

The Victorian Electric Vehicle Trial

Climate Change & Business conference, 2 August 2011



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Today

1. Why EVs?
2. What are we doing?
3. What do we know?
4. What can you do?

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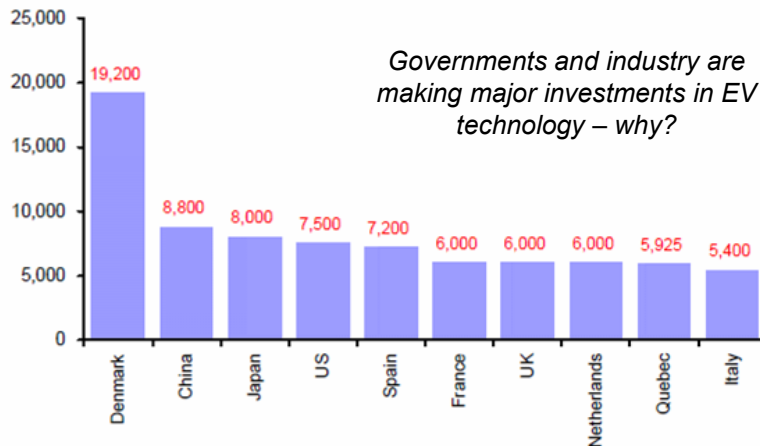
Why EVs?

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The global push... over 130 xEV models in the global pipeline for 2012

\$ USD / car purchase incentive



Governments and industry are making major investments in EV technology – why?

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Ref: Deutsche Bank, The End of the Oil Age, Dec 2010
<http://bioage.typepad.com/files/1223fm-05.pdf>



Why electric vehicles?

- ✓ *Energy*
- ✓ *CO₂*
- ✓ *Air quality*
- ✓ *Noise*
- ✓ *Jobs*

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Energy Oil prices are ahead of forecasts... as are battery price reductions

The main driver for EV technology is pure economics – as oil gets more expensive EVs will get cheaper, tipping the capital vs operating cost in favour of EVs

Electricity is also domestically produced, thereby addressing one of the US's enduring national security issues



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Ref: Deutsche Bank, The End of the Oil Age, Dec 2010
<http://bioage.typepad.com/files/1223fm-05.pdf>



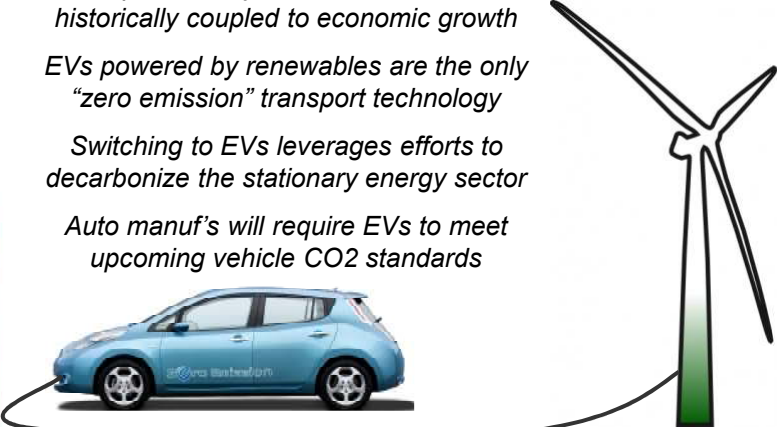
Climate change Vic GHG (Transport) = 17%
Road transport contrib'n = 90%

Transport activity/emissions have been historically coupled to economic growth


EVs powered by renewables are the only "zero emission" transport technology

Switching to EVs leverages efforts to decarbonize the stationary energy sector

Auto manuf's will require EVs to meet upcoming vehicle CO2 standards



Department of Transport Ref: DCC National GHG inventory 2008




Air quality Economic cost of motor-vehicle related pollution in Aust = \$2.7 billion


Air pollution from motor vehicles kills more people in Victoria every year than car accidents

For emerging economies such as China and India seek to improve the quality of life for their citizens, improving their notoriously bad urban air quality is an imperative

EVs provide zero tailpipe emissions regardless of electricity source



Department of Transport Ref: "Health Costs of Transport Emissions in Australia: Economic costs", BTRE, June 2005
<http://www.bitre.gov.au/publications/94/Files/wp63.pdf>



