Eceee Summer Study 2013

Electric vehicles: Improving consumer information to encourage adoption

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The Low Carbon Vehicle Partnership

Information | Influence | Network

- Develops initiatives
- Policy advice to Government
- A forum for stakeholders
- Opportunities for UK business
- Contribution to meeting climate targets

c200 member orgs

Accelerating the Shift to Low Carbon Vehicles and Fuels

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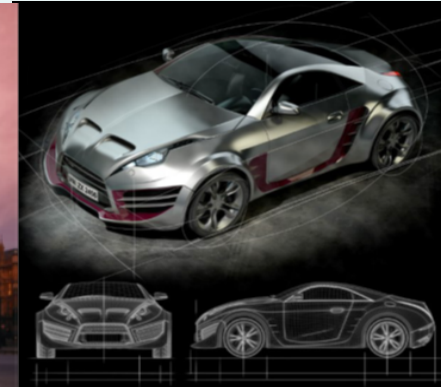
Overview

Why aren't consumers buying electric vehicles?

From general principles to one element of a solution...

❏ Background

   - EVs and consumers: main barriers to uptake (synthesis)

   - Potential solutions

❏ Review of the UK Fuel Economy label

❏ Labelling EVs (BEVs, PHEVs)

❏ Labelling - study conclusions and recommendations

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Background: UK Context

❑ UK Climate Change Act (2008) – legally binding CO_2 reduction targets

❑ 80% cut in CO_2 emissions in 2050 vs 1990

❑ Road transport electrification key element in UK Govt Carbon Plans

The Carbon Plan:
Delivering our
low carbon future

December 2011   HM Government

"...the emergence of ultra-low emission vehicles (ULEVs) and hybrid and electric cars will be crucial in preparing for progress in the 2020s" (Carbon Plan - DECC 2011)

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Despite doubts about EV's emissions benefits, policy makers in UK (and all over the World) are backing them

❑ Life-cycle analyses of EVs emissions show modest – or no - benefits based on current power generation mix (NTNU 2012; Ricardo 2011; Hawkins et al 2012)

- Fuel use phase benefits offset by emissions embedded in vehicle and battery production
- 10-24% lower global warming potential than conventional (ICE) vehicles at current generation mix

❑ But policy-makers and manufacturers worldwide are 'hanging their hats' on vehicle electrification; assumption of power grid decarbonisation and scale efficiencies
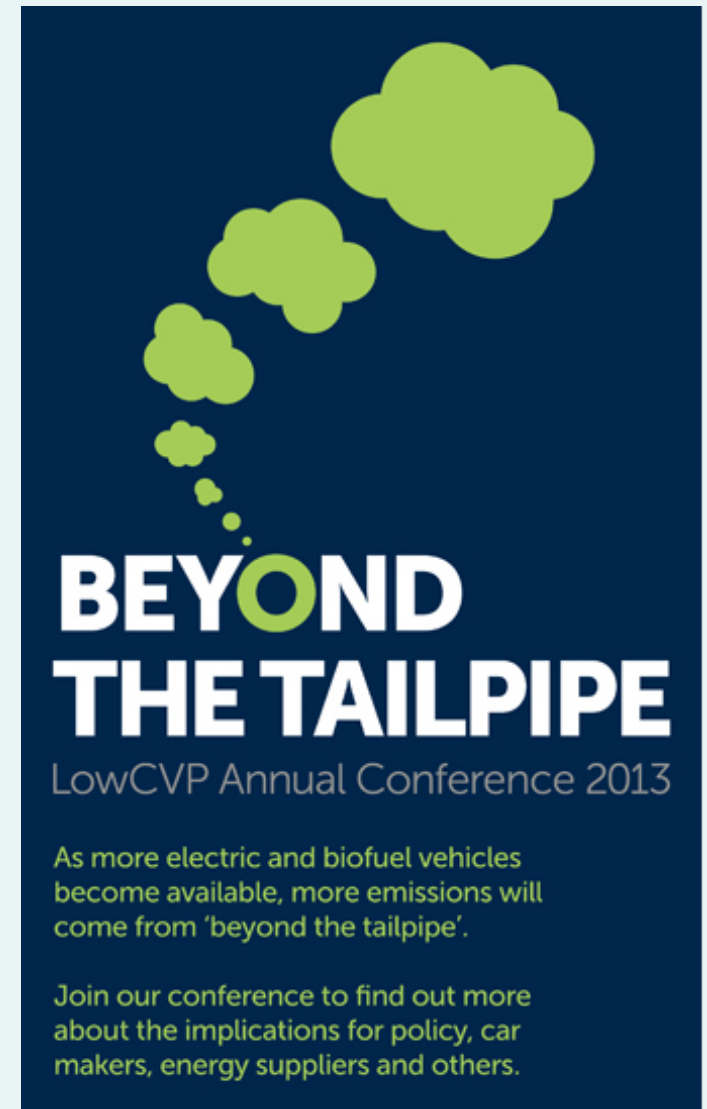
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By the way…

