Xerox® VersaLink® B620 Life Cycle Assessment Summary Report

For the Xerox® VersaLink® B620 Single Function Printer.

xerox™

Document Version: 1.0 (April 2024)

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Summary Report

Introduction

Xerox has a long history of interest in preserving our natural environment. In keeping with this interest, we seek to ascertain the environmental impact of our new devices. In understanding these impacts we can accurately represent our environmental initiatives to our stakeholders.

Xerox commissioned Sphera to conduct a life cycle assessment (LCA) study for the Xerox® VersaLink® B620 Single Function Printer (SFP). The goals of this study include the following:

1. Perform a cradle-to-grave LCA to quantify the potential environmental impacts of the Xerox® VersaLink® B620 throughout its life cycle.
2. Quantify the environmental hotspots within the cradle-to-grave boundary for the product.

Product Overview

Technical Properties	Xerox MFP Printer	Unit
Color options	Monochrome	—
Monochrome print resolution	1200 x 1200	dpi
Monochrome print speed	61	Pages per minute (ppm)
Connectivity/data inputs	Ethernet 10/100/1000 Base-T, High-speed USB 2.0 direct print, NFC; Optional: WiFi®/WiFi® Direct with Xerox Wireless Network Adapter	—
Automatic mechanical duplexing feature	Yes	—
Duplexing setting default or optional	Default	—
Energy efficiency or environmental labels	Energy STAR, EPEAT, Blue Angel	—
Functions	Print	—
Maximum document print size	216 x 356	mm × mm
Maximum document scan size	N/A	mm × mm
Maximum scan resolution	N/A	dpi
Printer memory	2	GB
Dimensions (depth x width x height)	42.8 x 51.0 x 44.5	cm
Weight	25.4	kg

Table 1 – Overview of the technical properties and specifications of the VersaLink B620 SFP.

Product Function and Functional Units

The Xerox VersaLink B620 SFP offers standard black-and-white printing capabilities. In accordance with the Product Category Rule (UL, 2018), this study considers two functional units: (1) providing printer functionalities over its assumed lifetime of 5 years with an expectation of 2,419,429-page simplex job in total, (2) a 1,000-page simplex job. The former value was calculated using the ENERGY STAR test method, which establishes a daily print volume that can be extrapolated to lifetime volume based on device speed (ENERGY STAR, 2018).

The reference flow for two functional units is the number of printers needed to fulfill the printing job:

- Perform a cradle-to-grave LCA to quantify the potential environmental impacts of the Xerox VersaLink B620 SFP throughout its life cycle.
- Quantify the environmental hotspots within the cradle-to-gate system boundary for the product.

System Boundary

The processes included and excluded from the system boundary for the study is defined in **Table 2**. This LCA study covers the entire product life cycle, from cradle to grave, including raw material extraction, product manufacturing, distribution, use, maintenance, and end-of-life (EoL) treatment.

Included	Excluded
• Extraction of raw materials • Printer manufacturing • Printer distribution • Printer use, including electricity consumption, paper production and disposal, and consumables production, distribution, and EoL • Printer maintenance, including technician service, and spare parts production, distribution, and EoL • Printer EoL	• Production of capital equipment (factories, tooling, etc.) • Network infrastructure outside of the product itself • Manual labor

Table 2 – System boundaries of this life cycle assessment.

Methodology and Standard Used

ISO STANDARDS

This study was carried out according to the requirements of the international standards ISO 14040 and ISO 14044 (ISO, 2006). The findings of this study serve for external communication purposes, such as making marketing claims and gaining a public relations or marketing advantage by presenting the results in various formats such as white papers, sustainability reports, and conferences. The results generated in this study are not intended to support comparative assertions.

IMPACT CATEGORIES

The evaluated impact categories and metrics included the 100-yr Global Warming Potential (GWP) excluding biogenic CO2, Non-Renewable Primary Energy Demand (PEDnr), Acidification Potential (AP), Eutrophication Potential (EP), Particular Matter (PM), Ozone Depletion Potential (ODP), Smog Formation Potential (SFP), and blue water consumption.

