



**Australian Government**

**Department of Infrastructure and Transport**

# Electric Vehicles

*Presentation to:*

**SAE/Auto CRC Electric Vehicles Seminar**

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# EVs & The Commonwealth's Role

- New Vehicle Design Standards  
(the Australian Design Rules)
- New Vehicle Labelling Standards (ADR81/02)
- The Green Vehicle Guide Website

# ADRs for New EVs

- **EVs expected to comply with passenger car ADRs**
  - Crash performance, lighting, braking...
  - ADR certification of Mitsubishi i-MiEV, Tesla and Blade Electron indicates this should not be an issue
  - *But* it does mean lightweight EVs (quadracycles) not acceptable for road use unless they comply with relevant passenger car ADRs
- **UN recently revised Regulation (R100/01) governing electrical safety of EVs (including plug-in hybrids)**
  - UN also considering standards for crash safety performance and post crash hazards
- **Full (pure) EVs out of scope for the noxious emissions standard (ADR79/02)**
  - But plug-in hybrids are required to meet ADR79/02

# Labelling ADR for EVs

- **ADR81/02 mandates fuel consumption labelling**
  - ECE Reg 101 adopted in ADR81/02 provides test procedures for all light vehicle types, including EVs and plug-in hybrids, *but*
  - Existing ADR was silent on labelling for EVs and plug-ins
- **ADR81/02 procedures require a modified label format**
  - Primary results from testing pure EVs are range (km) and energy consumption (Wh/km)
  - Test for plug-in hybrids also records CO<sub>2</sub> emissions and fuel consumption
  - Fuel Consumption label format was not adequate for these vehicles

# New Label for EVs In Place

- **Revised ADR81/02 determined in Sept 2010**
  - Specifies new “Energy Consumption” label for EVs and plug-ins
- **New Energy Consumption label in ADR81/02:**
  - Displays energy consumption and range data from testing under ECE R101 (adopted in ADR81/02)
    - as well as CO<sub>2</sub> & fuel consumption data (displaying “0” for pure EVs)
  - Utilises single format for all vehicles with external charge capacity
  - Alerts consumers to potential for CO<sub>2</sub> emissions from recharging, but does not attempt to quantify those emissions on the label
    - refers consumer to Green Vehicle Guide website for more information

# New EV Label Format under ADR81/02

## ENERGY CONSUMPTION

Energy Consumption  
(Wh/km)



Range  
(km)



Fuel Consumption  
(L/100km)



