Electric vehicles

THE SILVER BULLET FOR EMISSIONS?

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UNIVERSITY OF AUCKLAND - 19 FEBRUARY 2018

About SBN
(Sustainable Business Network)

This afternoon…

1. Transport in NZ: the Big Picture

➢ How we travel...

Car – 86%

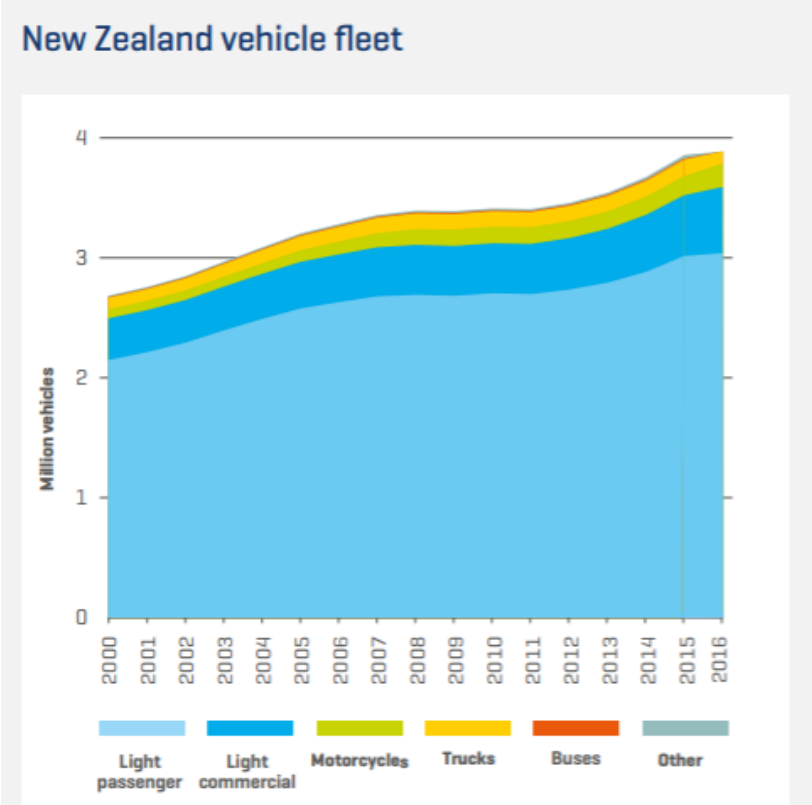
(as a passenger – 8%)

Cycle or walk – 7%

Public transport – 7%

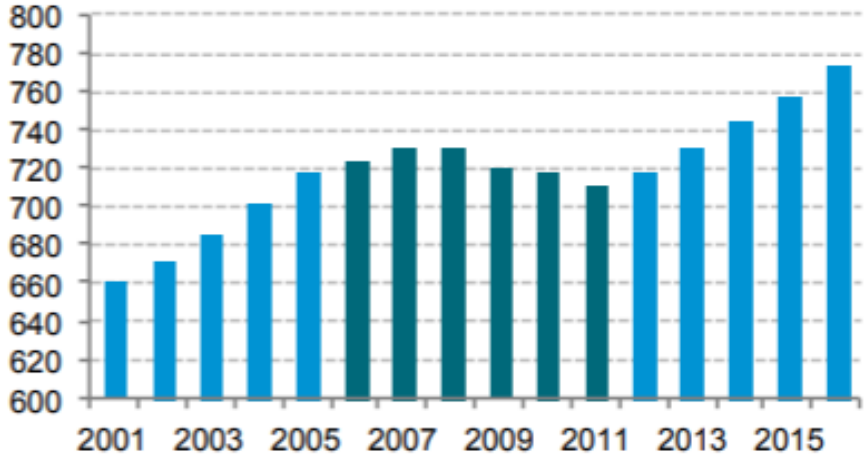
Over the last twenty years car use has grown, while the share of trips made by walking, cycling, and public transport has fallen.

➢ What we own…



Light vehicles per 1000 people

Vehicle ownership rates started increasing in the second half of 2012 after dropping from 2007 to 2011, and have kept on increasing. They are now at their highest ever level.



Car ownership highest in OECD… and rising…

➢ The impacts…

40 mins to 53 mins

(average Auckland commute 2015-2016)

$ 1.3 billion p.a.

(estimated cost of congestion in Auckland)

$ 5 billion p.a.

(cost of imported oil in 2016 – NZ)

~400 premature deaths

(estimated effects of pollution from vehicles – 2002)

➢ … and emissions…

18%

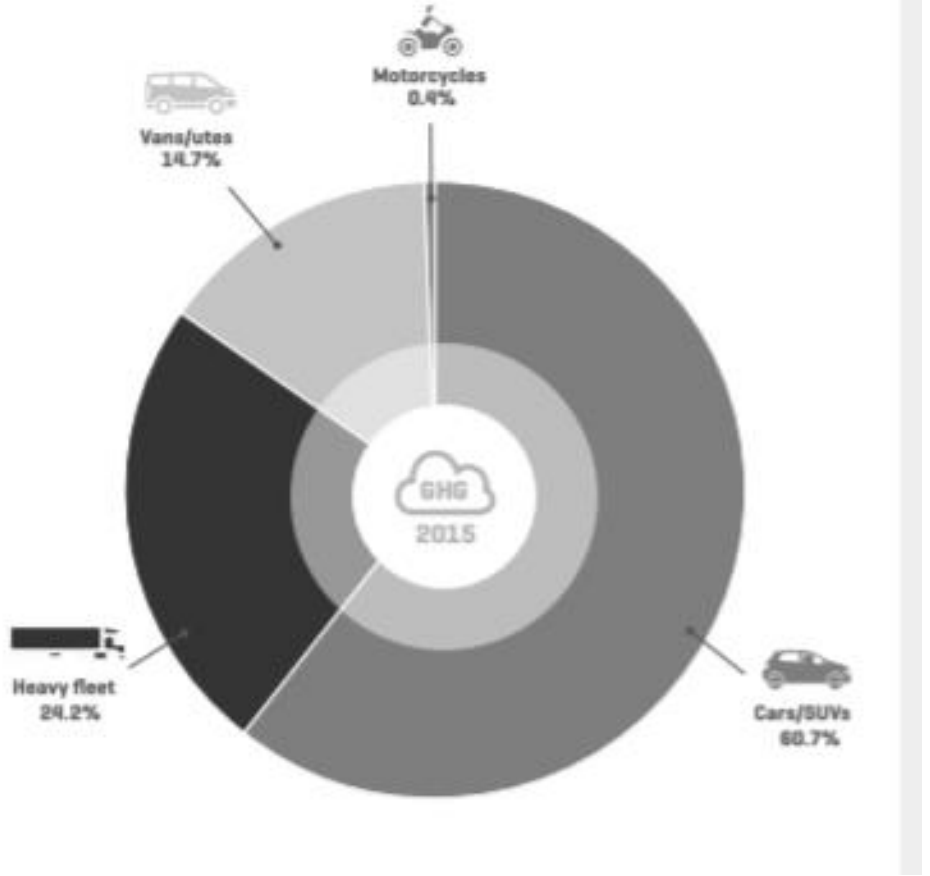
of New Zealand's domestic greenhouse gas emissions are from transport

