An End-to-End Transition Framework for Fleet Decarbonisation

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Key takeaways I hope to pass on

Key points in this presentation:

- This is a major change exercise that needs integration across the organisation
- Data and modelling are key to properly understanding needs
- There are many tricky bits and unknowns - but don't let these paralyse you
- There are also many easy bits and ways to get support (free and bespoke paid services)
- Leverage the support you can get now to start, use the knowledge gained and behaviour changes achieved to then help you work on the more complex bits down the track

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?

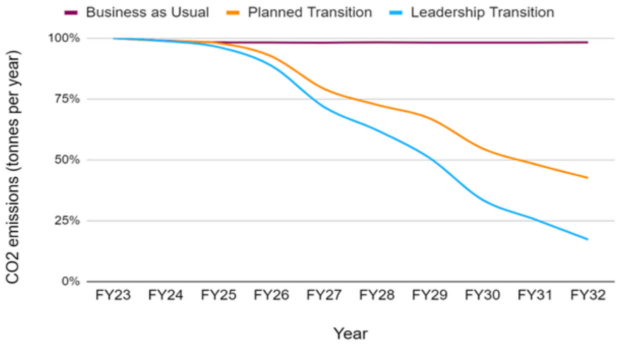
- What funding will be required?
- When are major infrastructure upgrades?
- When will TCOs beat BAU?

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

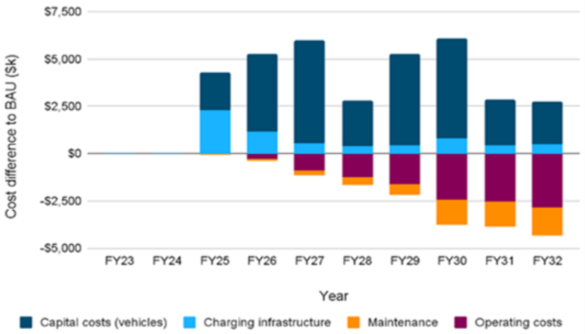
- How do I track vs. targets?
- What systems must integrate?
- How do I stay abreast of new technologies?

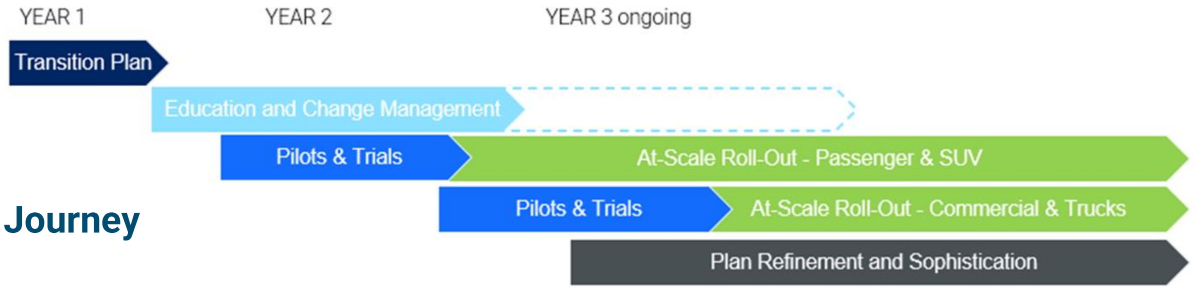
The vision must be compelling and include the goal, the ask and the framework for getting there

Sustainability Goals



Financial Goals





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

Steps:

1. Stakeholder engagement and change management
2. Baseline your fleet – understand what you have and what you need
3. Select new vehicles – 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

