Electric vehicles in New Zealand: today and tomorrow

Elizabeth Yeaman, Energy Efficiency and Conservation Authority
New Zealand Wind Energy Association AGM, November 2017
What counts as an EV?

- Uses an external source of electricity for some or all of its motive power
- You can plug it in
- Battery Electric Vehicle (BEV) – 100% electric
- Plug in Hybrid Electric Vehicle (PHEV) – electric and petrol/diesel
This includes heavy EVs
EVs: energy efficient and switch to low carbon energy
New Zealand’s EV advantage

Equivalent to paying $0.30 per litre

90% of travel by car in NZ is less than 90 km

80% fewer CO₂ emissions than a petrol vehicle when used in NZ
The Government’s EV Programme

Ministry of Transport
- Oversight of programme
- Lead for transport legislative work
  - RUC exemptions
  - Special vehicle lanes
- Electric Vehicles Programme Leadership Group

NZ Transport Agency
- Supporting the development of public charging infrastructure
- Enabling electric vehicles access to special vehicle lanes
- Updating the motor vehicle register

Energy Efficiency & Conservation Authority
- Nationwide information and promotion campaign
- Contestable fund to encourage and support innovative low emissions vehicle projects

Ministry of Business Innovation & Employment
- Public-private procurement of electric vehicles
- Energy Innovation Bill

Inland Revenue Department
- Review of tax depreciation rates for light electric vehicles
- Review of fringe benefit for light electric vehicles

WorkSafe NZ
- Providing guidance on electrical safety
New Zealand’s EV target

Barriers reducing: battery and vehicle price reductions, EV supply increases, technology improvements, increased awareness and information.
4,000 EV target for 2017 reached 5 months early

Aucklanders buying 2nd hand import Nissan Leafs as private vehicles 2013 onwards (Gen2) Nissan Leafs come ready for Vehicle to Grid

EV information campaign www.electricvehicles.govt.nz
# Increasing favourability, & confidence in EVs

## Familiarity with EVs

<table>
<thead>
<tr>
<th>Familiar</th>
<th>Know just a little</th>
<th>Unfamiliar</th>
</tr>
</thead>
<tbody>
<tr>
<td>11%</td>
<td>51%</td>
<td>38%</td>
</tr>
</tbody>
</table>

Mean: 2.6

### NETT familiar

<table>
<thead>
<tr>
<th></th>
<th>Jul-Sep ’16 (n=750)</th>
<th>Oct-Dec ’16 (n=757)</th>
<th>Jan-Mar ’17 (n=749)</th>
<th>Apr-Jun ’17 (n=754)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Familiar</td>
<td>41%</td>
<td>47%</td>
<td>49%</td>
<td>54%</td>
</tr>
<tr>
<td>Neutral</td>
<td>33%</td>
<td>10%</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Unfamiliar</td>
<td>10%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DK</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mean: 3.7

## Favourability to EVs

### NETT favourable

<table>
<thead>
<tr>
<th></th>
<th>Jul-Sep ’16 (n=750)</th>
<th>Oct-Dec ’16 (n=757)</th>
<th>Jan-Mar ’17 (n=749)</th>
<th>Apr-Jun ’17 (n=754)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favourable</td>
<td>39%</td>
<td>42%</td>
<td>43%</td>
<td>47%</td>
</tr>
<tr>
<td>Neutral</td>
<td>21%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unfavourable</td>
<td>23%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DK</td>
<td>9%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mean: 3.3

## Confidence to meet needs

### NETT confident

<table>
<thead>
<tr>
<th></th>
<th>Jul-Sep ’16 (n=750)</th>
<th>Oct-Dec ’16 (n=757)</th>
<th>Jan-Mar ’17 (n=749)</th>
<th>Apr-Jun ’17 (n=754)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Confident</td>
<td>39%</td>
<td>42%</td>
<td>43%</td>
<td>47%</td>
</tr>
<tr>
<td>Neither</td>
<td>21%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not confident</td>
<td>23%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DK</td>
<td>9%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mean: 3.3

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**Note:** Total samples: Jul-Sep ’16 (n=750), Oct-Dec ’16 (n=757), Jan-Mar ’17 (n=749), Apr-Jun ’17 (n=754)
Kiwi’s views about EVs

<table>
<thead>
<tr>
<th>Why would consider EVs (n=514)</th>
<th>Oct-Dec ’16 (n=521)</th>
</tr>
</thead>
<tbody>
<tr>
<td>They’re environmentally friendly</td>
<td>67% 61%</td>
</tr>
<tr>
<td>They save fuel resources</td>
<td>60% 58%</td>
</tr>
<tr>
<td>They’re cheaper to run</td>
<td>54% 47%</td>
</tr>
<tr>
<td>They use renewable energy</td>
<td>50% 49%</td>
</tr>
<tr>
<td>Cheaper maintenance costs</td>
<td>41% 40%</td>
</tr>
<tr>
<td>They are quieter</td>
<td>36% 38%</td>
</tr>
<tr>
<td>Maintenance costs are lower</td>
<td>32% 35%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Why would not consider EVs (n=357)</th>
<th>Oct-Dec ’16 (n=339)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NETT Recharging concerns</td>
<td>61% 59%</td>
</tr>
<tr>
<td>Initial cost is too high</td>
<td>60% 57%</td>
</tr>
<tr>
<td>NETT Awareness / info barriers</td>
<td>52% 54%</td>
</tr>
<tr>
<td>Lack of recharging stations</td>
<td>48% 50%</td>
</tr>
<tr>
<td>Unsuitable for long-distance travel</td>
<td>44% 46%</td>
</tr>
<tr>
<td>Lack of information</td>
<td>39% 40%</td>
</tr>
<tr>
<td>Limited range of vehicles</td>
<td>38% 38%</td>
</tr>
</tbody>
</table>