Jobs

Employment multiplier
(direct / onwards FTE)

Electricity = 5.0

Automotive = 4.3

Ref: McKinsey, "Looking Under the Hood 2: How the Auto Industry Grows", April 2010

All motor vehicle producing nations are scrambling to stake their claim in the emerging EV technology market

China in particular wants to avoid competing on mature technologies and instead leapfrog to #1 in EVs

EVs also deliver substantial employment in the electricity sector

Over the life of the Vic EV Trial \$43 million of investment and 500 new jobs will be created

Nissan's Dandenong casting plant has secured a \$21m global supply agreement for the Nissan LEAF
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Better Place recently signed a \$60m renewable energy supply agreement with Actew-AGL



What are we doing?

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Why Victoria? Victoria is one of only 15 locations worldwide where a car can be taken from concept to the showroom

The auto industry currently employs around 28k Victorians

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Priority areas for Australian Auto Industry to 2020

Australian auto industry participants nominated vehicle electrification as the highest priority opportunity area out to 2020

Priority Area	Percentage
Vehicle electrification	35%
Gaseous fuels	29%
Lightweighting	23%
Data & communication	13%

Ref: AutoCRC 2010, <http://www.autocrc.com/files/Image/2009/AA2020TechnologyRoadmap.pdf>

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So what is Victoria doing?

- ✓ *National EV Standards*
- ✓ *Victorian EV Trial*
- ✓ *EV registration discount*
- ✓ *Local EV industry development*



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What the auto industry is saying

*The Chevy Volt is truly coming to life, but **preparing the market for electric vehicles also requires capable partners from outside the auto industry.** Momentum is building as governments, technology companies, communities and universities are increasingly working together to prepare the market for electric vehicles.*

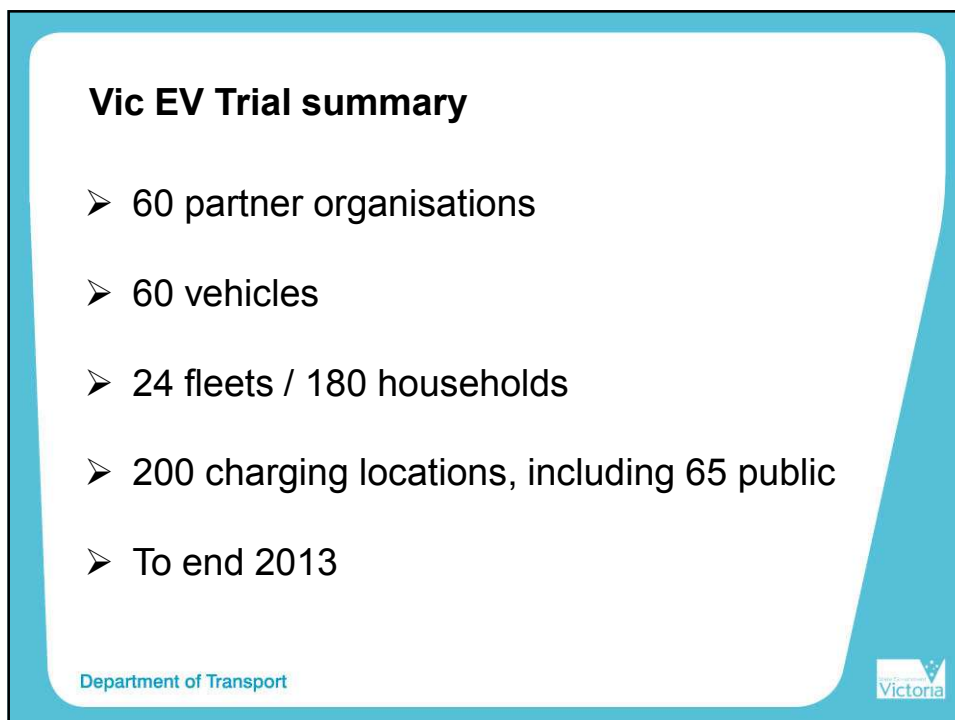
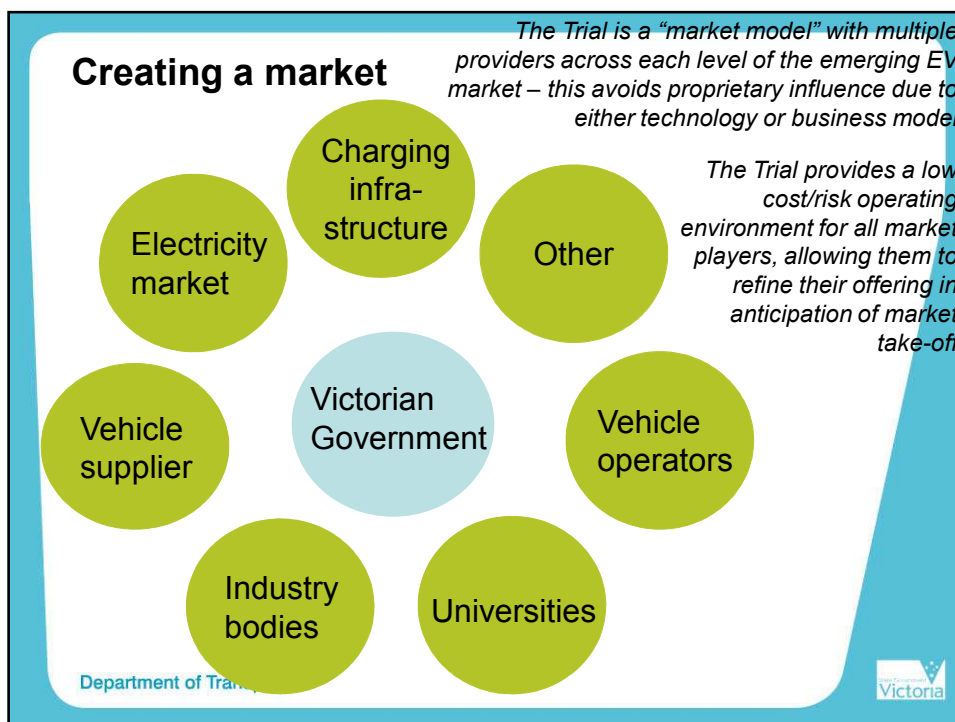
Ed Peper, GM North America vice president, Chevrolet, Feb 2009