TRANSITION PHASE

Transition Plan

Education and Change Management

Pilots & Trials

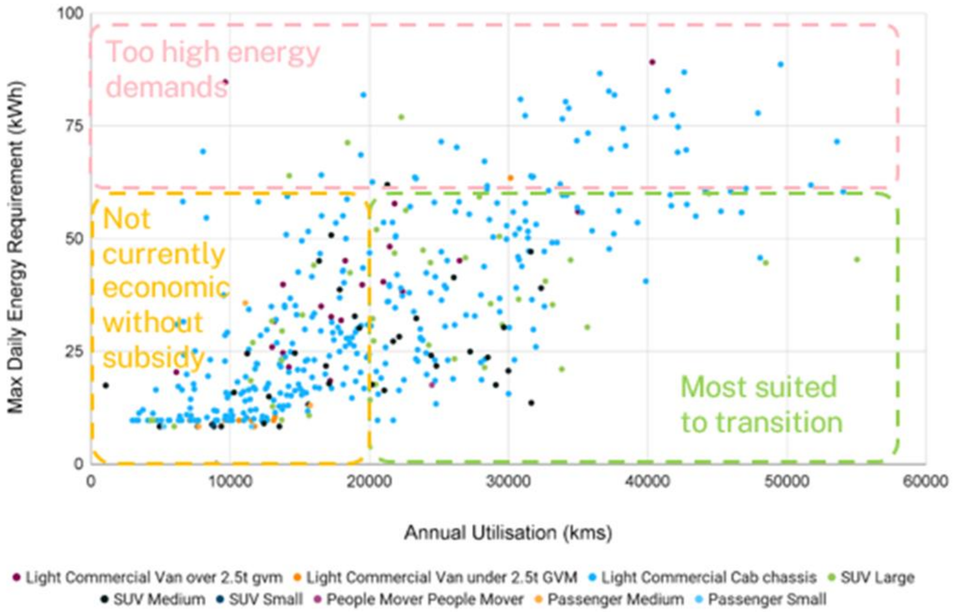
STAKEHOLDER GROUP	SUGGESTED STAKEHOLDER ACTIVITIES									
	Kickoff workshop	Drive Days	EV Committees	Transition Modelling	Charging Solutions	TCO Calculations	Business Case	Software Demos	Vehicle Pilots	Charger Pilots
Senior Management	✓	✓	✓				✓			
Sustainability Mgrs	✓	✓	✓	✓			✓	✓	✓	
Finance	✓	✓	✓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

Example Engagement Activities

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

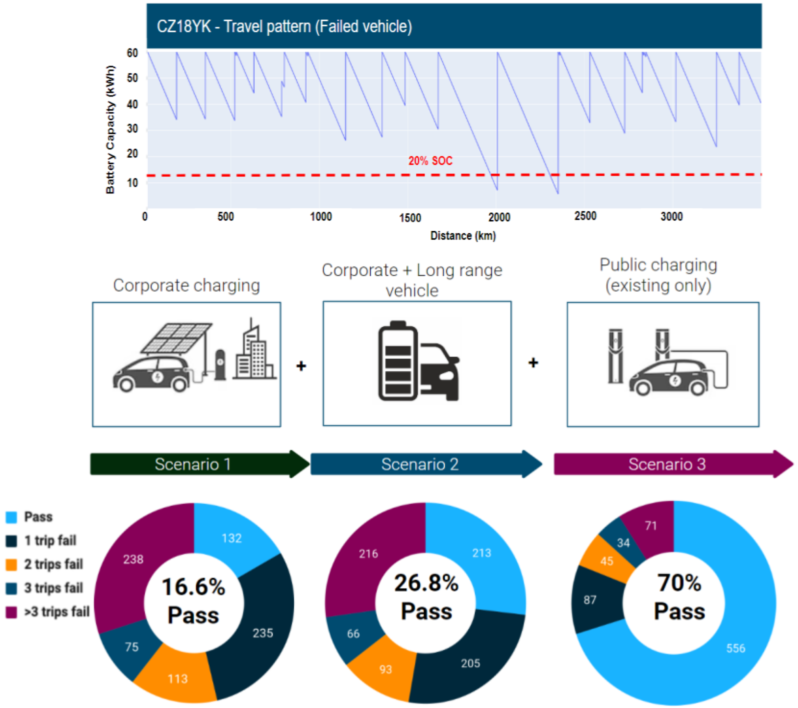
MAP OF DAILY ENERGY REQUIREMENTS VS MILEAGE



2. Telematics can be useful if you have them

- Modelling Use Cases
  - Can see exact use patterns
  - Can understand utilisation
  - Can understand outliers
- Finding Charging Opportunities
  - See exactly where vehicles stop
  - Can incorporate public chargers
  - Optimise charging solutions