90%

of New Zealand's domestic transport emissions come from road transport

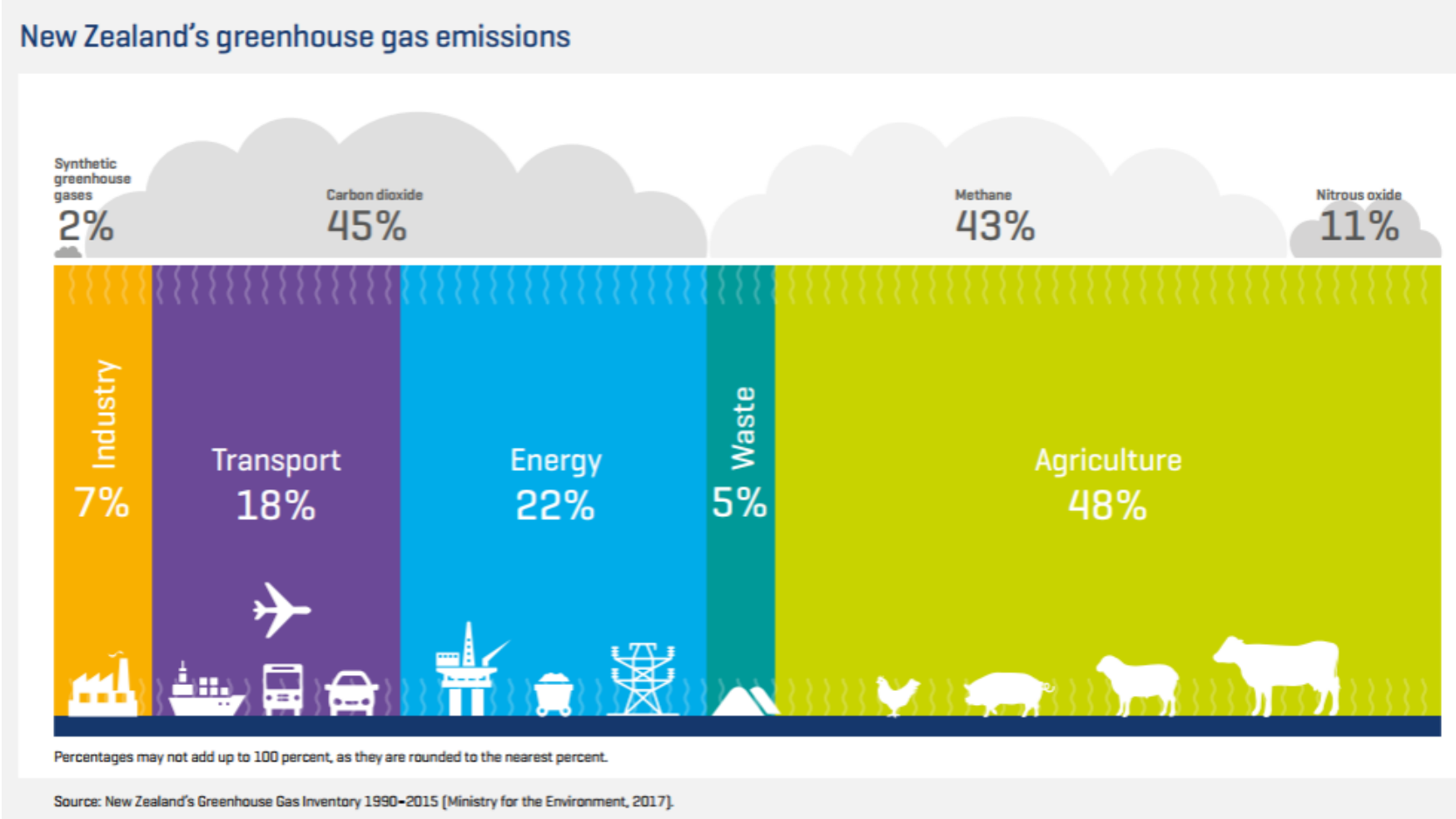
68%

increase in New Zealand's domestic transport emissions since 1990



Major growth area - from all road vehicle types

2. EVs and the Zero Emission Challenge



Transport sector is the prime opportunity

WHERE WE NEED TO GET TO…

CARBON FROM ENERGY FOR ROAD TRANSPORT

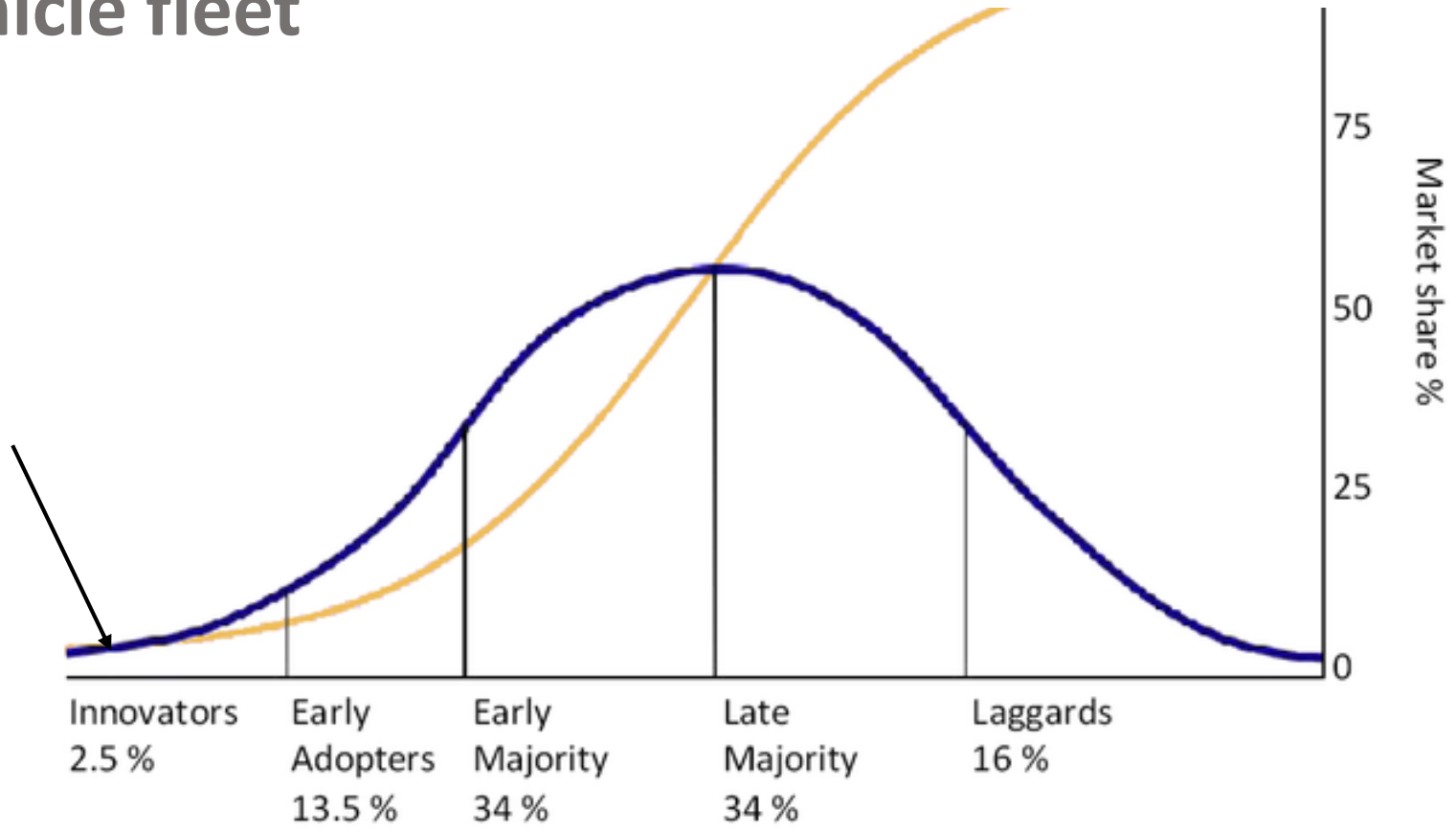
100% to 0%

(2018-2050)