Road transport electrification and
rising biofuels use (+ hydrogen?) means we
need to change where and how
emissions are measured…

➢ Profound implications for policymakers,
motor co's, fuel suppliers and others.

LowCVP Conference, July 11, London:
www.lowcvp.org.uk for more details

BEYOND THE TAILPIPE

LowCVP Annual Conference 2013

As more electric and biofuel vehicles
become available, more emissions will
come from 'beyond the tailpipe'.

Join our conference to find out more
about the implications for policy, car
makers, energy suppliers and others.

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Main barriers to consumer uptake of EVs

❑ High purchase price

❑ 'Range anxiety'

❑ Recharge time

❑ Limited model range

| Nissan Leaf - £24k |
| Renault Zoe - £14k |
| Mitsubishi iMiEV- £24k |
| Vauxhall Ampera (hybrid) – £30k |
| |
| NB All prices after £5k UK Government subsidy |

❑ Unfamiliar technology and pace of technology change

❑ Maintenance/battery replacement costs uncertainty

❑ Safety concerns

But…consumers not driven by purely 'rational' factors – importance of 'individual values' (eg style; values; alignment with self-image)

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Breaking down the barriers – how?

❑ **High purchase price**

- Purchase subsidies + tax benefits -> economies of scale production
- Total ownership cost benefits (consumer education)

❑ **'Range Anxiety'**

- Infrastructure subsidies -> kick-start private provision
- Comprehensive and up-to-date information (use latest info tech)
- Consumer education; trial and familiarity

❑ **Recharge time**

- Fast-charge facilities on main routes (c30 mins)
- Consumer education; trial and familiarity

❑ **Technology issues; maintenance costs; safety**

- Consumer education; trial and familiarity

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Consumer Information & Education

❑ Variety of communicators: government; motor and fuel companies; dealers; media & others – need for consistency:

> Nissan advertisement (about Leaf): "Over 300mpg-equivalent"
> NextGreenCar (media website), Leaf listing: "169mpg-equivalent"

- In UK, OLEV (Office for Low Emission Vehicles) working to promote consistency in messaging

- LowCVP support via eg 'Green Claims Guide in Marketing'

❑ Product labelling

- EU Labelling Directive, 1999 required standardised, comparable data to be displayed on vehicles for sale from 2001

- Colour-coded fuel economy label; introduction facilitated by LowCVP in UK in 2005

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UK Fuel Economy Label review

LowCVP Aims:

- ✓ To improve the presentation of financial information to demonstrate benefits of choosing low CO_2 vehicle

- ✓ To test consumer reactions to mpg vs CO_2 figures on label

- ✓ How to improve provision of comparative information

- ✓ How to incorporate new information technology

- ✓ How to specifically accommodate new vehicle types including electric and plug-in hybrid vehicles

Method: 6 x focus groups (n=10) and 1 quantitative (n= 1005) web-based study

Target audience: Recent new or used car buyers (99% petrol or diesel)

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Design & Testing process

Information Designer

Phase 1
Creation of
Prototype 1 Label Designs

Phase 2
Creation of
Prototype 2 Label Designs

Typography, graphics, visual style to enhance provision of information

Consumer Researcher

Phase 1
Round 1 – Testing & Analysis

Phase 2
Round 2 – Testing & Analysis

Qualitative & quantitative research using a sample of car buyers

Final Revised
Fuel Economy Label

Design and testing be an iterative process between information designer and consumer researcher

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Round 1 Prototype Fuel Economy Label Designs