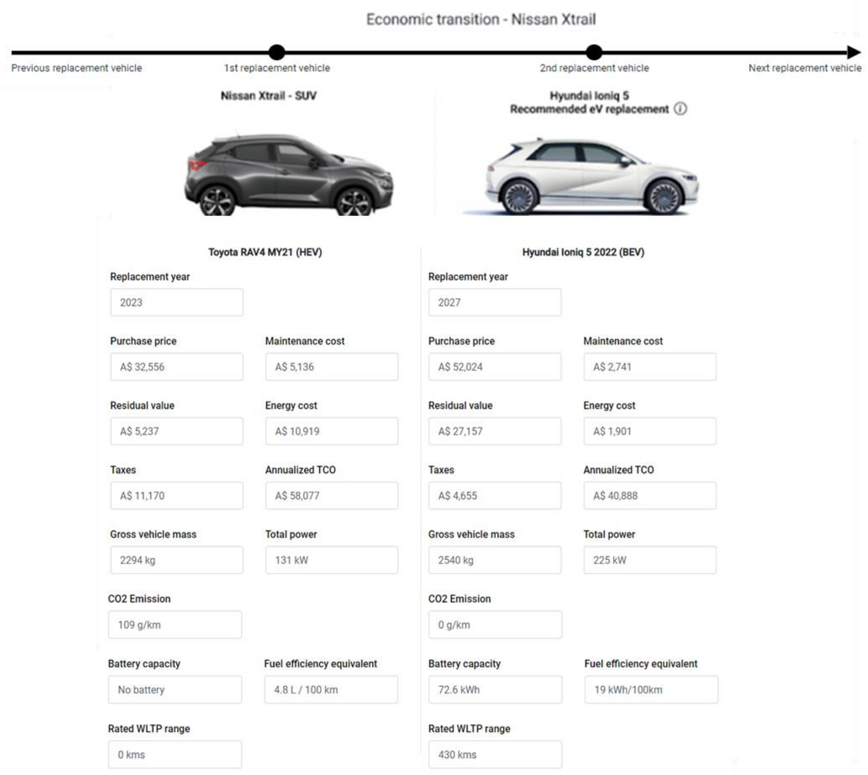
TELEMATICS ANALYSIS HELPS UNDERSTAND DETAILS



3. Select New Vehicles

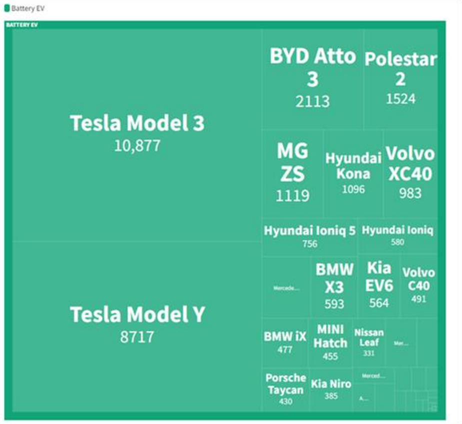
- EV Suitability
  - Required range and capability
  - Local servicing options
  - Preferred supplier lists
- Phasing of the Transition
  - EV availability in Australia
  - Don’t overload change in year 1
  - Aligned to infrastructure build
- Total Cost of Ownership (TCO)
  - Purchase price parity
  - Resale values of ICE and EVs
  - Fuel standards and CO2 taxes

BUILDING THE FLEET TRANSITION PHASING

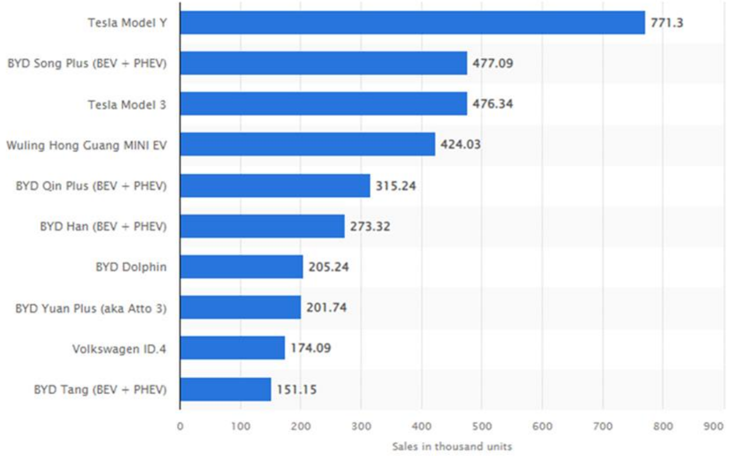


It is very likely that a change in the regular brands in the fleet will be needed, at least in the short term

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

Passenger vehicle and SUV options are growing at pace

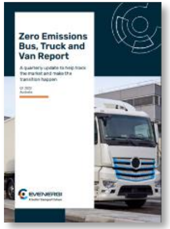
Class	Sub Class	Current Models (mass market)	Models Coming Soon in 2023	Additional Models Beyond 2023	Price Range*	Segment Comment
	Light & Small	Mini Electric Nissan Leaf Cupra Born Honda e	Ora Goodcat, MG4 BYD Dolphin, Fiat 500e	Volkswagen ID.3 Peugeot e208	\$35,000 - \$77,000 Typical: \$55,000	An 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.
	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** ***(GVM from 3.5 to 8 tonnes)***	**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** ***(2 axles and GVM > 8 tonnes)***	**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** ***(3+ axles or 2 axles with GCM > 39 tonnes)***	-	**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.