➢ Technology adoption curve

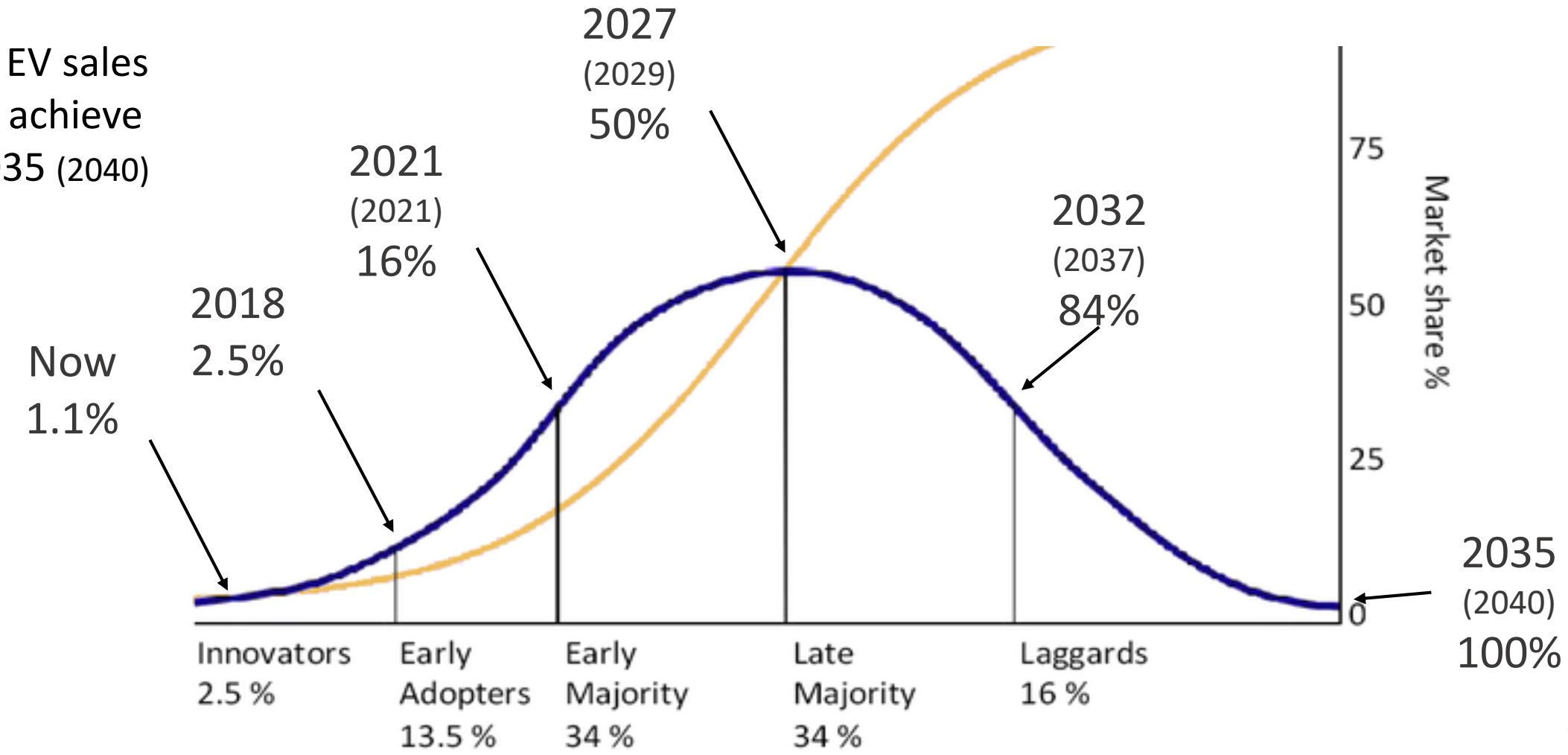
Focus on light vehicle fleet

Now
6,600
(0.2%)



➢ An adoption pathway to 100%...

Percentage EV sales per year to achieve 100% by 2035 (2040)



Are EVs and NZers up to the challenge?

3. The arguments for and against

Zero emissions by 2050:

The case for...

➢ The NZ Pioneers…

EV talk 06/09/2017

A hundred EVs for Canterbury car share Yoogo

charge.net.nz

Electric Vehicle Charging Network

EECA

NZ TRANSPORT AGENCY
WAKA KOTAHI


100% FREE
100% ELECTRIC
GREEN CABS

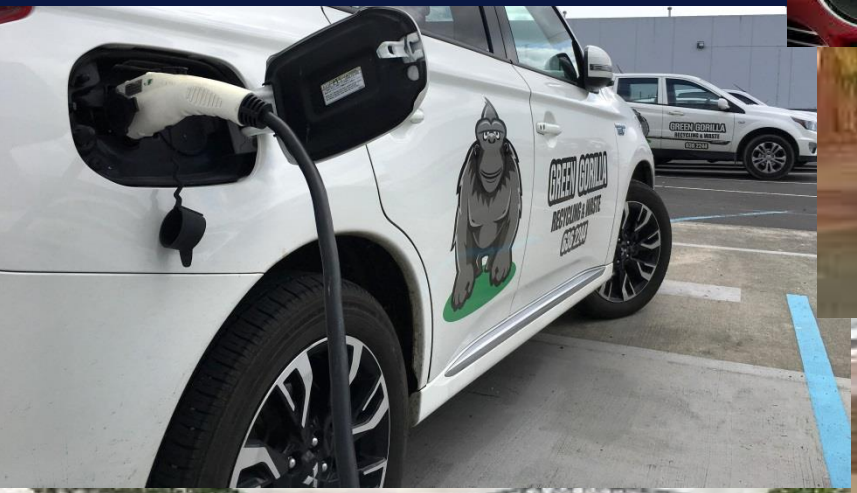

Blue
CARS
Clean cars for blue skies!