The role of EV trials projects in this context is described in "Changing the Game", Accenture, Jan 2011,

http://www.accenture.com/SiteCollectionDocuments/PDF/Accenture_Uilities

Department of Transport [Study_Changing_the_game.pdf](#)







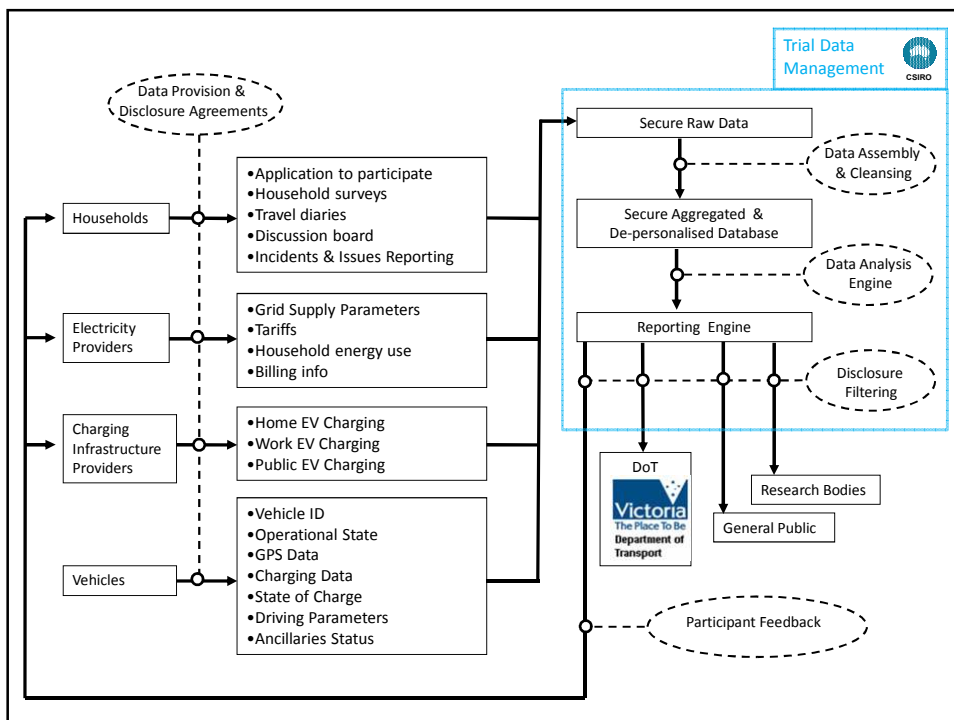
Household/fleet vehicle roll-out

- What do people think of EVs?
- How far do people drive between charging?
- When do people charge?

Picture shows one of the Trial participants next to his new EV charge spot – subsequent to his experience he has stated his intention to buy an EV and has taken part in a series of news interviews independent from the Trial

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Victoria





Education and awareness program

AUSTRALIAN INTERNATIONAL

MOTOR SHOW

✓ **EV Technology Showcase**

Linking the local EV technology supplier base into the emerging EV market for the Victorian community

For more info refer to


<http://www.ausautoweek.com/TechnologyShowcase.aspx>

✓ **EV drive event**

EV test drive opportunity run as part of the Motor Show – around 250 participants now have first-hand experience of EVs

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The Victorian Electric Vehicle Trial

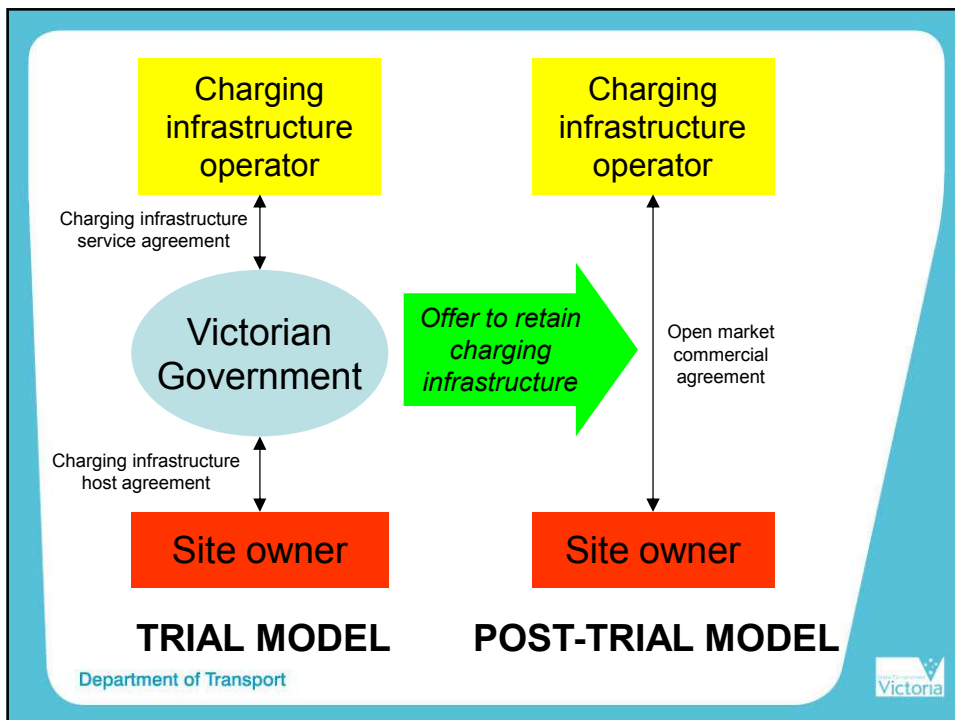
Forums
Members
Moderation and use guidelines
View new posts
Help section

