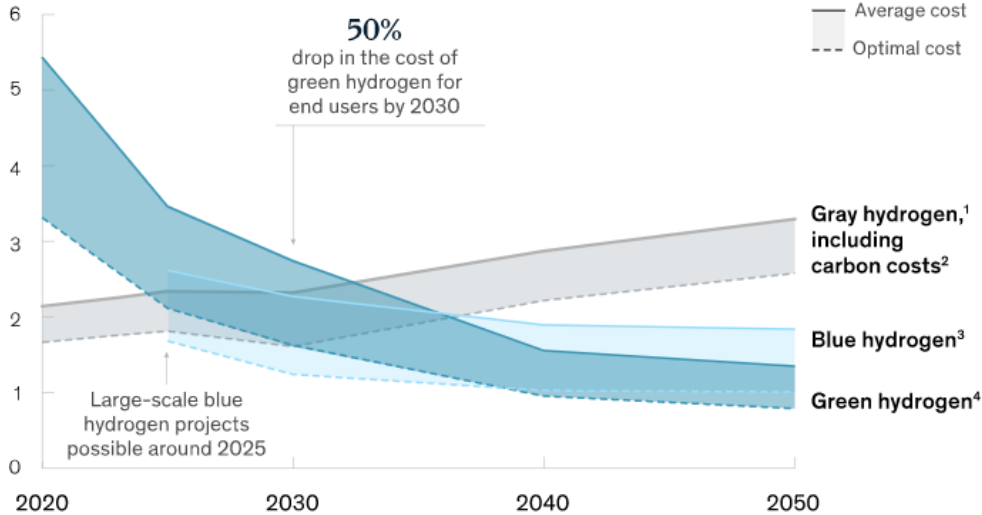
Lithium-Air batteries show significant promise – theoretically can beat petrol in km range per kg

Source: Royal Society of Chemistry

Hydrogen technology and supply chains are seeing significant investment and support that will help it mature

FORCASTED COST OF HYDROGEN

Projected global production cost of hydrogen, \$/kilogram



¹Steam methane reforming (SMR) without carbon capture, utilization, and storage (CCUS).
²Based on projected average global CO₂ costs of \$57/ton (2030), \$94/ton (2040), and \$131/ton (2050). For Saudi Arabia, CO₂ costs are assumed to be \$33/ton in 2030, \$69/ton in 2040, and \$105/ton in 2050.
³Gas prices of \$2.60 to \$6.80/MMBtu (approximately \$3/MMBtu in Saudi Arabia).
⁴Refers to the cheapest green hydrogen, which is provided by solar energy.
 Source: McKinsey Hydrogen & Derivatives Flows Model, October 2022

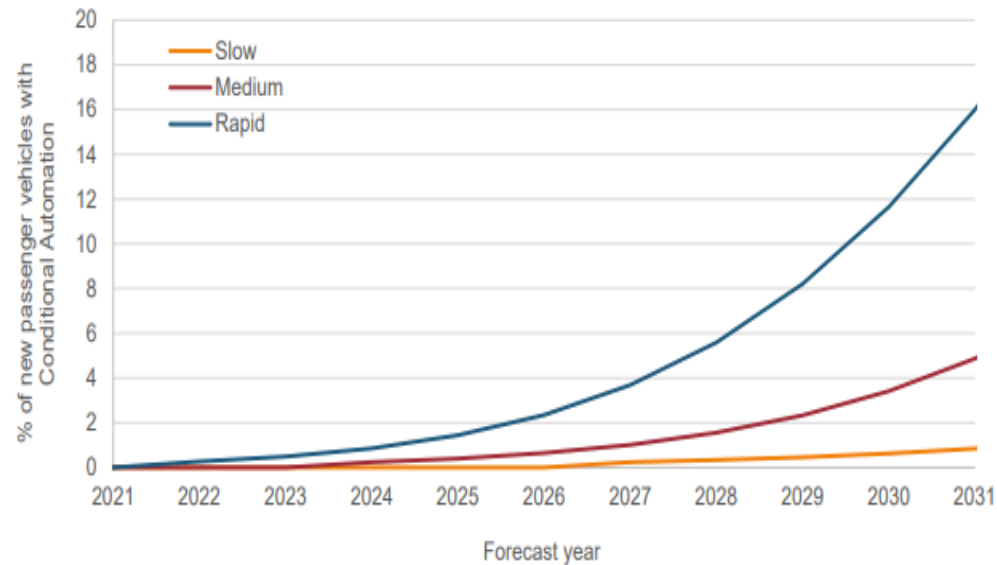
BREAKEVEN POINT AT WHICH HYDROGEN COMPETES WITH OTHER LOW EMISSIONS TECHNOLOGIES



1. Regions assessed are the US, China, Japan/Korea, and Europe
 2. Transportation segments breakeven calculated as weighted average
 SOURCE: McKinsey; IHS; expert interviews; DoE; IEA

Autonomous vehicles still need to pass many regulations and technical challenges, but promise profound changes by 2030

LVL 3 (CONDITIONAL DRIVING AUTOMATION) ADOPTION FORECASTS



Source: AustRoads, September 2021

LEVEL 4 (HIGH DRIVING AUTOMATION) FORECASTED TO DISRUPT TRANSPORT



Zoox (Amazon) robotaxi (California)

In conclusion, I leave with these key summary points

KEY MESSAGES FROM THIS PRESENTATION

1. This is a major change exercise that needs integration across the organisation
2. Data and modelling are key to properly understanding needs
3. This ability to get started then adapt will be key to your success



Thank you.

For any questions, please feel free to reach out to the team:

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SYDNEY

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Audience Q&A Session [slido](#)

- What single word, describes the most important aspect of decarbonisation in fleet management for you?
- We were thinking of trialing EV's as pool cars, are you saying it's a bad idea?



Session Details

An End-to-End Transition Framework for Fleet
Decarbonisation

Tues, 23/5

Emissions
Plenary

Add session

SESSION FEEDBACK



**Fleet Conference
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2023 Australasian Fleet Conference

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SESSION FEEDBACK