AUTOLINK EV
THE #1 EV EXPERTS FOR OVER 4YRS
ZERO EMISSIONS


NZ
LOLGAS


#LeadingTheCharge


meridian
Powering today
Protecting tomorrow

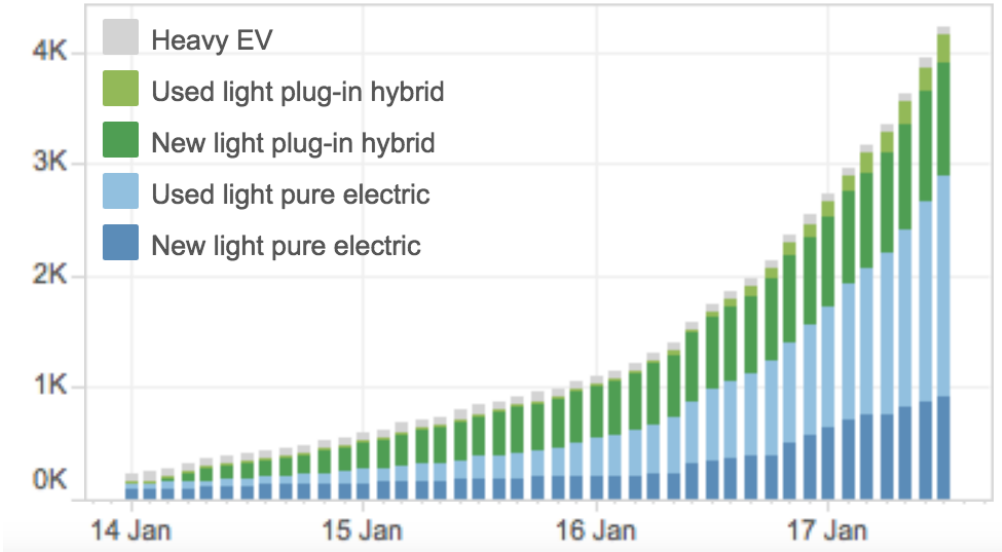

GREEN GORILLA


NISSAN
NO2GAS
ecotricity.co.nz


MEVO


cityhop

➢ … and the individuals buying Nissan LEAFs

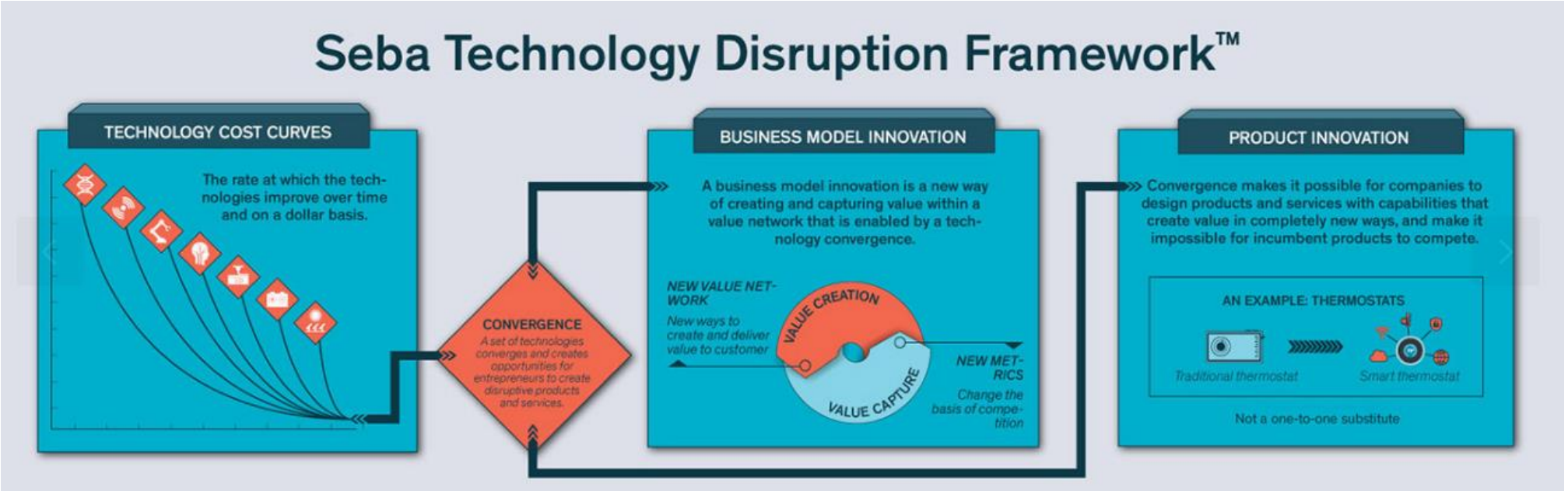


~ 50% of all EVs registered to date

➢ The Visionaries…

Tony Seba: by 2030…

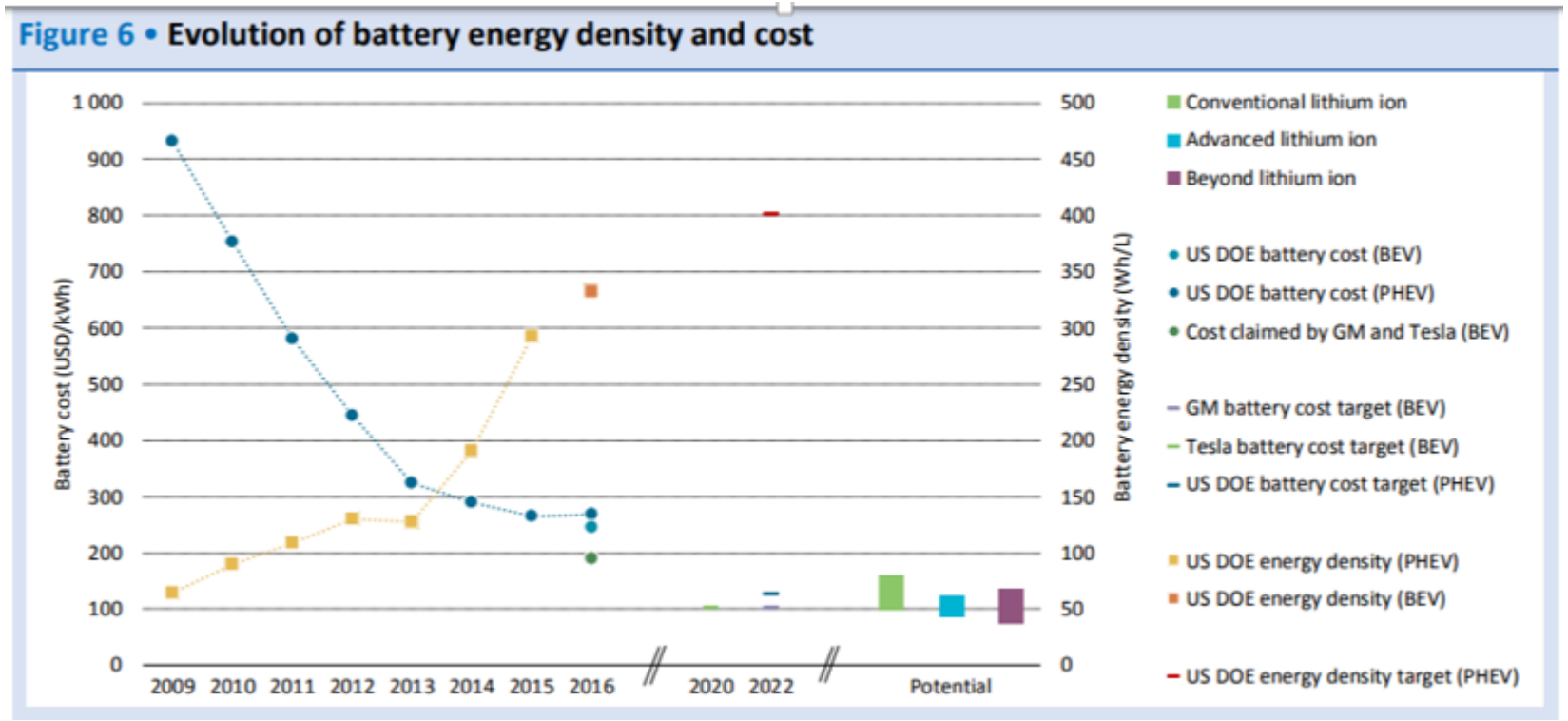
- All new vehicles electric and autonomous
- Car ownership obsolete
- All new energy solar or wind



New, cost competitive technology + Business model innovation

= "Impossible for incumbent products to compete"

➢ Battery costs coming down…

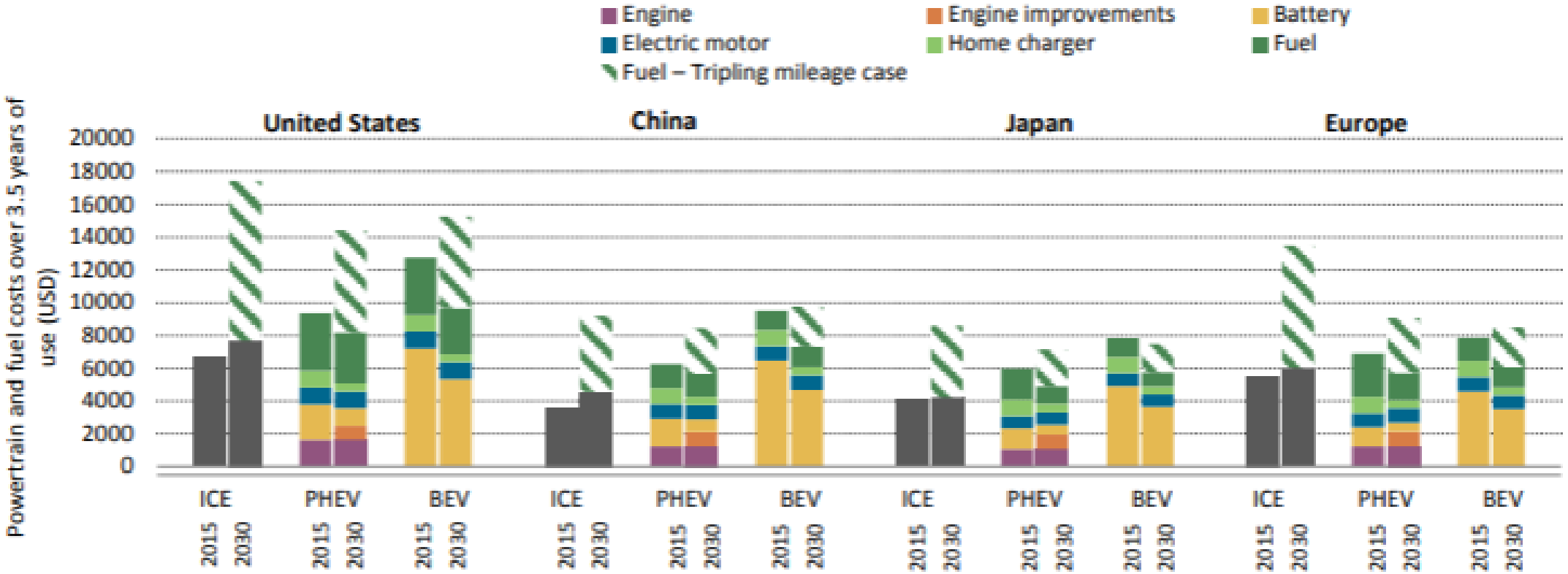


Now: $180-$275/kWh

2025-2030 Projection: $100/kWh = ICE-equivalent (TCO basis)