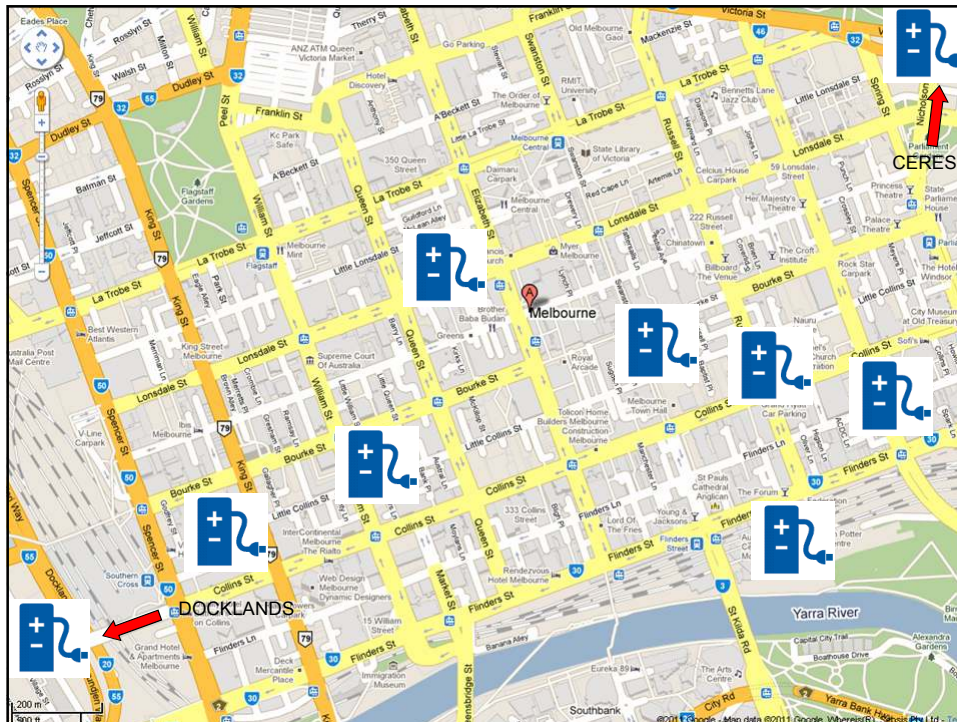
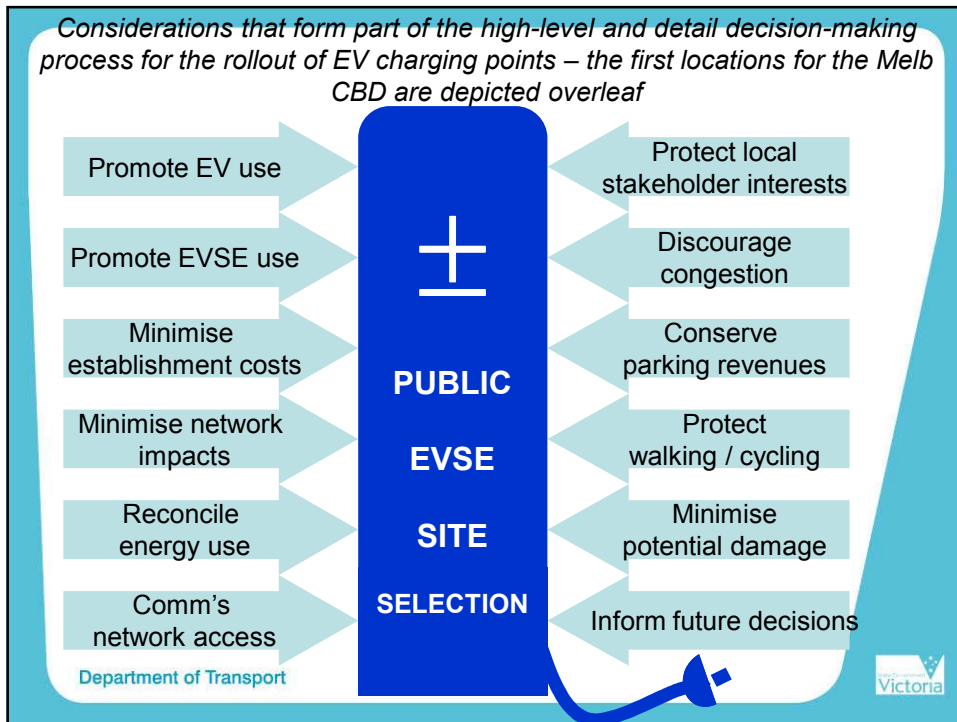
I drove Camberwell - Dandenong - Boronia - Ferntree Gully - Camberwell (91 km) in ... an i-MiEV. Was a little concerned that I might run out of power toward the end, but ... ended up with 7 km to spare according to the indicator.