Download our free zero emissions bus, truck and van report: *evenergi.com/btv-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 it

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 Evenergi 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 an 8 year lifespan for a 50kW and 250kW charger respectively

5. Costs & Scenarios

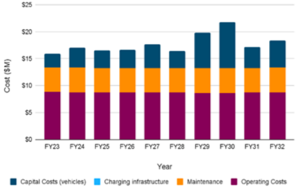
- Scenarios to Understand Options
  - Cost of a more rapid transition
  - Sensitivities & risks
- Total Cost Modelling
  - Vehicle, charger and infrastructure
  - Capex and Opex impact vs. BAU
  - Year on year budgets
- Sense Check Your Numbers
  - Focus on the early years
  - Model availability?
  - Sites can be prepared in time?

OVERVIEW OF A SCENARIO OUTCOMES

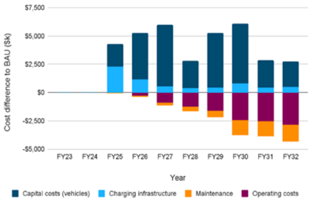
Overall financial summary NPV 2023 to 2032

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**

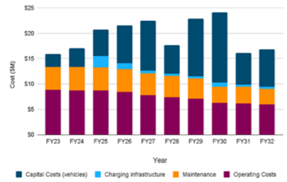
BUSINESS AS USUAL



YEAR ON YEAR COST DIFFERENCE COMPARED TO BAU



LEADERSHIP TRANSITION

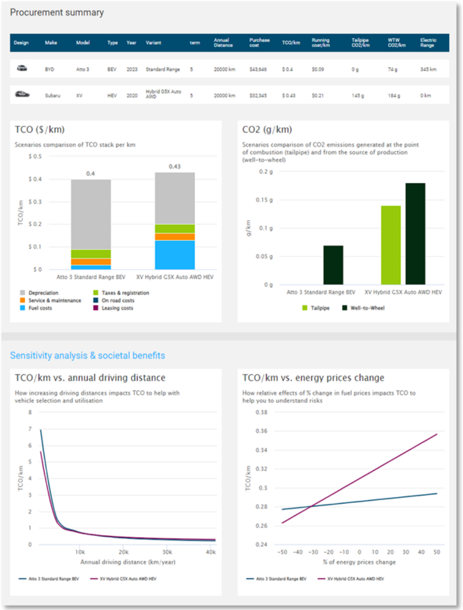


TCO is a common concept for fleet managers but EV disruption adds new factors and complexity

TCO = Vehicle Costs + Running Costs
= (Purchase - Resale) + (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