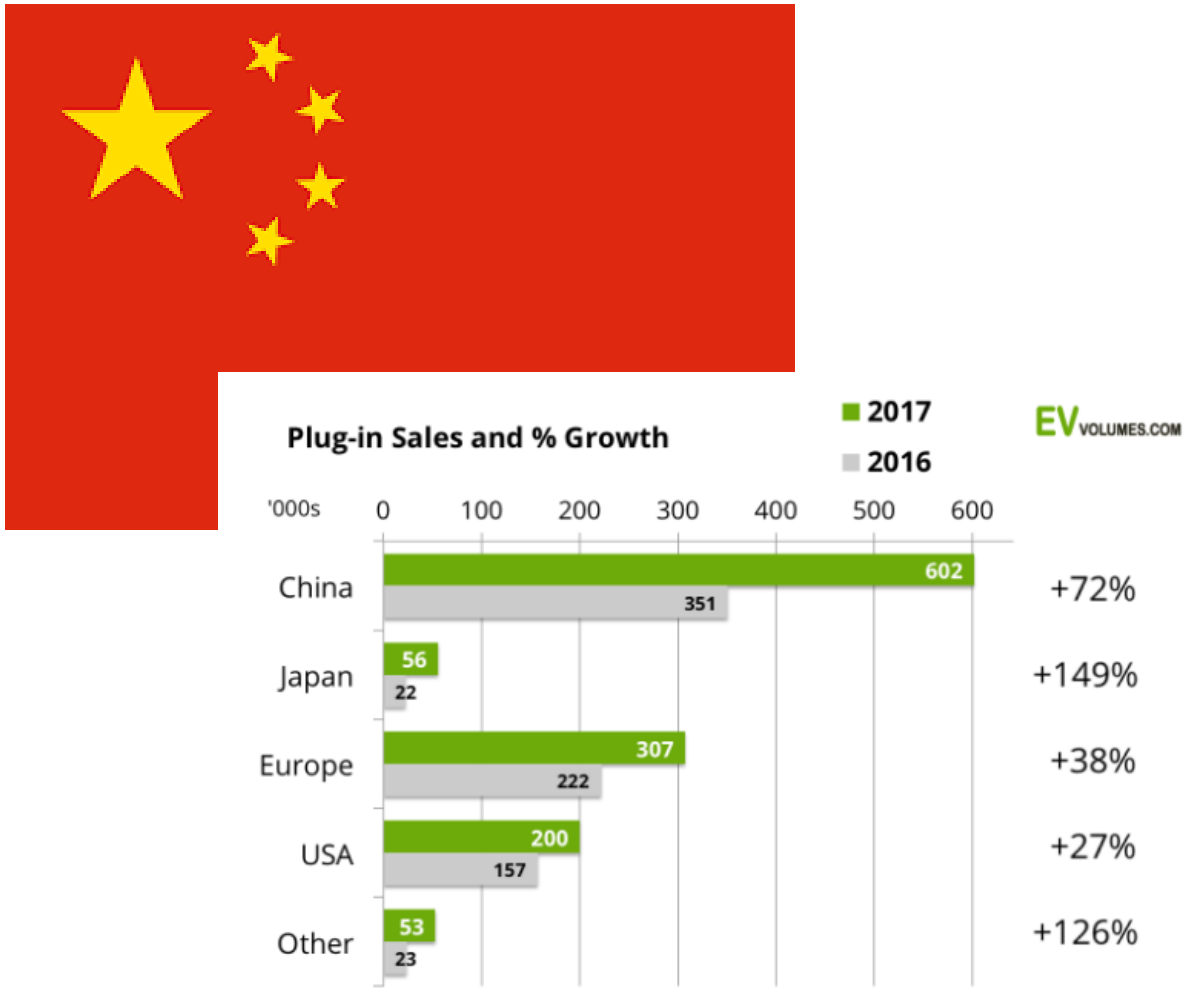
https://www.iea.org/publications/freepublications/publication/global-ev-outlook-2017.html

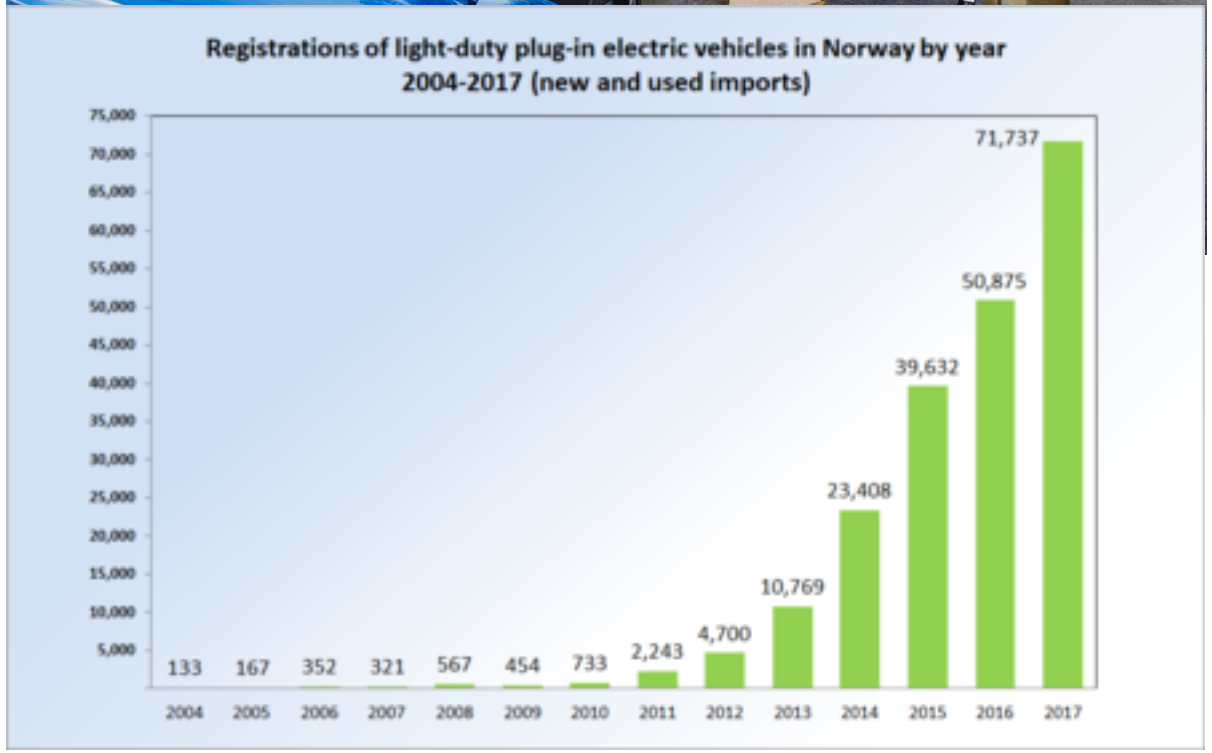
Figure 7 • Comparative cost of PLDV technologies by country/region in the 2DS, 2015 and 2030



https://www.iea.org/publications/freepublications/publication/global-ev-outlook-2017.html

➢ State superstars leading the way…





Norway leads way on electric cars: 'it's part of a green taxation shift'

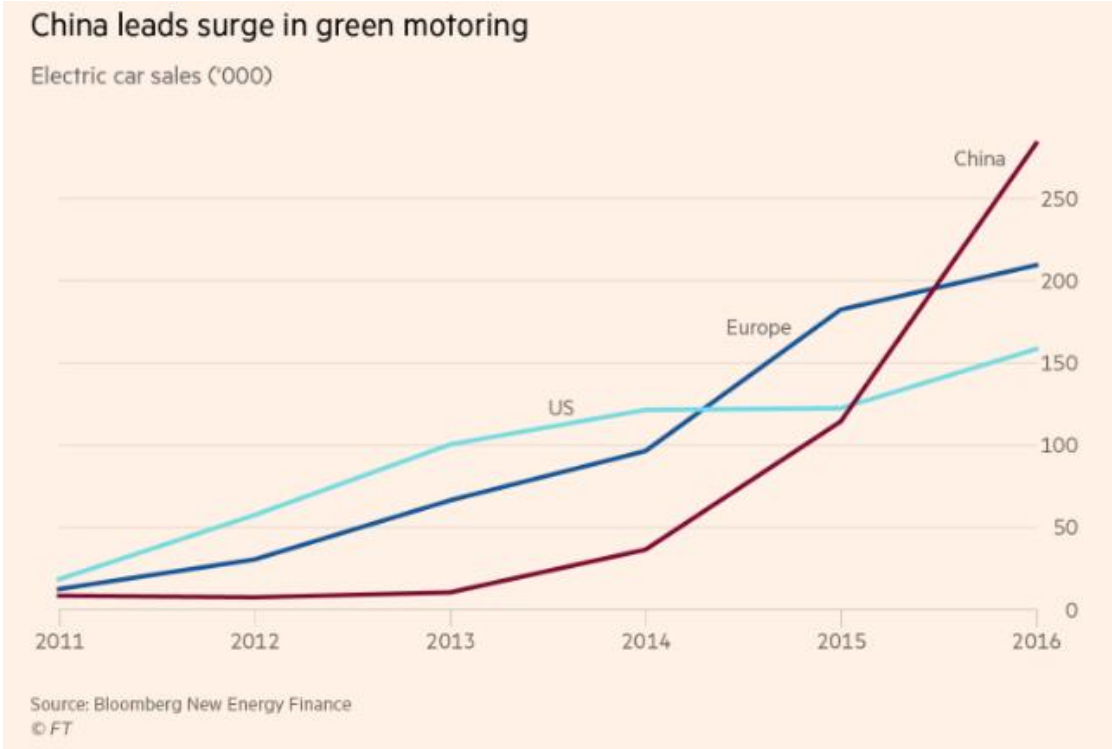
Nearly a third of all new cars sold in the country this year will be plug-in models and experts expect that share to skyrocket