Combined Test

CO<sub>2</sub> Emissions  
(g/km)\*



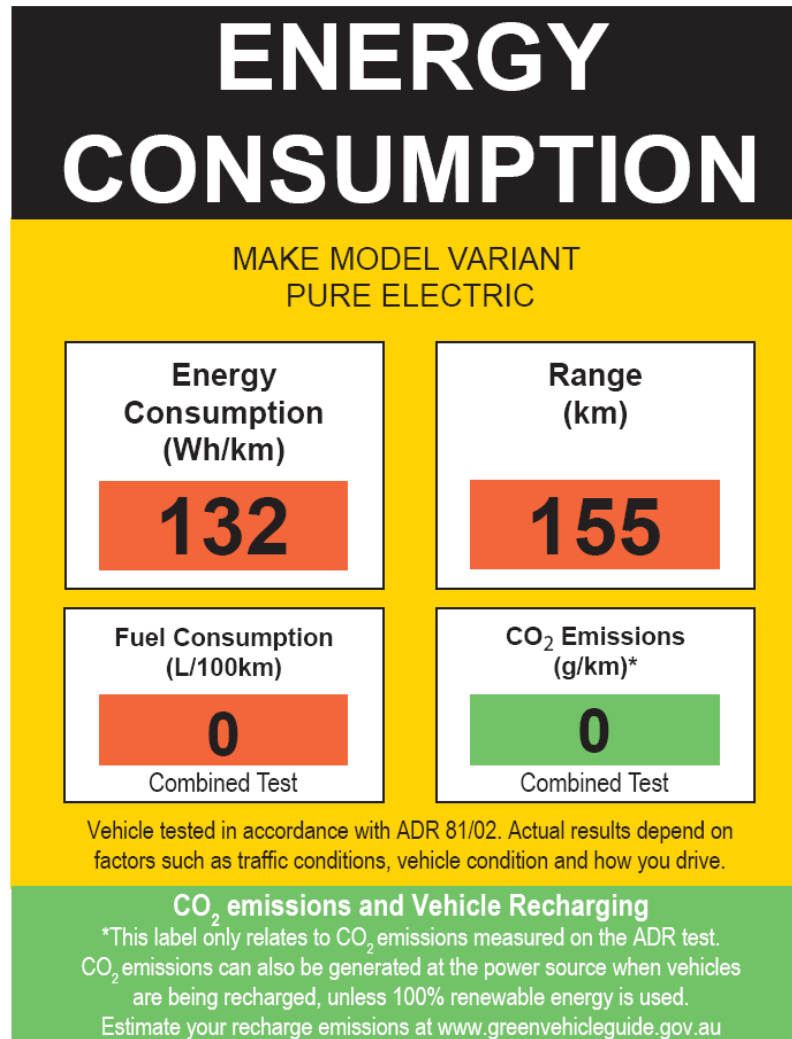
Combined Test

Vehicle tested in accordance with ADR 81/02. Actual results depend on factors such as traffic conditions, vehicle condition and how you drive.

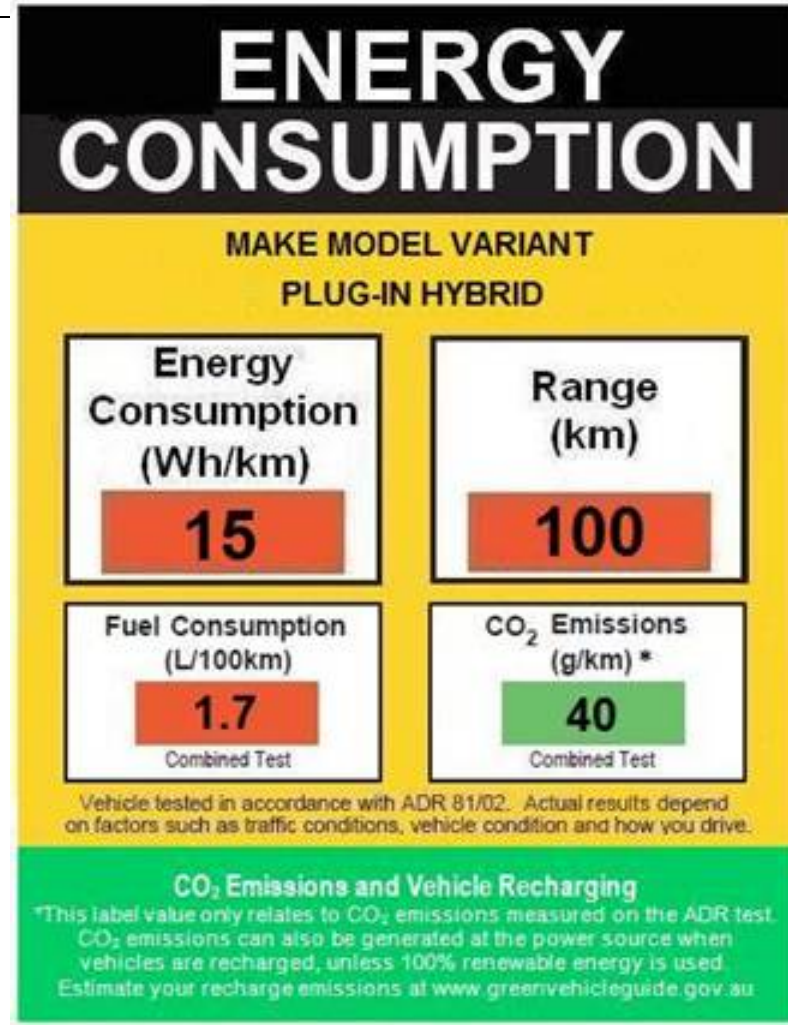
### CO<sub>2</sub> emissions and Vehicle Recharging

\*This label only relates to CO<sub>2</sub> emissions measured on the ADR test. CO<sub>2</sub> emissions can also be generated at the power source when vehicles are being recharged, unless 100% renewable energy is used. Estimate your recharge emissions at [www.greenvehicleguide.gov.au](http://www.greenvehicleguide.gov.au)