That was actually a pretty big drive for a suburban commute, and I don't think I'd ever go further in a day in Melbourne.

Excerpt from the Trial discussion board – this anecdotal info forms part of the Trial data set and is an example of the “narrative” method that will be used to report the Trial

Refer to <http://evtrials.invisionzone.com/>





All infrastructure costs (establishment, transaction) are being benchmarked as an input to the economic model developed for the Trial and broader policy deliberations (e.g. into electricity law reform for metering)

Fleet infrastructure roll-out

Charging circuit average cost	\$2,326
...without trenching	\$1,885
... with trenching	\$5,415

There's money underground!!

Calculated over 16 installations

Circuit runs from distribution board to charging infrastructure / outlet

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- *What impact for Victoria?*
- *What role for government?*
- *What policies will work?*

AECOM

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6 May 2011

Forecast Uptake and Economic Evaluation of Electric Vehicles in Victoria

Final Report

Ref: <http://tiny.cc/by55c>



What do we know?

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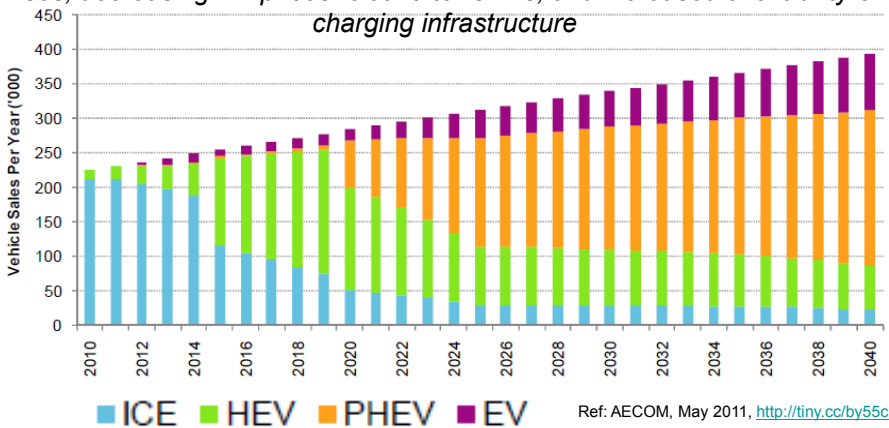


EVs are a good idea

Under all scenarios, EVs provide Victoria with a net economic benefit in the long-term

The chart below depicts one scenario of EV uptake in Vic

Breakeven point in terms of benefits moves forward with increasing oil price rises, decreasing EV prices relative to ICEVs, and increased availability of charging infrastructure

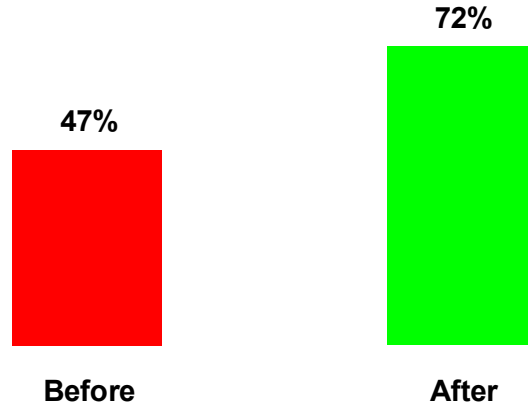


Year	ICE	HEV	PHEV	EV	Total
2010	180	30	0	10	220
2012	170	40	0	10	220
2014	150	60	0	10	220
2016	120	80	0	20	220
2018	90	100	0	30	220
2020	60	120	30	10	220
2022	40	130	60	10	240
2024	30	110	100	10	250
2026	20	90	130	10	250
2028	15	70	140	10	235
2030	10	50	140	10	210
2032	5	30	140	10	185
2034	2	15	140	10	167
2036	1	5	140	10	156
2038	0	2	140	10	142
2040	0	1	140	10	131

Ref: AECOM, May 2011, <http://tiny.cc/by55c>

People like EVs

Question posed to participants in a public EV test-drive:
Would you use an EV as your regular car?