The zero emissions incentives include:

› No purchase/import taxes (1990)
› Exemption from 25% VAT on purchase (2001)
› Low annual road tax (1996)
› No charges on toll roads or ferries (1997 and 2009)
› Free municipal parking (1999)
› Access to bus lanes (2005)
› 50 % reduced company car tax (2000)
› Exemption from 25% VAT on leasing (2015)

Electric cars: China's highly charged power play

Beijing bets on battery vehicles in state-backed push to become a high-tech industrial power



BYD

For a second year running, BYD was the **world's top selling plug-in electric car manufacturer** with over 100,000 units delivered in 2016.

➢ Our natural advantage…

2016 - 85% renewable production (35-year high)

➢ And… the promise of autonomy…

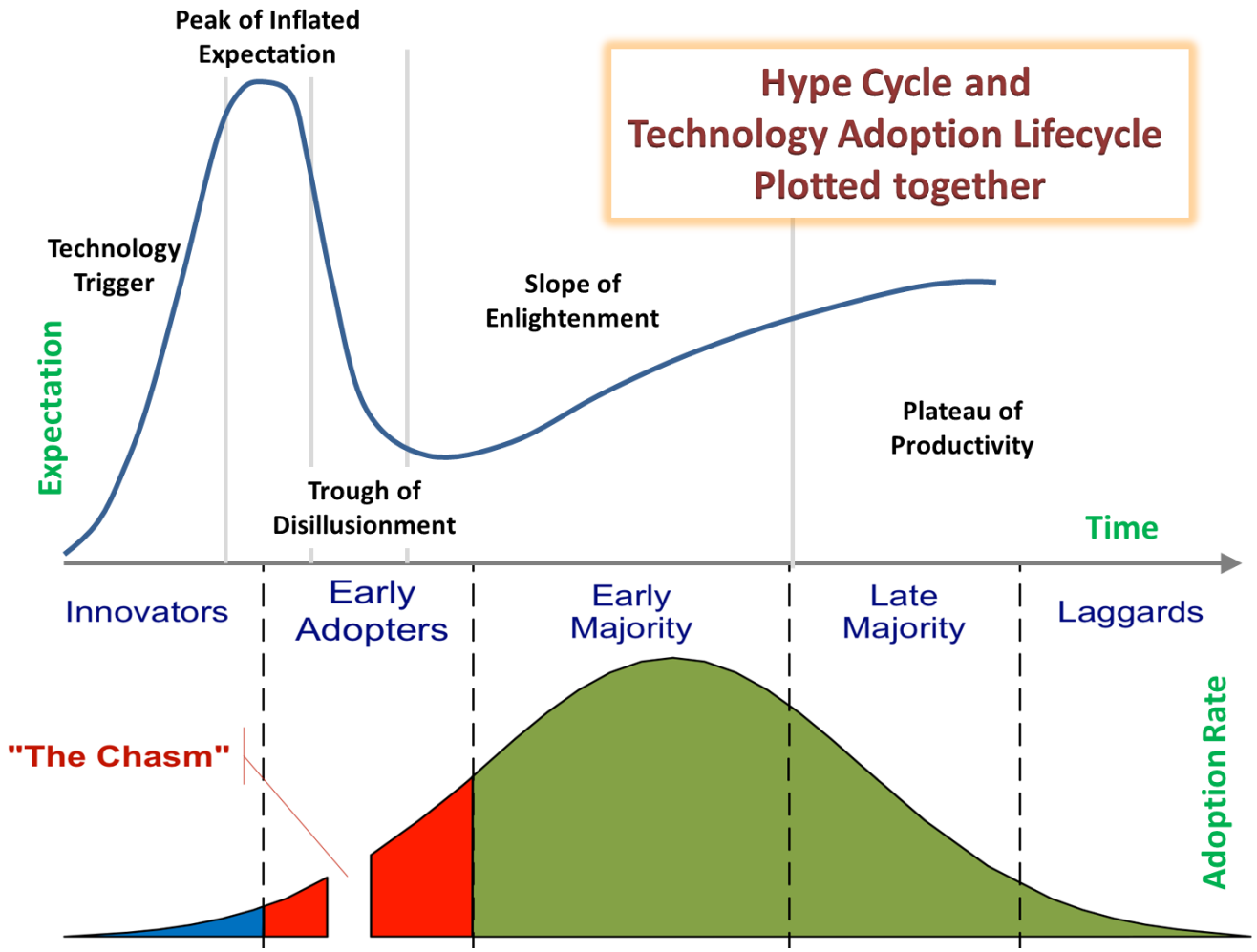
"… (autonomous vehicles) will mean for the *first time in history*, mobility freedom will be available *for everyone, everywhere*."

https://home.kpmg.com/nz/en/home/insights/2018/02/2018-autonomous-vehicles-readiness-index.html

Zero emissions by 2050:

The case **against**...

