

Electric Options for Reducing Air Pollution and Carbon Footprint of Transport in Cardiff (and in urban settings throughout Wales)

The Problems

- **Air pollution**

UKHACC says air pollution contributes to an estimated 40,000 deaths each year in the UK and costs the economy an estimated £22bn annually. UKHACC (UK Health Alliance on Climate Change) represents major medical bodies including the Royal College of Nursing, the British Medical Association and the BMJ

<https://www.theguardian.com/environment/2018/oct/28/top-uk-health-bodies-demand-new-clean-air-act>

- **Traffic Noise**

The health effects of traffic noise are considerable although they get less attention.

<https://www.theguardian.com/lifeandstyle/2018/jul/03/sonic-doom-noise-pollution-kills-heart-disease-diabetes>

- **Climate Change**

Deisel and petrol powered traffic emits CO2 contributing to climate change.

Electric Vehicles (EVs) as part of the solution.

- Electric transport is zero emission at point of use. If the electricity used is from renewable sources then electric transport can be emission free and zero carbon in use.
 - Even using average grid supplied electricity the operational carbon footprint is less than for fuel burning vehicles.
 - The carbon intensity of average grid supplied electricity is continuing to fall.
- EVs are much quieter than fuel-burning vehicles.

Notes:

- EVs currently have a higher capital cost than comparable petrol or diesel vehicles.
- Running costs are much lower - partly due to lower maintenance costs - but mainly down to avoided fuel cost.
- Lifetime cost (capital + running) can already be similar to petrol or diesel options.
- The extra capital cost of EVs is because of high battery costs.
- Battery costs are continuing to fall dramatically year on year.
- Batteries do fall in charge capacity over time.
- Batteries whose capacity has fallen too low for EV use can have a second life as static batteries (e.g. storing day time solar output for evening use) before being recycled.

Electric Buses

- **All new urban-use buses should be electric.**
- **Electric buses should be deployed first on routes through AQMAs.**
- **The most polluting diesel buses should be retired first.**

An AQMA is an area where air pollution exceeds permitted levels. Cardiff has several Air Quality Management Areas (AQMAs) including Westgate Street in central Cardiff.

<https://airquality.gov.wales/laqm/air-quality-management-areas>

Westgate Street is used by many bus services..

UK Government offers limited grant funding in England Wales to cover the difference in capital cost between new electric buses and new diesel buses. This is awarded on a competitive basis with only some applications succeeding. Cardiff Bus applied in summer 2018 for funding to cover purchase of 33 electric buses (11 per year over 3 years). The competition outcome has not yet been publicly announced.

A low or zero interest revolving loan scheme for electric bus purchase would be a better way to help speed the electric bus transition. This could be along similar lines to the Salix fund for public sector energy efficiency projects. This would be best done at a Welsh Government level but could perhaps be done by Cardiff Council. Another possibility would be a not-for-profit organisation to buy electric buses and then lease them to operators.

Places operating electric-only buses include Inverness, London, Milton Keynes and York.

<http://www.alexander-dennis.com/news/deputy-mayor-of-london-switches-on-europes-largest-all-electric-bus-fleet-london-to-save-700-tonnes-of-co2-emissions-a-year/>

In Brighton a small bus company is using solar PV (partly community funded) to charge fixed location batteries during the day, which are then used to charge an electric bus overnight.

<https://thebiglemon.com/solarbus/>

Park and Ride Solar Carports

Offering solar electric car charging at park and ride sites could encourage more people to use park and ride and encourage take-up of electric cars. Electric park and ride buses could be given a brief fast charge at park and ride sites.

https://www.solarpowerportal.co.uk/news/uks_largest_solar_carport_with_additional_storage_planned_for_st_ives_park

As a step towards purely electric buses it may be easier for some routes to first adopt what are being referred to in Bristol as “virtual electric buses”. These are plug-in hybrid electric buses which are able to run in electric only mode for part of the time, but can also use a diesel engine. Crucially they can be automatically switched to electric only mode as they enter a GPS defined “geofenced” zone and switched back as they leave. The zone could be an AQMA, a wider urban zone, as they pass a school etc. Overall fuel use is reduced (compared with diesel non-hybrid buses) thanks to recharging from regenerative braking and via induction plates at stopping places on their route.

<https://www.busworld.org/articles/detail/2743>

Electric Taxis

- **All new urban-use taxis should be electric.**

Licenses for new taxis could be limited after a certain date to electric vehicles or (as a transition) also plug-in hybrid electric vehicles that can drive in electric only mode. The latter could be subject to the same geofencing control as discussed above for buses. Arguably only cars such as this should be on sale at all after a certain date – but that of course is a matter for Westminster.

In London all new black cabs must be electric from January 2018.

<https://www.theguardian.com/uk-news/2017/apr/26/electric-black-cabs-transport-for-london-tfi-charging-stations>

The London Electric Vehicle Company makes and leases electric “London black cabs”.

<https://www.levc.com/tx-electric-taxi/>

Electric Blue is crowdfunding to set up e-taxi charging stations powered by 100% renewable electricity in Cambridge. They are keen to expand to other cities.

https://www.ethex.org.uk/electric-blue_2386.html

<https://www.electricblueuk.com/>

The Low Emission Taxi Guide was published in 2018 by Low Carbon Vehicle Partnership

https://www.lowcvp.org.uk/assets/reports/LowCVP_Low_Emission_Taxi_Guide.pdf

Water buses

- **All water buses should be converted to electric running as in Amsterdam.**

<https://www.bbc.co.uk/news/business-45783085>

EV charging

Car Parks

- **All car parks should have EV charging bays.**

Cardiff Council should apply Planning Permission conditions for this for new car parks.

All new development which includes car parking spaces should be required to have EV charging.

NCP car parks at Greyfriars, Dumfries Place, and Pellett Street have EV charging but the others in Cardiff don't.

Un-shaded car parks are good locations for solar carports.

<http://www.environmenttimes.co.uk/news/item/364-exeter-multi-storey-car-park-s-award-for-combining-cars-and-solar>

BRE solar car park guide (March 2018) covers solar, storage and EV synergy

<https://bregroup.com/wp-content/uploads/2018/03/99939-BRE-Solar-Carpark-Guide-Feb18-A4-24pp-nocrop-LR.pdf>

On-road residential parking

Where terraced housing has only on-street residential parking lamp-post chargers should be set up on demand from residents. (as in Amsterdam)

<https://www.amsterdam.nl/en/parking/electric-charging/>

<https://www.ovoenergy.com/electric-cars/urban-charging>

<https://www.energylivenews.com/2018/08/23/uk-firm-wins-contract-to-roll-out-lamppost-ev-chargers-in-london/>

Recycling Collection Vehicles

These cover relatively short rounds and stop and start a good deal, making them good targets for electrification. As with buses and taxis, recycling vehicles operating in AQMAs could be prioritised. Reduced noise levels would be an added advantage.

London

<https://waste-management-world.com/a/city-of-london-trials-uks-first-all-electric-refuse-collection-vehicle>

Sheffield

<https://www.veolia.co.uk/press-releases/veolia-trial-electric-refuse-collection-vehicles>

<https://www.dennis-eagle.co.uk/en/products/ecollect/>

Shore-to-Ship Power

Most ships currently burn heavy fuel oil which is particularly polluting, as well as generating CO2. Ships often burn heavy fuel oil whilst in port in order to provide on-board electricity. Shore-to-ship power systems allow docked ships to be supplied with electricity from the dockside so that ship's engines aren't used and the resulting pollution is avoided.

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