

Executive Summary

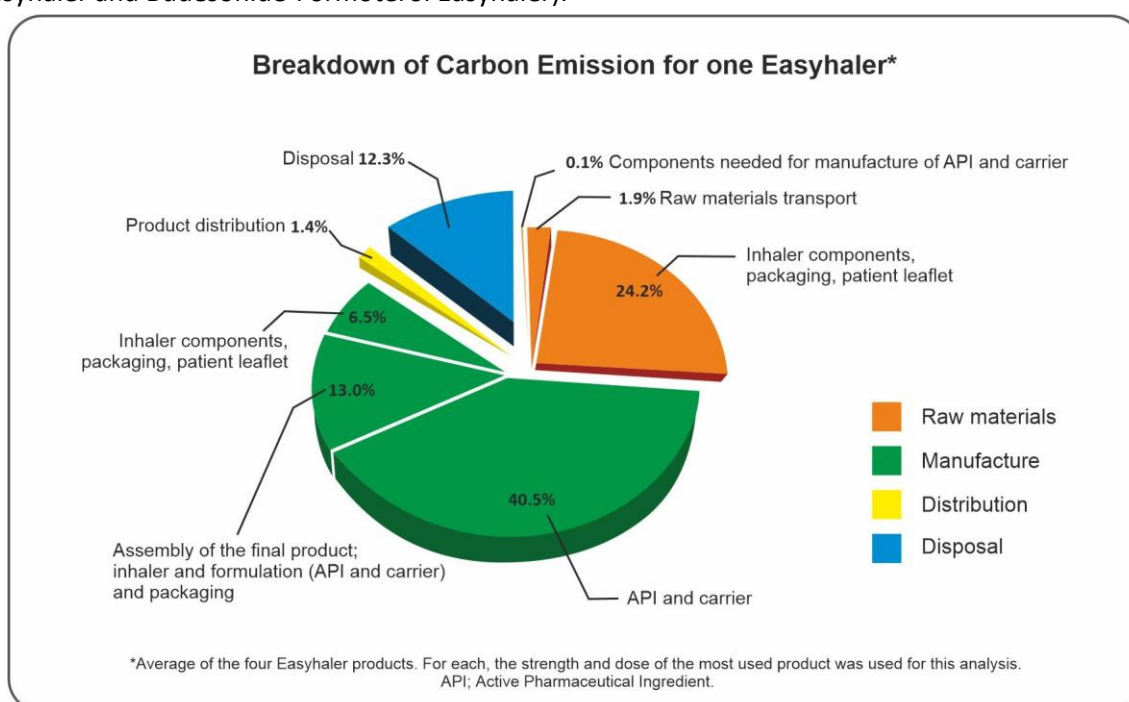
This executive summary provides an overview analysis of the greenhouse gas emissions associated with Orion Corporation, Orion Pharma (Orion)'s Easyhalers. This 'Cradle to Grave' assessment focuses on the embodied raw material emissions, the transport of these materials, the manufacture/processing, distribution and disposal of each product.

Orion Pharma's Easyhalers are plastic inhalers used to distribute dry-powder active pharmaceutical ingredients (APIs). Within this assessment, four variations of the Easyhaler, each with different APIs, have been assessed; the Salbutamol Easyhaler, Salmeterol-Fluticasone Easyhaler, Formoterol Easyhaler and Budesonide-Formoterol Easyhaler.

The inhaler itself is predominantly made of injection moulded thermoplastic components; and within the medicine, the lactose 'carrier' accounts for the largest proportion in mass. Considering the product as a whole with its packaging, the cardboard accounts for 36% of the total mass of the product. The raw materials are all sourced from within Europe and the inhaler is assembled at Orion Pharma's factory in Espoo, Finland. These are then transported to the warehouse in Salo, Finland, where the Easyhalers are distributed to distribution centres across the world. After use, customers are recommended to return the empty Easyhalers to the pharmacies where they were purchased so that they can be incinerated; when this is not followed, the Easyhalers are assumed, in this study, to be disposed of through landfill.

Total **cradle to grave** product life cycle carbon emissions for an Easyhaler is **588.50 g CO₂e** (averaged from the 4 varieties).

The following graph shows the percentage breakdown of emissions based on an average of the four Easyhaler varieties (the Salbutamol Easyhaler, Salmeterol-Fluticasone Easyhaler, Formoterol Easyhaler and Budesonide-Formoterol Easyhaler).



The most significant source of emissions for the Easyhalers are the emissions associated with manufacture, accounting for 60% of the total emissions per product. In comparison, the emissions associated with product distribution accounts for less than 2%.

The breakdown of life cycle carbon emissions for each Easyhaler variation is shown in the following table:

Process	Life Cycle Emissions per one Easyhaler (g CO ₂ e)			
	Salbutamol Easyhaler	Salmeterol-Fluticasone Easyhaler	Formoterol Easyhaler	Budesonide-Formoterol Easyhaler
Strength and Dose ¹	100 µg 200 doses	250 / 50 µg 60 doses	12 µg 120 doses	160 / 4.5 µg 120 doses
Raw materials – embodied <i>(Inhaler components, packaging, patients' leaflet)</i>	142.31	142.31	142.31	142.31
Raw materials - embodied <i>(APIs and carrier components needed for manufacture)</i>	0.74	1.88	0.27	0.50
Raw materials transport	11.54	11.50	11.45	11.40
Manufacture <i>(API + carrier)</i>	314.12	250.41	224.05	164.74
Manufacture <i>(Inhaler components, packaging, patients' leaflet)</i>	38.44	38.44	38.44	38.44
Manufacture <i>(Assembly of the final product; inhaler and formulation (API & carrier) and packaging)</i>	76.37	76.37	76.37	76.37
Product distribution	8.48	8.42	8.38	8.31
Disposal	72.43	72.43	72.43	72.43
Total	664.06	601.75	573.69	514.49

The main differences in the emissions associated with the different types of Easyhaler arise predominantly from the manufacture. This is due to the different APIs used in the inhalers and the amount of lactose. The Salbutamol Easyhaler has the largest emissions associated with its manufacture since it requires the largest amount of lactose.



Orion in conjunction with Carbon Footprint Ltd, has assessed the cradle to grave carbon emissions associated with one Easyhaler (Salbutamol Easyhaler, Salmeterol-Fluticasone Easyhaler, Formoterol Easyhaler and Budesonide-Formoterol Easyhaler). By achieving this, Orion has qualified to use the Carbon Footprint Standard branding.

¹ For each product, the strength and dose of the most used product in Europe was used in this analysis.