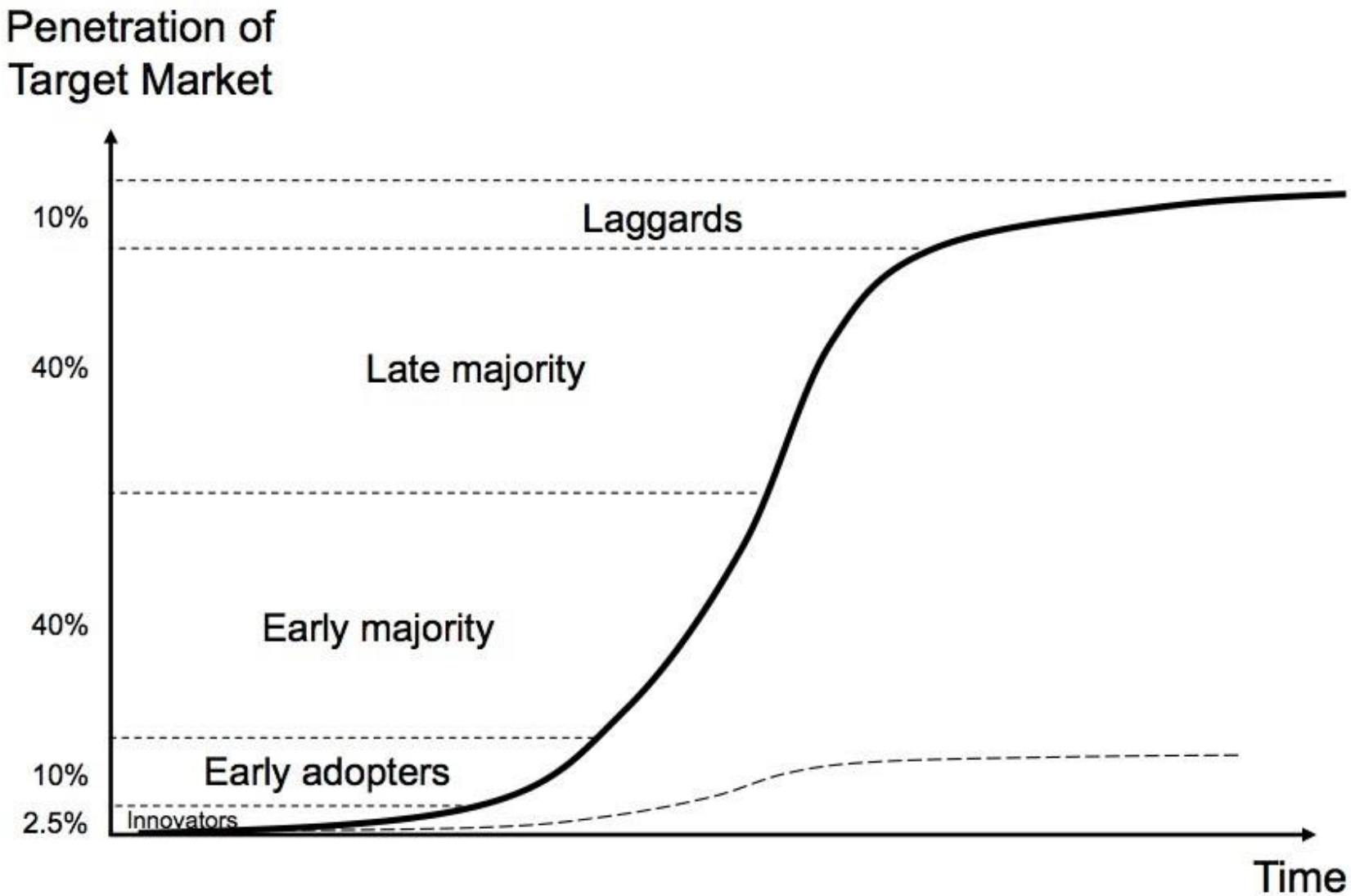
➢ Another curve…



Early Majority

- *"Want a **hassle-free solution** that performs as promised."*
- *"Are **not willing to tolerate** anxiety or doubt."*
- *"Are **willing** to purchase only **when all elements of the requisite infrastructure** are in place."*

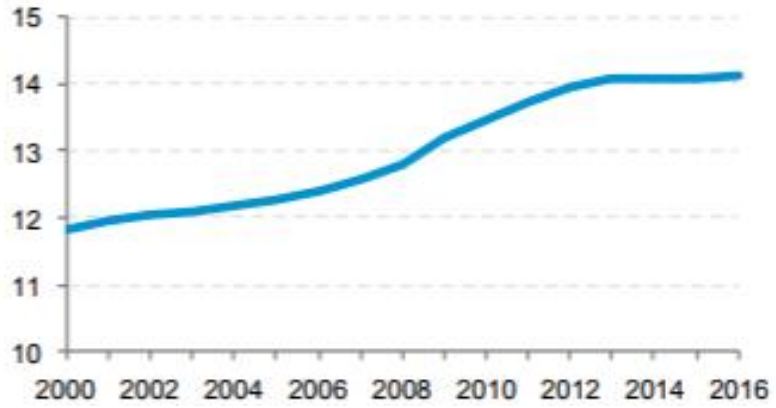
https://www.nap.edu/catalog/21725/overcoming-barriers-to-deployment-of-plug-in-electric-vehicles


Penetration of
Target Market
10%
40%
40%
10%
2.5%
Laggards
Late majority
Early majority
Early adopters
Innovators
Time

➢ Another year older…

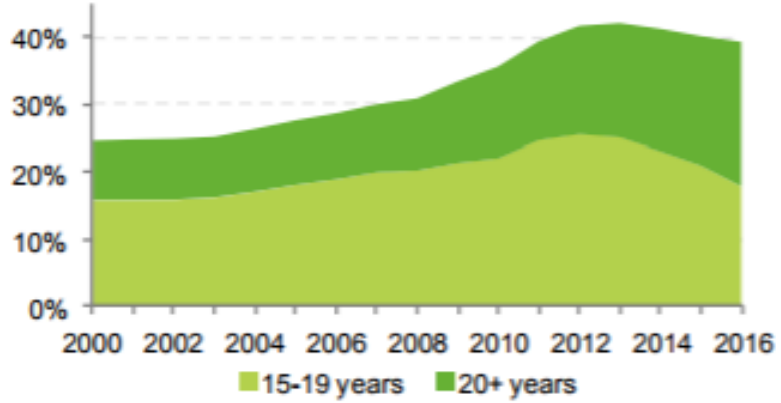
Light fleet average age

Vehicle registrations dropped after 2005, and as a result the average age of the light vehicle fleet started to increase. The increase in age has been arrested by the high levels of registrations, but hasn't dropped due to the low levels of scrappage.



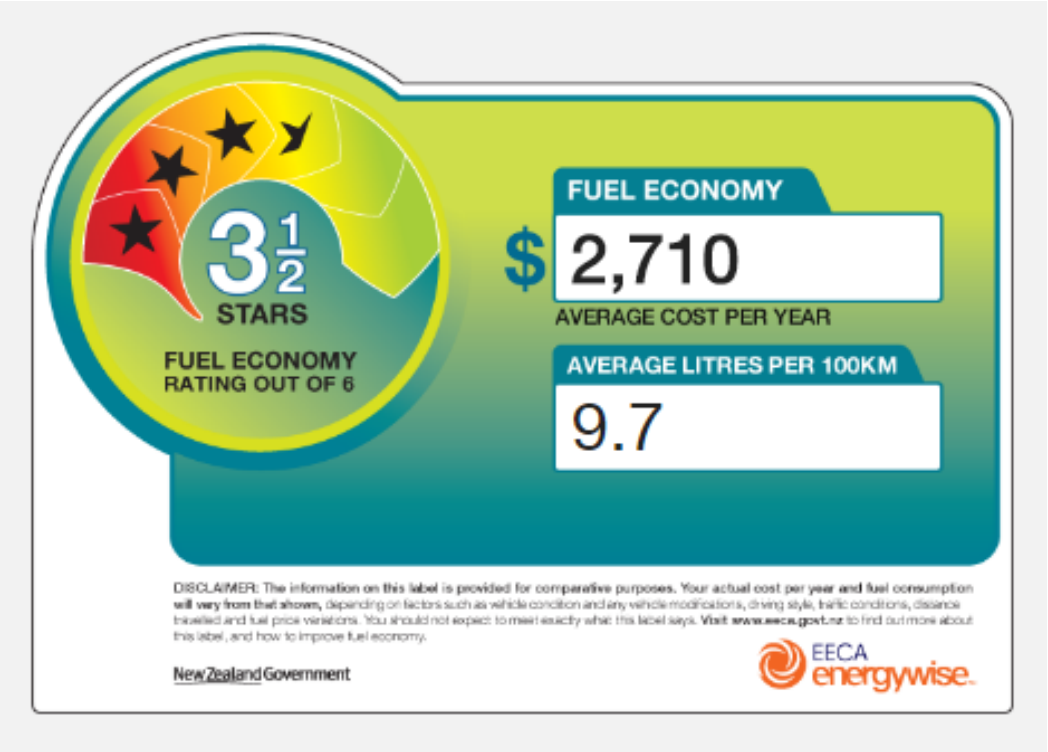
Light fleet age structure

The large number of recent vehicle registrations have reduced the proportion of the fleet that is aged 15 years or older. However, the absolute number of these vehicles remains high and many are approaching the end of their life.



Our vehicle fleet is old – 40% are over 15 years old

➢ Our unnatural dis-advantage…

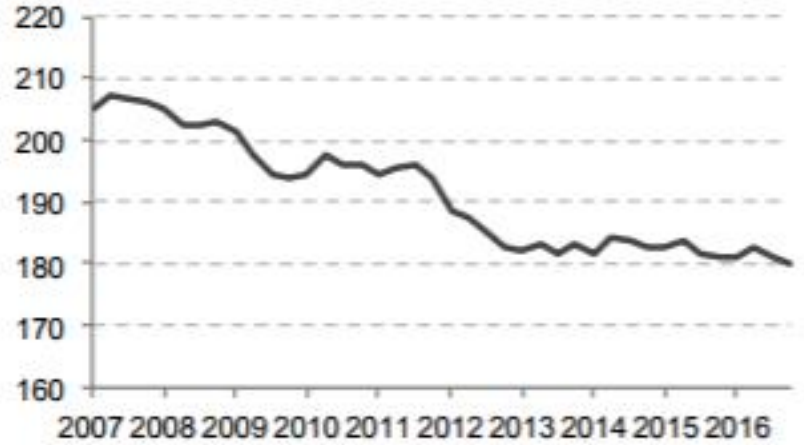


Information labels - the only measure to encourage purchase of more fuel efficient vehicles