Current label
x 1
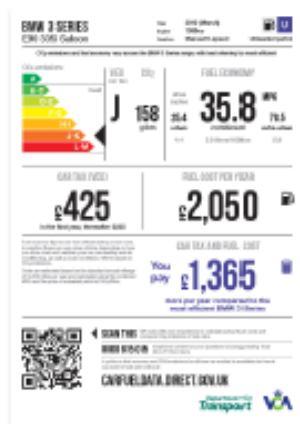
'Traditional'
x 2
'You lose'
'You pay'

'Slider'
x 3
Per mth slider
Per mth rank
Per mile

'Dashboard'
x 2
Petrol
EV

'Buyers Guide'
x 3
Petrol 1 year
Petrol 3 year
EV

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Current Fuel Economy Label - feedback

FOCUS GROUPS – MPG & CO2 INFO

Title at odds with prominence of CO2 information

Very strong visual element – liked by almost all

Weakest part of this design element

Little demand for metric data

Demand for MPG to be more prominent

Fuel Economy		VED band and CO₂

CO₂ emission figure (g/km)

<=100	A
101-110	B
111-120	C
121-130	D
131-140	E
141-150	F
151-165	G
166-175	H
176-185	I
186-200	J
201-225	K
226-255	L
256+	M

E 137 g/km

Make/Model:	**Ford Focus**	Engine Capacity (cc):	**1753 cc**
Fuel Type:	**Diesel**	Transmission:	**Manual**

Fuel Consumption:

Drive cycle	Litres/100km	Mpg
Urban	6.7	42.2
Extra-urban	4.3	65.7
Combined	5.2	54.3

