

Backup Plus Retail Packaging Product Life Cycle Analysis Summary

Product Description

This life cycle analysis (LCA) was performed on eleven product packaging models configured to ship drives from assembly plants in Asia to customers throughout the world. The packaging is divided into two types, primary and secondary. Secondary packaging consists of the master carton, board partition and the pallet and is disposed of at the retail location. The primary packaging includes all remaining bill of material items such as the retail box, labels, and product tray and is end-user disposed. This study, conducted on a “cradle-to-grave” basis, including regionally specific estimates for end of life burdens.

This life cycle inventory analysis was completed using SimaPro LCA software. The ReCiPe mid-point hierarchical method was used to determine life cycle impacts for the product life cycle. This study was commissioned by Seagate, prepared by WSP Environmental, performed by Pré North America, and 3rd party critically reviewed by EarthShift.



Life Cycle Analysis

Functional Unit, System Boundaries and Allocation Unit

The functional unit is defined as the amount of packaging protection and shipment required to deliver a hard disc drive from Seagate’s assembly site to the end user. The packaging configuration varies between different products because each package is designed for a specific hard disc drive each with unique shipment protection requirements. Results are presented on a “per-pack” basis.

Calculated Results:

Results are presented for four common Mac and PC portable drives on a cradle-to-grave basis and include raw material extraction and production, hard drive packaging at Seagate’s retail hard drive contract manufacturers, distribution, retail, and end of life. Environmental burdens from infrastructure production, e.g. auto-bagging machine manufacture, are not included within the study boundary and have not been targeted in primary and secondary data collection efforts.

Impact Category	Portable Avg.	Portable Mac Avg.	Desktop Avg.	Desktop Mac Avg.
Climate Change (kg CO2e)	2.11E+00	2.78E+00	3.40E+00	3.39E+00
Ozone Depletion (kg CFC-11 eq)	2.34E-07	3.24E-07	3.84E-07	3.84E-07
Human Toxicity (kg 1,4-DB eq)	7.24E-02	8.68E-02	9.78E-02	9.59E-02
Photochemical Oxidant Formation (kg NMVOC)	9.02E-03	1.28E-02	1.59E-02	1.59E-02
Particulate Matter Formation (kg PM10 eq)	2.68E-03	3.66E-03	4.39E-03	4.38E-03
Ionizing Radiation (kg U235 eq)	7.81E-02	8.71E-02	6.53E-02	6.53E-02
Terrestrial Acidification (kg SO2 eq)	7.70E-03	1.05E-02	1.26E-02	1.25E-02
Freshwater Eutrophication (kg P eq)	4.97E-05	5.20E-05	4.85E-05	4.67E-05
Marine Eutrophication (kg N eq)	6.41E-04	7.24E-04	1.31E-03	1.31E-03
Terrestrial Ecotoxicity (kg 1,4-DB eq)	2.39E-04	3.08E-04	4.23E-04	4.22E-04
Freshwater Ecotoxicity (kg 1,4-DB eq)	1.30E-03	1.64E-03	2.42E-03	2.41E-03
Marine Ecotoxicity (kg 1,4-DB eq)	1.65E-03	2.15E-03	2.51E-03	2.49E-03
Water Depletion (m3)	1.08E-02	1.26E-02	1.65E-02	1.64E-02
Metal Depletion (kg Fe eq)	4.59E-02	4.69E-02	4.43E-02	4.09E-02
Fossil Depletion (kg oil eq)	7.98E-01	1.04E+00	1.11E+00	1.11E+00

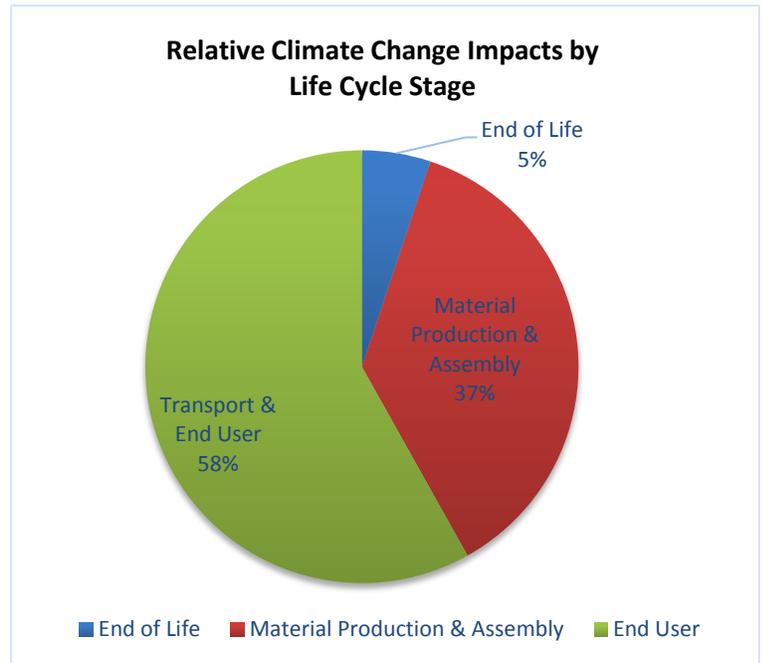
Climate Impacts

Climate change impacts are often a significant concern for our stakeholders and consequently the remainder of this document will focus on analysis of carbon dioxide equivalent emissions (CO₂e) through the product lifecycle.

Summary of Results

The average total lifecycle greenhouse gas (GHG) emissions of 2.92kg CO₂e per packaging product are split between the various life cycle stages as presented to the right, with product transport accounting for over half of all packaging lifecycle GHG emissions.

Total climate change potential results range from a low of 0.978 kilograms CO₂e to a high of 4.67 kilograms CO₂e. Climate change is most heavily influenced by air transport, with the hard drives that travel greater distances by air having higher impacts. Additionally, the desktop packaging unit is heavier than the portable hard drive unit, which leads to larger transportation impacts.



The chart below shows the relative GHG emissions with four average packaging configurations. It is important to note that direct comparisons between packaging configurations is not possible due to differences in technical requirements met by each design.