Most OECD countries have regulation &/or financial incentives for efficient models

CO_2 emissions of light vehicles registered

The CO_2 emissions (grams per km driven) of light vehicles entering the fleet dropped in 2011 and 2012 but have remained steady since then.



http://www.transport.govt.nz/research/newzealandvehiclefleetstatistics/#annual

…contributing to flat-lining CO_2 emissions - 180 g/km

…compared to 120 g/km (EU) and 143 g/km (Japan)

http://www.oecd.org/environment/environmental-pressures-rising-in-new-zealand.htm

➢ Feeling the (business case) blues…

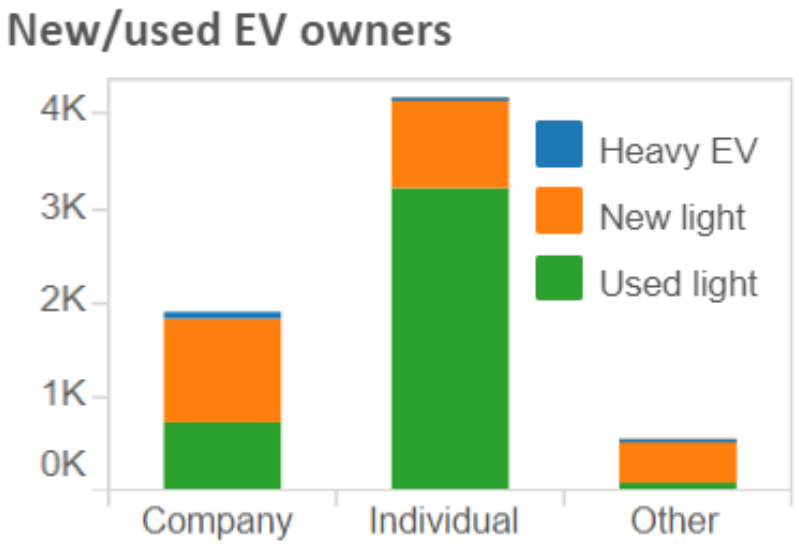
BUSINESS

NZ major corporates commit to electric vehicle fleet expansion

14 Oct, 2016 1:29pm

3 minutes to read

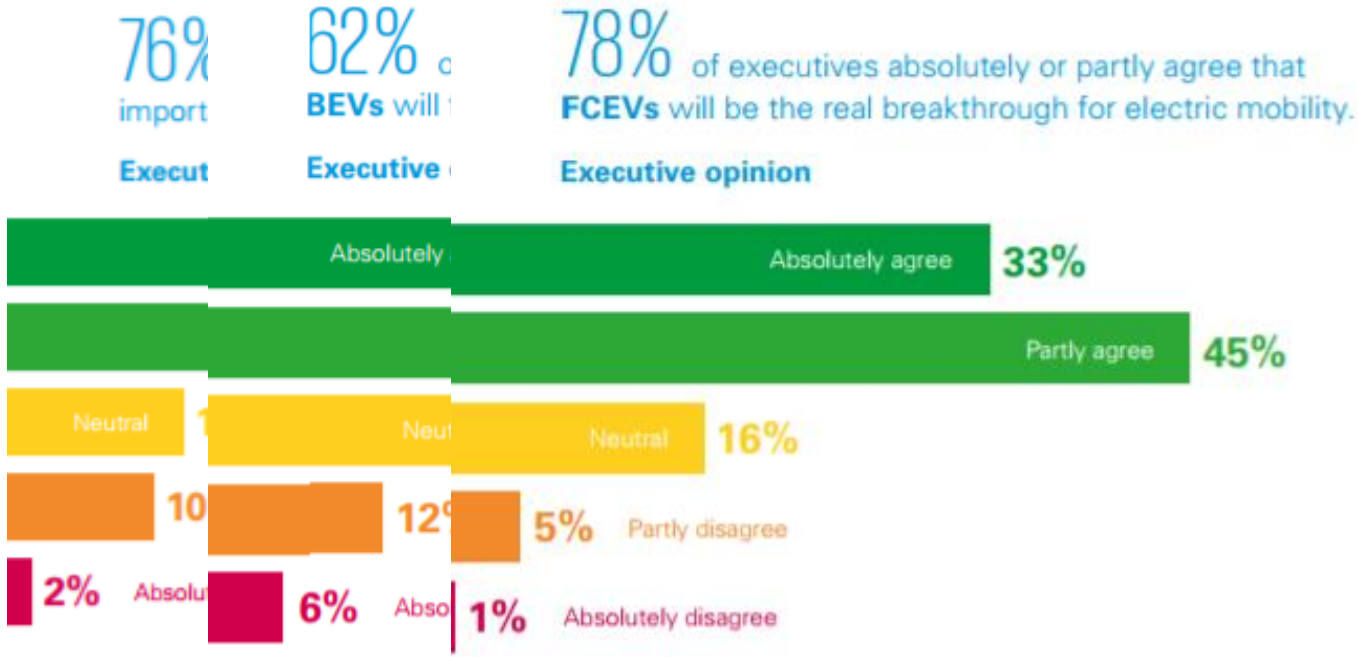
~70% of new vehicles are bought by organisations



Major challenges…

A/C charging equipment	Installation
Site capacity / load management	Network capacity

➢ The auto-industry – keeping BEVs on ice?



Battery electric vehicles (BEVs) will fail due to infrastructure challenges while fuel cell electric vehicles (FCEVs) are seen as the real breakthrough for electric mobility.

https://home.kpmg.com/xx/en/home/insights/2017/01/global-automotive-executive-survey-2017.html

➢ There's (more) money to be made…

Carbon Tracker Initiative

*"Between **60-80% of coal, oil and gas reserves** of publicly listed companies are **'unburnable'** if the world is to have a chance of not exceeding global warming of 2°C."*

Value $6 trillion (as at 2013)

https://www.carbontracker.org/reports/unburnable-carbon-wasted-capital-and-stranded-assets/

4. The verdict… zero by 2050?

Summary of arguments…

1. NZ pioneers
2. Visionaries
3. Global leaders
4. Battery costs reducing
5. Renewables grid
6. Promise of AVs

1. Crossing the chasm
2. Age of fleet
3. Lack of incentives
4. Company uptake
5. Commitment by auto-industry
6. Oil reserves

Conclusion: 1. Need to tick all the boxes…

➢ Policy & Incentives	➢ Technology
➢ Infrastructure	➢ Consumer demand

Conclusion: 2. To create the momentum…

EV market share of 16+ % by 2021 (latest 2025)

1. **Affordable vehicles – financial incentives**
2. **Consumer demand – targeted marketing**
3. **Product availability – committed auto-industry**
4. **Visible charging network – good progress**

Conclusion: 3. To achieve mass uptake…

Moving to 50% market share by 2025-2030

1. **Continuing fall in battery costs (cost equivalence well before 2030)**
2. **Comprehensive product availability (e.g. SUVs)**
3. **Global acceptance of the end of the fossil fuel era**

And…continuing shift to a carbon zero electricity supply

➢ Final word…

Success isn't only electrifying our fleet… it's offering an integrated mix of healthy, efficient, zero-carbon transport options


You want to have a future where you're
EXPECTING
things to be
BETTER
not one where you're expecting things to be
WORSE
Elon Musk Quotes via Gecko&Fly

sustainable
BUSINESS NETWORK
Reshaping Profit

Any questions?

Thank you!

Phil Jones
Sustainable Business Network
phil@sustainable.org.nz

➢ More information...

Electric Vehicles in New Zealand

Information on two types of electric vehicle - battery electric and plug-in hybrid.

Benefits and considerations of electric vehicles

Advantages and challenges of electric vehicles.

Vehicle total cost of ownership tool

Choosing the right vehicle for your fleet comes down to more than just purchase price.

Electric vehicle battery life

You can get the best out of EV batteries and extend their life by looking after them.

Charging your electric vehicle

Ways to charge an electric vehicle and charging facilities in New Zealand.

Regulations for electric vehicles

Regulations and exemptions for electric vehicles in New Zealand.

Transport funding and support

Information on the Government's Electric Vehicles programme.

Electric Vehicles website

The electric vehicles website also has links to lots of useful information about EV's.

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PUTTING ENERGY TO WORK

EV Electric Vehicles Drive the Future

https://www.eecabusiness.govt.nz/technologies/electric-vehicles/