6

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Traditional Label Design – Loss Aversion
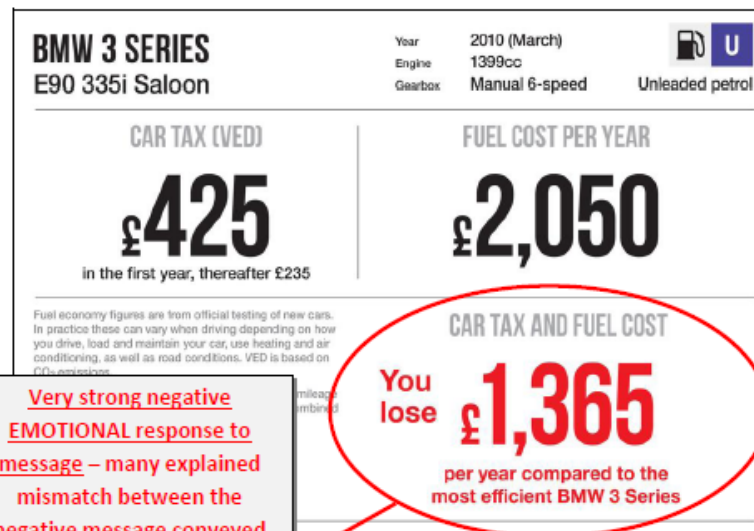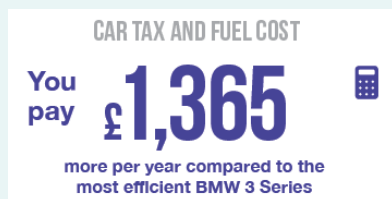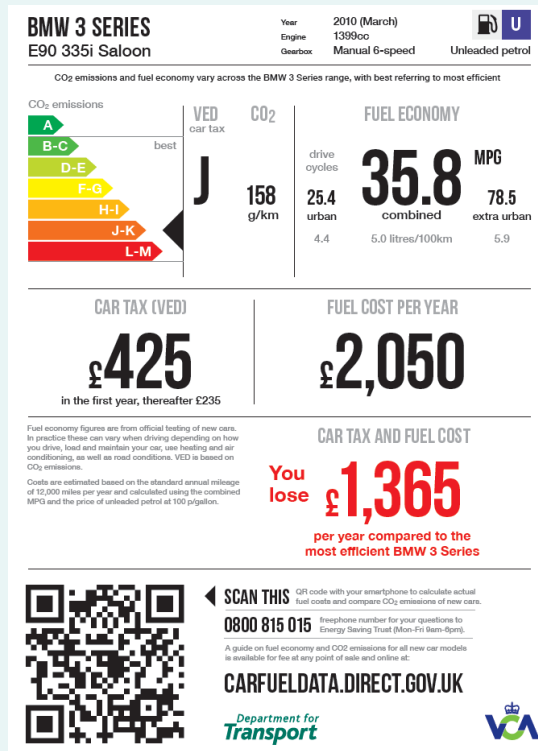
'Dashboard' Label Design
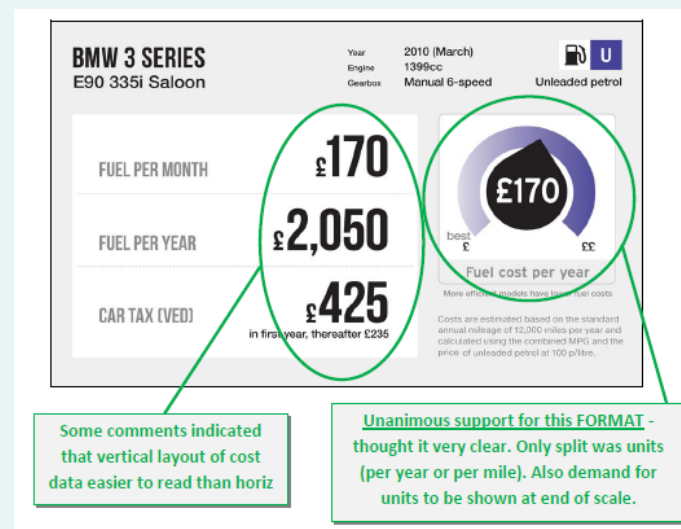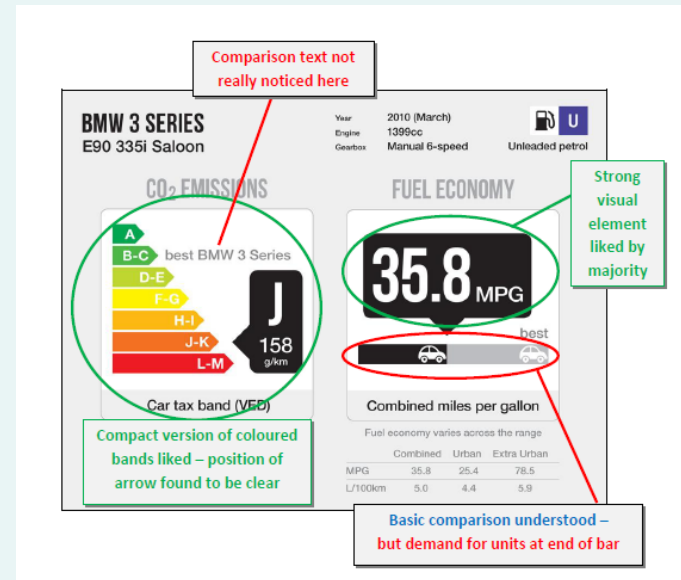
'Dashboard' Label Design – Electric Vehicle

QR – Quick Response - Code

Tested QR code using iPod Touches as smart phones and creation of a mock up tool on a URL

Fuel calculator tool linked to QR Code

Panel 1:

VW Polo | Best in model range

VW Polo 1.2 TDI 75PS BlueMotion
Supermini, Manual 5-speed, 1199cc (1.2 litre), Diesel

For this model...
Select your driving information using the following menus

- Your MPG
- Your driving style
- Your fuel price
- Your annual mileage

Calculate your fuel cost now →

Panel 2:

VW Polo | Best in model range

VW Polo 1.2 TDI 75PS BlueMotion
Supermini, Manual 5-speed, 1199cc (1.2 litre), Diesel

- **83.1 mpg** — Miles per gallon (combined) — Metric: 3.4 litre/100km
- **89 g/km** — CO2 Emissions — Vehicle tail pipe emissions only
- **A £0** — Car tax - Standard rate 2011/12 — 12-month rate for cars reg since 01/03/01*
- **A £0** — Car tax - First year rate 2011/12 — 12-month rate for cars reg since 01/03/01*
- **7.7 p/mile** — Fuel cost per mile — Pence per mile
- **V** — Euro Emissions Standard — CO: 0.023   PM: 0.000   HC+NOx: 0.163
- **£0 /day** — London Congestion Charge — 100% Greener Vehicle Discount