Note: Top-7 reasons for considering and not considering shown in charts.
Plug in at home or out and about

It’s easiest and cheapest to charge at home overnight – 92% of EV owners in NZ prefer to charge at home*

Sometimes you may want to top up when you are out, or on a longer trip. There’s an ever increasing number of public charging stations around the country – to find one download an app

EV fast charging infrastructure rapidly expanding
Low Emission Vehicles Contestable Fund

Funding of up to $6 million per year to co-fund innovative projects
Rounds 1 and 2 were significantly oversubscribed
Round 3 closed September 2017 – announcements prior to Xmas
Round 4 expected to open early 2018

Round 1 approved projects

**Demonstrations:**
- 100% electric delivery vans: Foodstuffs
- 100% electric taxis: Green Cabs
- 100% electric buses: Auckland Transport; Tranzit Group
- PHEV car share: Mevo; Z Energy

**Infrastructure:**
- EV truck conversion facilities: Waste Management
- Charging at park and ride: Auckland Transport
- Smart poles with EV charging: Auckland Transport
- Charging on tourist routes: Thames-Coromandel DC; Unison (Taupo-Napier)
- Other charging: The Warehouse (20 stores); Counties Power (Pukekohe); PowerNet (Southland)
Round 2 approved projects

**Demonstrations:**
- 100% electric medium trucks: Civic Ltd; PNCC
- 100% electric courier vans: NZ Post
- 100% electric shared fleet for businesses: Yoogo
- 100% electric rental cars: Europcar
- 100% electric shuttle buses: Snap Rentals
- **450 kW** opportunity charged buses: Tranzit
- EV battery refurbishment: Blue Cars

**Infrastructure:**
- On-street residential charging: Wellington City Council
- Eastland Pacific Coast Highway: Eastland Group
- Eastern Bay of Plenty: Horizon Networks
- Northland Crimson Coast Highway: Northland RC
- ChargeNet: Dunedin to Queenstown; Invercargill to Queenstown; Christchurch to Picton via Lewis Pass
Road User Charges

**Light vehicles:** Light EVs (eg cars and vans) are exempt from RUC until 2021

**Heavy vehicles:** From 1 September 2017 heavy EVs will be exempt from road user charges until they make up 2% of the heavy vehicle fleet.

Examples of what this is worth:

<table>
<thead>
<tr>
<th>Vehicle</th>
<th>Definition</th>
<th>RUC rate (GST incl)</th>
<th>Example annual distance</th>
<th>Example RUC exemption saving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban delivery truck</td>
<td>Under 6 tonnes, dual rear wheels</td>
<td>$66 / 1,000 km</td>
<td>30,000 km</td>
<td>$1,980 / year</td>
</tr>
<tr>
<td>Regional freight truck</td>
<td>12 – 18 tonnes, 3 axle</td>
<td>$292 / 1,000 km</td>
<td>75,000 km</td>
<td>$21,900 / year</td>
</tr>
</tbody>
</table>
Auckland EV trial – phase 2

- EVs are able to use 11 transit lanes on state highways in Auckland for a 12 month trial
- Lanes were selected taking into account safety and impacts on traffic flow and public transport
- Lanes will be prepared with the required signs and road markings over the upcoming weeks
- EV drivers must check the signage at the start of each lane to ensure they are eligible to use it

For more information contact evprogramme@nzta.govt.nz or visit www.nzta.govt.nz/ev-special-vehicle-lanes
Opportunities for EVs: intra-regional freight

78% of freight movements (million tonnes all modes) are within regions*

Nine Australian manufactured SEA EV10 trucks delivered to Kings Transport, Melbourne in July 2017
UPS expanding their fleet of EV trucks operating in London from 50 to 72 this year

Potential charging infrastructure demand

Fleet assumption: 20 delivery trucks @ 150kWh

- Overnight re-charge at 22kW AC:
  - = 0.44 MW load added to network
  - ~ 130 Nissan Leafs charging at the same time
  - ~ average demand of about 400 households

- Potential day top-up at 50kW DC (lunch time):
  - = 1MW load added to network
  - ~ 300 Nissan Leafs charging at the same time
  - ~ average demand of about 1,000 households
What’s coming next…

Daimler Mercedez-Benz pilot production of 18 and 25 GVM trucks underway, with full-scale production expected 2020.
Tesla plans commercial production of 100% electric trucks in 18-24 months
What’s coming next…

This year two large ferries, Tycho Brahe and Aurora, will operate completely on battery power between Helsingør (Denmark) and Helsingborg (Sweden), a distance of approximately 4 km carrying more than 7.4 million passengers and 1.9 million vehicles annually.
100% electric and autonomous cargo ship

Construction starts this year in Norway with manned operation scheduled from 2018 and autonomous operation in 2020.
Zunum Aero, whose investors include Boeing and Jet Blue, is aiming to have 10-12 seat plug-in hybrid electric commercial passenger aircraft in service by 2022.
What you can do now

1. Test drive an EV if you haven’t driven one yet
2. Try out an EV through car share companies like CityHop in Auckland, Mevo in Wellington and Yoogo in Christchurch, or from rental car companies like Hertz Auckland, Europcar, Blue Cars and Snap Rentals
3. Find out more about EVs for your household or company by visiting www.electricvehicles.govt.nz