# Sample “Pure” EV Label under ADR81/02



# Sample “Plug-in” Hybrid Label under ADR81/02



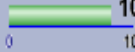

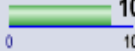

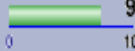

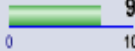

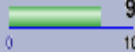

# Proposed GVG Additions for EVs

- Green Vehicle Guide (GVG) website amended to be consistent with new label for EVs and Plug-in hybrids
- Amended GVG website:
  - Provides the energy consumption, range, CO<sub>2</sub> and fuel consumption values from ADR81/02 (matching the label data)
  - Rates pure EVs as “zero emissions” vehicles for both Greenhouse and Air Pollution Ratings (i.e. score 10/10 on both ratings)
  - Rates plug-in hybrids on basis of CO<sub>2</sub> value from ADR81/02 for Greenhouse Rating, and on basis of standard to which vehicle is certified (ADR79/xx) for Air Pollution Rating
  - Provides consumers with additional information and calculation tools for estimating recharging emissions and fuel production emissions

# Non-road (Fuel Production) Emissions

- **To ensure fair representation, GVG provides calculator to estimate CO<sub>2</sub> emissions from fuel production**
  - Based on “Scope 2” and “Scope 3” National Greenhouse Accounts Factors for petrol, diesel, LPG and electricity
  - Addresses fuel extraction, production and transport/transmission
  - These emissions estimates not factored into the GVG ratings
- **For electricity, GVG users asked to select their home state (as emission factors vary widely)**
  - 0.35 kgCO<sub>2</sub>/kWh in Tas  $\implies$  1.37 kgCO<sub>2</sub>/kWh in Vic (ACT/NSW 1.07)
- **For liquid and gaseous fuels, emissions outcomes relate to energy/carbon content of fuel**
  - LPG (131gCO<sub>2</sub>/L); Petrol (181gCO<sub>2</sub>/L); Diesel (205gCO<sub>2</sub>/L);

# GVG Results Page for Current EVs vs Best Hybrid, Petrol & Diesel Models

Overall Rating	Vehicle Details	Fuel Type	Fuel Cons L/100km Comb	CO <sub>2</sub> g/km Comb	Greenhouse Rating (10 = Best)	Air Pollution Rating (10 = Best)	Energy Consumption (Wh/km)	Range (km)	Fuel Production CO <sub>2</sub> Emissions (g/km)
★★★★★	<b>Mitsubishi i car i MiEV</b> Electric, Wagon, 4 seats, 2WD	Pure Electric	0	0	 10	 10	132	155	141
★★★★★	<b>Tesla Roadster</b> Electric, Convertible, 2 seats, 2WD	Pure Electric	0	0	 10	 10	231	340	247
★★★★★	<b>Toyota Prius Hybrid</b> 1.8L 4cyl, CVT 1 speed Hatch, 5 seats, 2WD	Elec/Petrol 95RON	3.9	89	 9	 8.5	NA	NA	7
★★★★	<b>Ford WS Fiesta Econetic</b> 1.6L 4cyl (T), Man 5 speed Hatch, 5 seats, 2WD	Diesel	3.7	98	 9	 5	NA	NA	8
★★★★★	<b>smart fortwo Cabrio 52kW MHD</b> 1.0L 3cyl, Auto 5 speed Convertible, 2 seats, 2WD	Petrol 95RON	4.4	100	 9	 8.5	NA	NA	8

# Next Steps on EVs – Commonwealth Government

- **Monitor standards development process at UN ECE**
  - and consider case for adopting ECE Regs in ADRs
- **Continue to work with State and Territory transport and environment agencies working on EV issues**
  - Major EV trial underway in Victoria (60EVs, 5 years)
  - Smaller trial underway in WA
- **Australian Energy Market Commission to provide report on potential barriers to uptake of electric vehicles**
  - Including metering, technical and safety standards for vehicle connections, network capacity etc
- **Monitor outcomes of EV activity from the *Smart Grid, Smart Cities* program based in Newcastle**
  - EV element of project will operate in both Sydney and Newcastle

# Useful Links

ADR81/02:

<http://www.comlaw.gov.au/Details/F2011C00116/Download>

UN ECE Reg 100/01:

<http://www.unece.org/trans/main/wp29/wp29regs/R100r1e.pdf>

Green Vehicle Guide:

[www.greenvehicleguide.gov.au](http://www.greenvehicleguide.gov.au)

Smart Grid, Smart City:

<http://www.ret.gov.au/energy/energy%20programs/smartgrid/pages/default.aspx>