Compare with best in model range →

**Panel 3:**

VW Polo | Best in model range

Top Polo models
List shows greenest in this model range

		MPG (Comb)	CO2 (g/km)
	Polo 1.2 TDI 75PS BlueMotion Manual 5-speed / APPROVED 2010	83.1	89
	Polo 1.2 TDI 75PS BlueMotion Manual 5-speed /	80.7	91
	Polo 1.4 TDI 80PS without A/C +DPF Manual 5-speed /	74.3	99
	Polo 1.4 TDI 80 PS BLUEMOTION +DPF 3/5dr Manual 5-speed /	74.3	99
	Polo 1.4 TDI 80PS without A/C +DPF 3/5dr [from Nov Manual 5-speed /	74.3	99
	Polo 1.4 TDI 80PS without A/C +DPF Manual 5-speed /	74.3	99
	Polo 1.4 TDI 80ps BLUEMOTION 1 +DPF 3/5dr Manual 5-speed /	74.3	99
	Polo 1.4 TDI 80ps BLUEMOTION 2 +DPF 3/5dr Manual 5-speed /	74.3	99
	Polo 1.4 TDI 80ps BlueMotion 1 +DPF Manual 5-speed /	74.3	99
	Polo 1.4 TDI 80ps BlueMotion 2 +DPF Manual 5-speed /	74.3	99

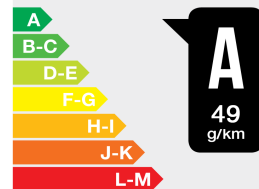↓ Show more vehicles in this range ↓

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Fuel Economy Label – Electric Vehicle
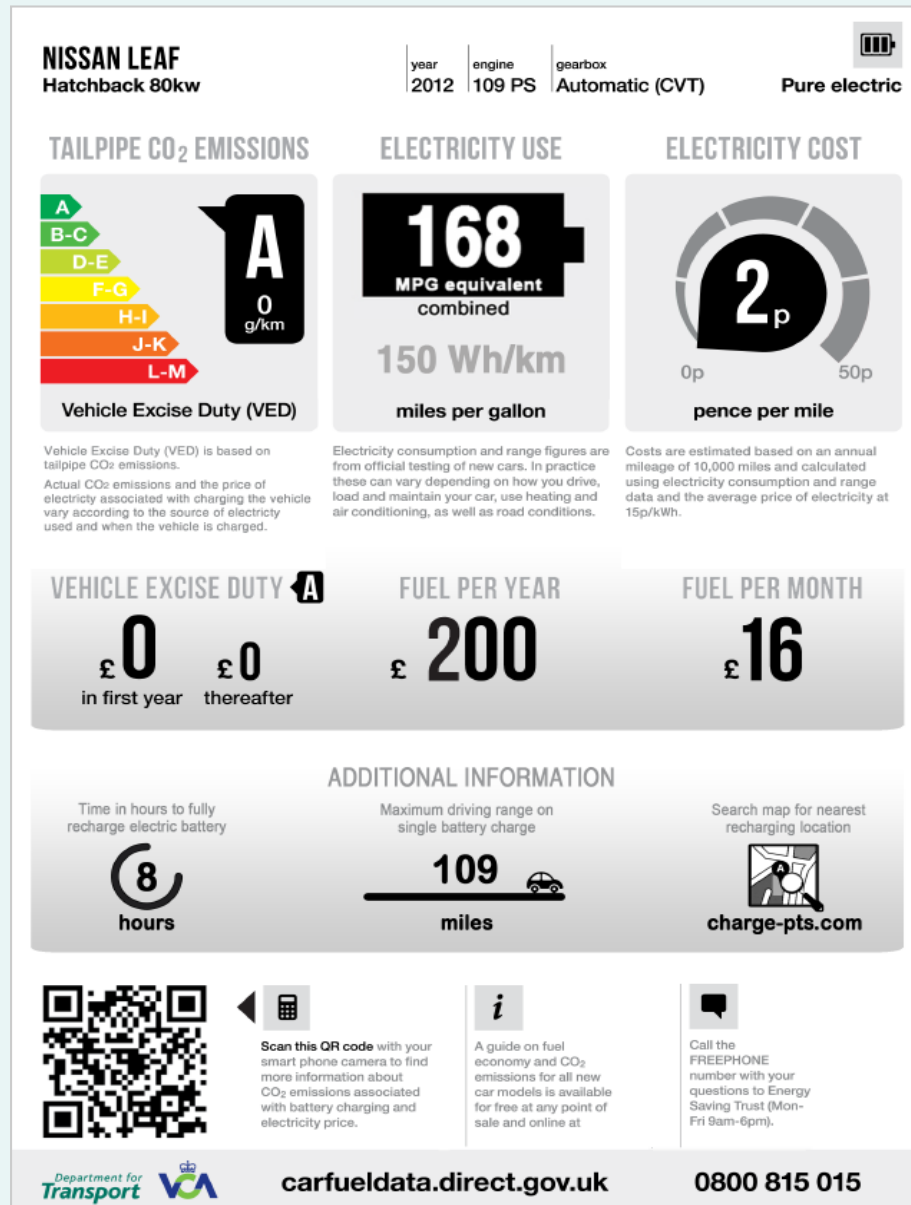
Fuel Economy label – Plug-in hybrid vehicle

