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# PHW Microbiology Single-use Plastic Project – Annex L – Case Studies

As part of the final project report, Revolution-ZERO introduced four case studies on assessing and reducing single-use plastic. These have been sectioned into separate pages to be shared individually.

To support understanding of the impact of emissions and better communication, a table of CO<sub>2</sub>e in real-life situations has been included.

## Emissions Equivalents

Activity	CO <sub>2</sub> e
Hour of using an average-efficient laptop	10 g <sup>1</sup>
Laundry load washed at 40C, tumble dried	2 kg <sup>1</sup>
Dry powder inhaler (estimated 200 doses)	4 kg <sup>2</sup>
5-watt low energy bulb for one year	15 kg <sup>1</sup>
London to Glasgow and back (train)	64 kg <sup>1</sup>
Using a smartphone (a year's typical usage of 195 minutes a day)	69 kg <sup>1</sup>
London to Glasgow and back (small efficient petrol car)	237 kg <sup>1</sup>
Metered dose inhaler (estimated 200 doses)	100 kg <sup>2</sup>
Insulating a loft (outlay for a detached house)	400 kg <sup>1</sup>
Hip replacement or knee surgery	1 tonne <sup>1</sup>
Heart bypass operation	2.3 tonnes <sup>1</sup>
A new build house (three-bedroom terrace, bricks and mortar)	32 tonnes <sup>1</sup>
Installation of a 100-kW wind turbine (saves 2619 tonnes after 20 years)	134 tonnes <sup>1</sup>

<sup>1</sup> Berners-Lee, M 2010, *How Bad Are Bananas?*

<sup>2</sup> <https://www.nice.org.uk/news/article/nice-encourages-use-of-greener-asthma-inhalers>



## Case Study 3: Reuse, Masks

The third case study relates to the next step down in the resource hierarchy which is that of reuse of items. The lead organisation already has significant experience of this working within Wales, having completed a formal study and report in March 2022. The potential reduction in plastic waste is considerable given that masks can be reused up to 40 times, repurposed at end of functional clinical life and then recycled after that, avoiding waste and also saving carbon. **Typical carbon savings for switching from a single-use to a reusable mask is 10g per mask, with 3.5g waste saving.**

During a workshop, PHW staff estimated the number of masks used per year in labs. Revolution-ZERO used these estimates to calculate emissions for all masks used in a year, shown in the table below.

### Emissions and waste savings from switching to reusable masks

Product	Quantity	Total Weight (kg)	Total CO <sub>2</sub> e (kg)	Carbon savings (kg)	Waste savings (kg)
Masks	365,000	1278	6,496	3650	1278

Taken across Wales laboratories, where we estimated 365,000 masks were used, **switching to reusable masks could result in savings of 3650 kg of carbon and 1278 kg of waste on an annual basis.** The economics of this still need to be refined, however this provides a useful workable case study, which could potentially be implemented in the near future.