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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 CO₂e in real-life situations has been included.

Emissions Equivalents

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

¹ Berners-Lee, M 2010, *How Bad Are Bananas?*

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



Case Study 2: Reduce, Packaging

One of the major new findings from this work, which came out of the first workshop, was the realisation that **packaging plays a major role in laboratory work streams and practices**. Though we were unable to quantify this fully, a new method to address this has been identified in case study 1. It was realised that there is significant room for reduction in plastic packaging across the NHS micro labs' footprint.

The first strategy to apply in this is to **question what sort of packaging is needed and what numbers of items need to be packaged in a single encased unit**.

For example, one tube in plastic packaging, five tubes in plastic packaging or 100 tubes in plastic packaging. By addressing this and questioning these, it appears that significant reductions can be made. It is suggested that **packaging limitations are implemented at procurement level once further audit of the workstreams and packaging systems has been made**. While the quantity and type of packaging is decided by suppliers, we recommend that **procurement teams in labs lead by requesting change from suppliers**.

This type of reduction approach is at the top of the resource hierarchy and is likely to make a major impact on both waste and emissions with likely cost benefits as well. In the LCA master table, carbon savings were estimated from a 50% reduction in packaging. The table below shows the impact on the four highest emission items. As the product quantities are hard to accurately record in procurement data, the quantities and emissions are likely to be higher.

Enhanced packaging practices impact for highest quantity items

Product	Total CO ₂ e (kg)	CO ₂ e reduction (kg)
Agar (contained in Petri Dish)	188,960	546
Microbank vials	99,275	294
Sodium hydroxide	54,216	160
Pipette tips	44,217	157