

# OUR WORKINGS

## Cargo bikes operating emissions per km

Based on the following:

1 kWh = Average of 40km of range in our bikes  
Grid CO2 intensity for 2022 = 178g/kWh  
<https://grid.iamkate.com/>

Charging a 1 kWh battery uses an estimated 1.1 kWh (10% efficiency losses) = 195.8g/kWh stored energy in our batteries  
 $195.9/40\text{km} = 4.895\text{g/km}$  operating emissions for cargo bikes

Assuming 75% renewables charging our fleet  $4.895/75\% = 1.22375\text{g/km}$  is the net CO2e emissions per km for our cargo bikes

2022 Diesel van approx 262g/km (WLTP Low-Speed figure for Mercedes Sprinter Panel Van) then saving/gkm = 260.8g/km for operating emissions

<https://www.mercedes-benz.co.uk/vans/content/dam/vans/united-kingdom/brochures/june-2022/MB%20Vans%20-%20price%20list%20-%20Sprinter%20Panel%20-%20Crew%20JUNE%202022%20AW.pdf>

## Electric van operating emissions per km

e-Sprinter

<https://www.mercedes-benz.co.uk/vans/en/e-sprinter-panel-van/technical-data>

55kWh battery  
109.4 miles range (176km)  
 $55 \times 195.8 = 10769\text{g}$

$10769/176 = 61.1875\text{g/km}$  operating emissions for EV assuming standard grid CO2 intensity charging at 178g/kWh

Saving compared to diesel per km =  $262 - 61.2 = 200.8\text{g/km}$   
Saving of EV using 75% renewables compared to diesel per km = 247g per km (15.3g/km emissions)



## Embodied carbon\* (totals if all fleet was trike/EV/diesel)

- Trike [0.35 tonnes]  $115 \text{ trikes} \times 0.35 \text{ tonnes} / 5 = \text{annual figure of 8 tonnes embodied CO}_2\text{e per year for current trike fleet based on 5 year lifespan}$
- EV [8–9 tonnes]  $115 \times 8.5 / 5 = 195.5 \text{ tonnes/ year based on 5 year lifespan}$
- Diesel [5–7 tonnes]  $115 \times 6 / 5 = 138 \text{ tonnes per year based on 5 year lifespan}$
- Lithium batteries alone typically account for approx 100kg/kWh embodied CO<sub>2</sub>

\*Note that embodied carbon for trikes revised up in 2022 from 0.25 tonnes to 0.35 to account for lifecycle emissions of approx 1kWh battery per trike

<https://www.mdpi.com/2071-1050/11/9/2690/pdf>

<https://www.carbonbrief.org/factcheck-how-electric-vehicles-help-to-tackle-climate-change/>

## NOX calculations

584,000km of electric distance  $\times 10.56\text{g/km} = 327 \text{ kg saving over 2022}$   
(based on 14.1kg saving per year based on 80km scaled down to 11kg per year based on 60km per day)

[https://crossriverpartnership.org/wp-content/uploads/2019/05/20190520\\_Element-Energy\\_Cycling-logistics-study\\_FINAL-REPORT.pdf](https://crossriverpartnership.org/wp-content/uploads/2019/05/20190520_Element-Energy_Cycling-logistics-study_FINAL-REPORT.pdf)

## Additional sources

HEALTH stats paper from Oxford University 2018

[https://www.cleanairstay.org.uk/files/press\\_release\\_-\\_health\\_costs\\_of\\_cars.pdf](https://www.cleanairstay.org.uk/files/press_release_-_health_costs_of_cars.pdf)

Transport Emissions stats from UK.GOV

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/984685/transport-and-environment-statistics-2021.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/984685/transport-and-environment-statistics-2021.pdf)

<https://www.gov.uk/government/statistics/transport-and-environment-statistics-2022/transport-and-environment-statistics-2022>

CO<sub>2</sub> comparison data from Carbon Neutral Group

<https://www.climateneutralgroup.com/en/news/what-exactly-is-1-tonne-of-co2/>

We would like to thank our Zedify Bristol rider Tad Jiunn Kho for his excellent photographic contributions to our bank of images, many of which have featured in our Impact Report this year.