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	✓	✓	✓	✓	✓	✓	✓	✓

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

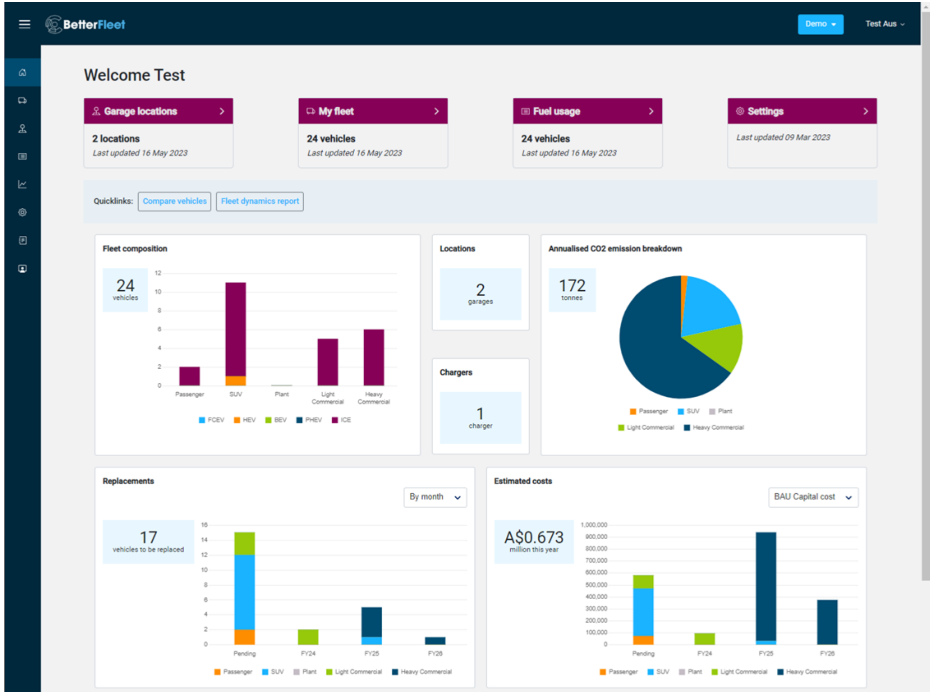
8. Pilots & Trials

- 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

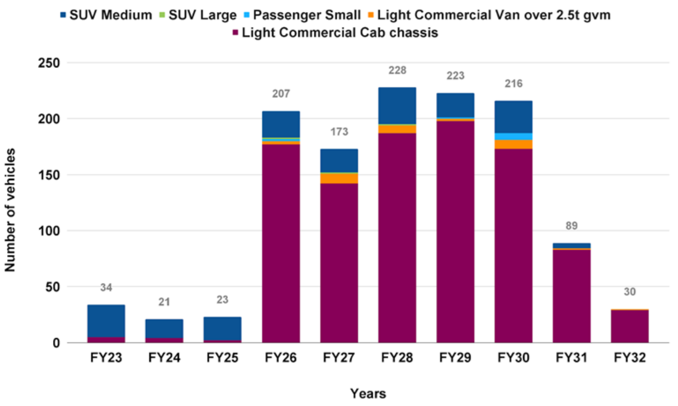
- Progress vs. Targets on Transition
    - Hold accountability to numbers
    - Keep the focus on solving issues
- GHG Emissions Tracking
    - Sustainability reporting
    - Marketing
- Charging Event Tracking
    - Expense reimbursement
    - Public vs. depot charging ratios
    - Support partner negotiations

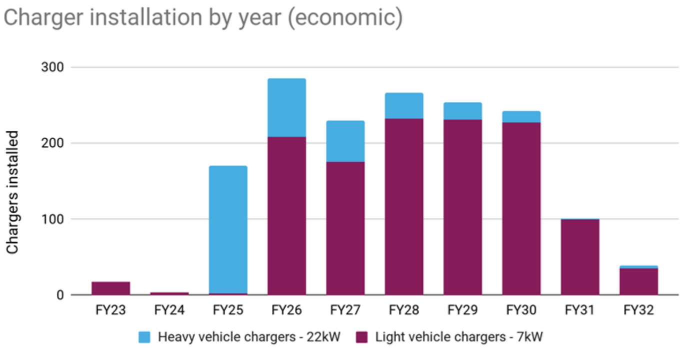


10. Roll Out at Scale

- Start With the Easy Parts
  - Passenger and SUV
  - Focused commercial and heavies
- Ensure Coordination 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

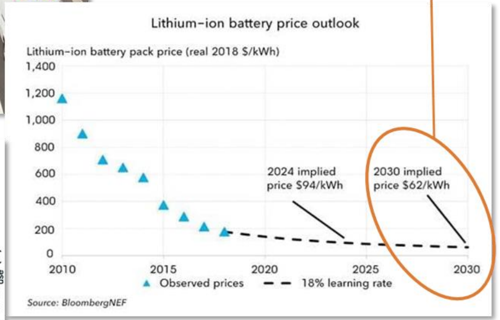


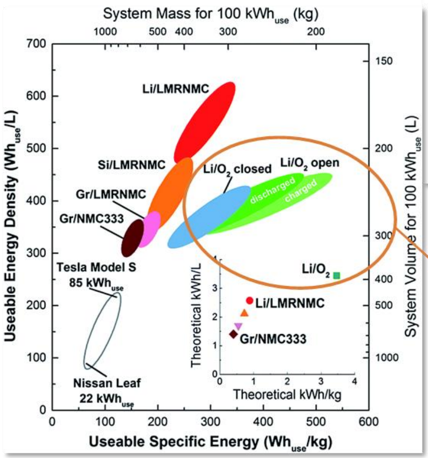


11. Refine and Adapt

- 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





Source: Royal Society of Chemistry

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

Key takeaways

1. This is a major change exercise that needs integration across the organisation
2. Data and modelling are key to properly understanding needs
3. There are many tricky bits and unknowns - but don't let these paralyse you
4. There are also many easy bits and ways to get support (free and bespoke paid services)
5. Leverage the support you can get now to start, use the knowledge gained and behaviour changes achieved to then help you work on the more complex bits down the track


Thank you

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