



SUCCESS STORY: **CONDUCTING A LIFE CYCLE ASSESSMENT TO LIMIT WASTE AND IMPROVE PACKAGING SUSTAINABILITY**

INTRODUCTION

HSSMI helped an automotive OEM assess the environmental benefits of changing their packaging strategy from expendable packaging (cardboard) to returnable packaging. HSSMI's expertise in circular economy and life cycle assessment (LCA) guided the OEM to become more sustainable by assessing the carbon emission savings in moving from single use to returnable packaging and introducing a closed loop packaging chain. The change has proven to have cost and environmental benefits for the company.

THE CHALLENGE

The OEM is a UK vehicle producer, receiving parts from all over the world. Most of the packaging was expendable and produced high levels of waste and additional cost to the OEM. This also presented an opportunity to reduce emissions within the entire supply chain.

THE APPROACH

HSSMI used the following approach to generate an LCA evaluating the move from expendable to returnable packaging in this OEM's case.

1 – Goal and scope definition

The products to study and the boundaries of the LCA were defined. The main focus was to calculate the carbon emissions and other environmental impacts within the packaging's life cycle.

2 – Life cycle inventory

HSSMI collected data from the OEM and supply chain, including information on packing material, dimension and weight, transport method and supplier's location for both plastic and cardboard boxes. Additional data was taken from research and HSSMI's manufacturing expertise. A data inventory on the materials and processes was created and some assumptions were also made to complete the inventory.

3 – Life cycle inventory assessment

The potential environmental impacts based on the model created were assessed. A baseline comparison table that clearly explains the results per impact category was created.

RETURNABLE PACKAGING



EXPENDABLE PACKAGING



THE RESULTS

The table below shows an example of one of the LCA results for a package with the following characteristics.

COMPARE

Expendable packaging	Returnable packaging
Material: Cardboard Weight: 3kg Dimensions: 1600x1000x700 mm	Material: Plastic (HDPE) Weight: 20kg Dimensions: 1650x600x550mm

For this analysis, the functional unit used was 1/1000th, i.e. the model compared the use of 1000 units of single-use cardboard packaging to a single unit of reusable plastic packaging used 1000 times.

	Box manufacturing	Transport (Kg CO2)	Disposal (Kg CO2)	Total (Kg CO2)
1000 expendable cardboard packaging	2,830	31,2	2,550	5,420
1 returnable plastic packaging (1000 uses)	17.9	250	7.13	275

- Total saving: 5.1 tonnes of CO2 eq.
- 95 % reduction in CO2 eq.
- Around 1.31 Kg of CO2 saving per vehicle produce

A similar assessment was carried out for 418 packaging solutions that the OEM ultimately changed to returnable packaging. It was estimated that the total carbon emission savings were equivalent to around 1,328 tonnes of CO2.

Although the OEM reported cost savings significant enough to justify the implementation of returnable packaging, we are unable to report precise figures in this case study.