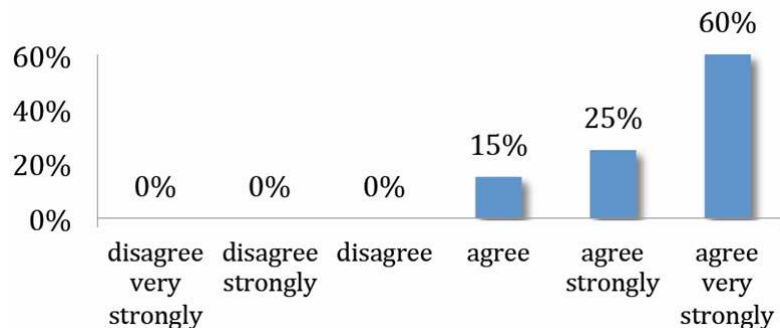
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Ref: CENEX, Oct 2010
<http://www.cenex.co.uk/projects/electric-vehicle-trials/smart-move>



Range anxiety is temporary

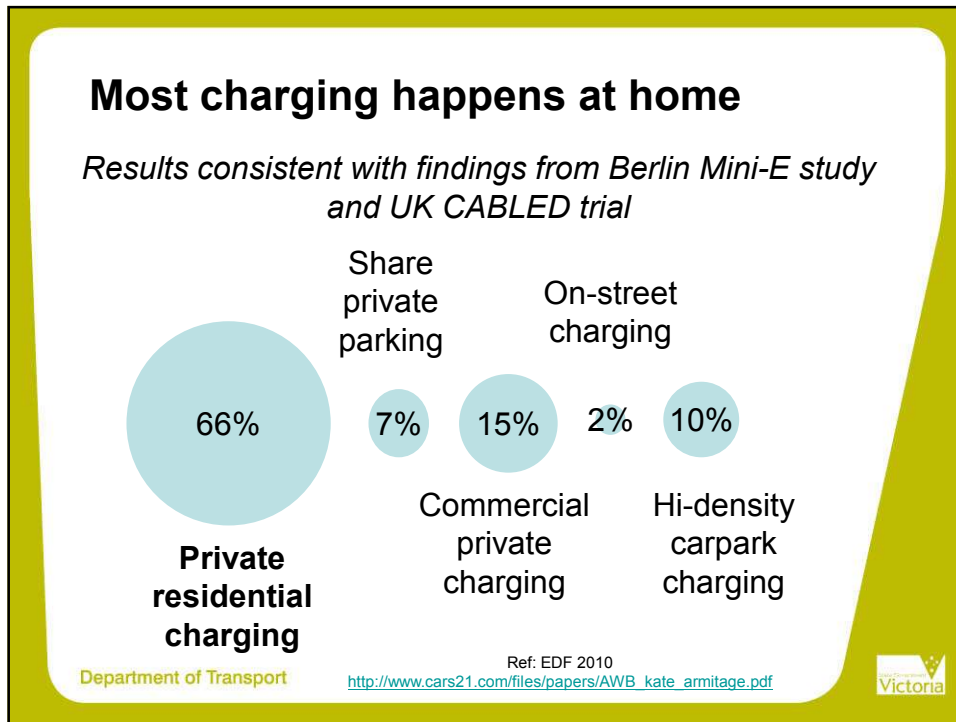
Question posed to participants in an extended EV evaluation program:
Agree or disagree: EVs are suitable for everyday use



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Ref: UC Davis Mini E Consumer study, May 2011
http://pubs.its.ucdavis.edu/publication_detail.php?id=1470





What can you do?

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Vehicles

Compelling reasons for fleet take-up of EVs with enabling measures

- ✓ Corporate branding
- ✓ CO₂ targets
- ✓ Fixed costs
- ✓ Whole-of-life costs



Conduct fleet analysis

Pursue procurement policies, consortia

Coordinate between fleet & facilities

Implement driver education / vehicle management

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Charging

Range of measures that should be considered

Provision for fleet, staff, public

Future-proof with dedicated 32A circuits

Design parking / charging policies

Partner with service provider



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