86% Carbon Emission Reduction with a Reusable Sharps Container

UK hospitals are seeking greater sustainability. Waste reduction studies using reusable sharps containers are well established, but lack the depth of a Life Cycle Assessment (LCA) of energy emissions for manufacture, transport or processing.

Objectives

To develop an innovative model to ascertain the difference in carbon emissions between reusable and disposable sharps containment systems.

Design and Methods

We used a Before/After intervention model from a 1,250 bed UK Acute-care Trust which converted from polypropylene disposable sharps containers (Daniels Healthcare, Hertfordshire UK) to an ABS reusable sharps container (Sharpsmart Ltd, Spennymoor UK.) CO_2e emissions for all life stages were calculated using internationally accepted unit energy consumptions for:

- Plastic pellet manufacture and container manufacture
- Transport to and from hospitals
- Decanting/washing of reusables; attrition replacement of reusables
- Incineration of waste; transport of residues to landfill

Average CO_2e was calculated over 10 years.
Data was analyzed using CHI2 and significance set at $p \leq 0.05$.

Results

Disposables = 182.4 tonnes CO_2e/yr; Reusables = 25.6 tonnes (-86%; $p<0.001$). Over 10 years, 466,190 disposable containers were manufactured vs 1,659 reusables. See right for result graphs.

Discussion

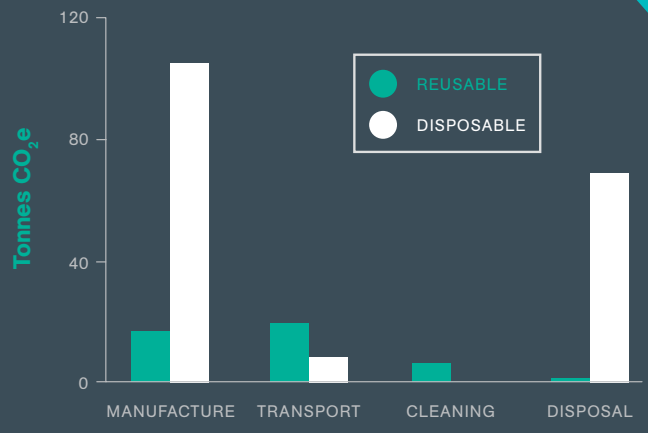
Manufacturing accounted for the largest CO_2e reduction, with treatment / disposal next. Transport and processing accounted for a small portion of the LCA Reusables saved 157 tons of CO_2e emissions/yr (15.1 tons/100 beds/yr).

Conclusions

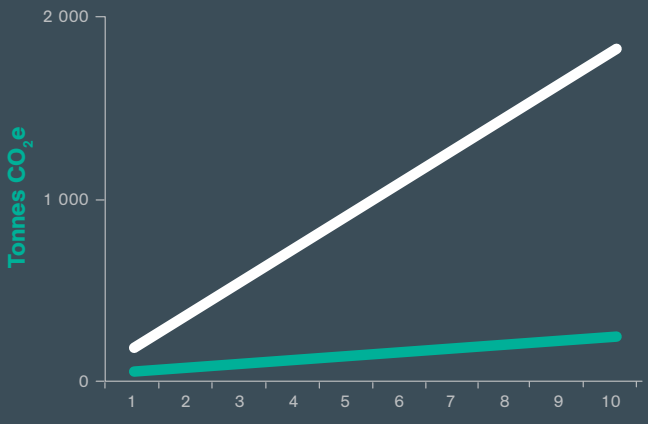
Reusable sharps containers provide permanent resource efficiency and waste reduction and achieve sustainable consumption and production.

RESULTS

CARBON FOOTPRINT
DISPOSAL VS REUSABLE



CUMULATIVE CO_2 EMISSIONS



Grimmond T*, Jenkinson H#, Trevor J#, Penfold G^ and Cullingford T^
*Grimmond & Associates New Zealand; #University Hospital of North Staffordshire UK, ^Waterman Energy, Environmental and Design UK. Paper presented at IPS Prevention 2010, Bournemouth UK, Sept 2010.