TOYOTA PRIUS
1.8 VVT-i T4 5dr

year	engine	gearbox
2009	1798cc	Automatic (E-CVT)

Plug-in hybrid

TAILPIPE CO₂ EMISSIONS

- A
- B-C
- D-E
- F-G
- H-I
- J-K
- L-M

A 49 g/km

Vehicle Excise Duty (VED)

| CO₂	Weighted combined	Battery state of charge	
		max	min
g/km	49	0	92

VED is based on CO₂ emissions. CO₂ emissions and the price of electricity associated with charging the vehicle vary according to when vehicle is charged.

FUEL CONSUMPTION

134 weighted combined **MPG**

| n/a urban		n/a extra urban
n/a	2.1 L/100km	n/a

miles per gallon
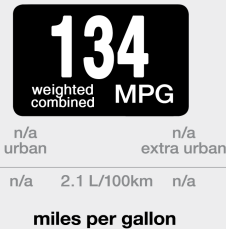
'Weighted' is a representative mixture of running a plug-in hybrid/range-extended electric vehicle over the combined drive cycle (urban and extra urban) partly on battery and partly using the combustion engine.

ELECTRICITY USE

20 kWh/100km

electric range **15 miles**

kilowatt hours per 100km
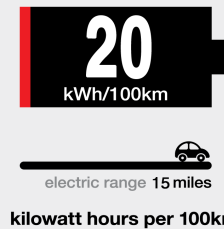
Fuel consumption, electricity consumption and range figures are from official testing of new cars. In practice these can vary depending on how you drive, load and maintain your car, use heating and air conditioning, as well as road conditions.

FUEL & ELECTRICITY COST

5p

0p — 50p

pence per mile
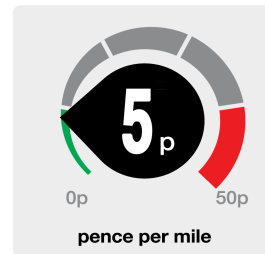
FUEL **PER MONTH** £**70**

FUEL **PER YEAR** £**840**

VEHICLE EXCISE DUTY **A**
in first year and thereafter £**0**

Costs are estimated based on an annual mileage of 10,000 miles and calculated using fuel and electricity consumption, range data and the average price of unleaded petrol at 140p/litre and electricity at 15p/kwh.

To calculate actual electricity & fuel costs and compare all new cars

SCAN QR CODE or visit
CARFUELDATA.DIRECT.GOV.UK

Call the Energy Saving Trust team with your questions
0800 815 015 FREEPHONE Mon-Sat 9am-6pm

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VCA
Department for **Transport**

Results Summary

1. <u>Dashboard most popular</u> label (existing & traditional labels least)

2. <u>MPG leading metric</u> – but some distrust about validity

3. <u>CO2 viewed primarily in terms of cost</u> – tax not emissions

4. <u>Demand for comparison</u> – dial works better than 'slider' format

5. <u>Per month and per mile costs useful</u> – in additional to per year

6. <u>Model ranking and 'lose' framing elicit strong emotional response</u>

7. <u>Positive response to Car Buyer label</u> – clear comparisons

8. <u>Independent branding adds authority to label</u> – e.g. WhatCar?

9. <u>QR Code tools very popular</u> – CALC tool most useful

10. <u>EV labels: Little understanding of Wh/km</u>, demand for additional info

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Questions/Comments/Feedback?

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