Despite being a major factor in the impacts of a device's use phase, printer manufacturers typically have little involvement in paper manufacturing and disposal. For this reason, the environmental impacts of the VersaLink® B620 SFP were analyzed both with and without considering paper-related impacts.

Results

As shown in the table below, the GWP 100 (excluding biogenic CO2) amounts to 14,858 kg of CO2 eq. per printer lifetime with the inclusion of paper-related impacts, and 1,512 kg of CO2 eq. per printer lifetime when paper-related emissions are excluded.

Scope	Impact Category	Total	Manufacturing	Distribution	Use	Maintenance	Eol
Excluding Paper	GWPe (kg CO_2 eq.)	1,512	188	29	854	439	1.8
Including Paper	GWPe (kg CO_2 eq.)	14,858	188	29	14,200	439	1.8

Table 3 – GWP 100 of the VersaLink B620 SFP, both including and excluding paper-related impacts, throughout the device's lifetime.

Excluding paper-related impacts, consumables make up the largest share of GWP at 49%, where the manufacturing of toner and cartridge body are the primary contributors. The manufacturing stage contributes 12% of the life cycle GWP, where the printer itself accounts for 80% of the manufacturing GWP with packaging accounting for the remaining 20%. The main contributors to the printer manufacturing GWP are the chassis, mainboard, and main cover, which collectively account for 66%. For the maintenance stage, technician service and spare part-related emissions account for 10% and 19% of the total life cycle GWP, respectively. The largest contributors to the spare parts' GWP are the manufacturing of the imaging unit and fuser. Electricity consumption accounts for 8% of the life cycle GWP, while distribution and end-of-life (EoL) together account for 1%. For other environmental impacts, similar to GWP 100 (excluding biogenic CO_2), the dominant contributors are consumables and manufacturing, which together contribute a mean of 76% of the impacts. However, for ODP, manufacturing of the printer, consumables, and spare parts accounts for over 99% of that impact category. Figures 1 and 2 on the next page illustrate the distribution of GWP across the device's lifetime—in addition to the other impact categories outlined earlier in this report.

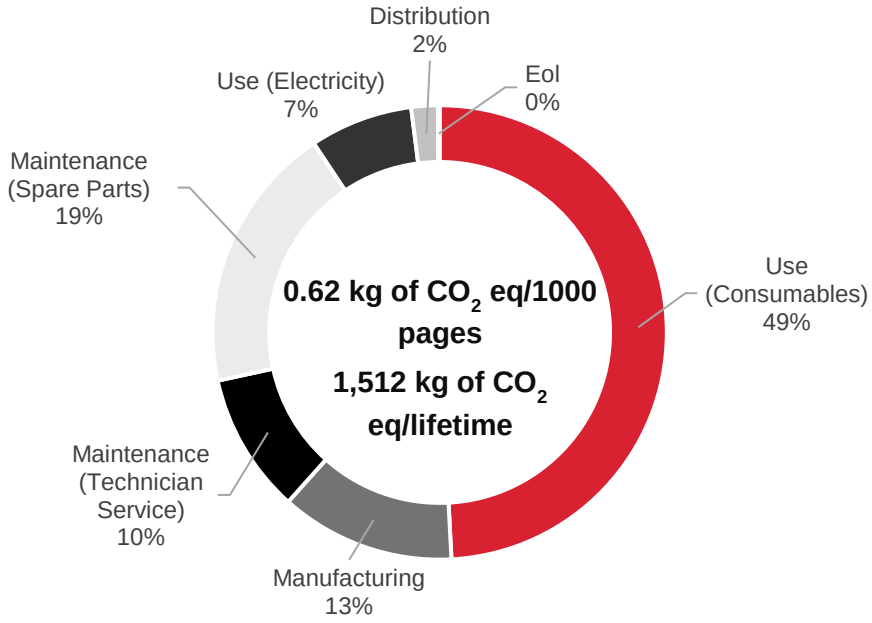

Figure 1 - GWP 100 (excluding biogenic CO_2) of printer life cycle without paper manufacturing and disposal.

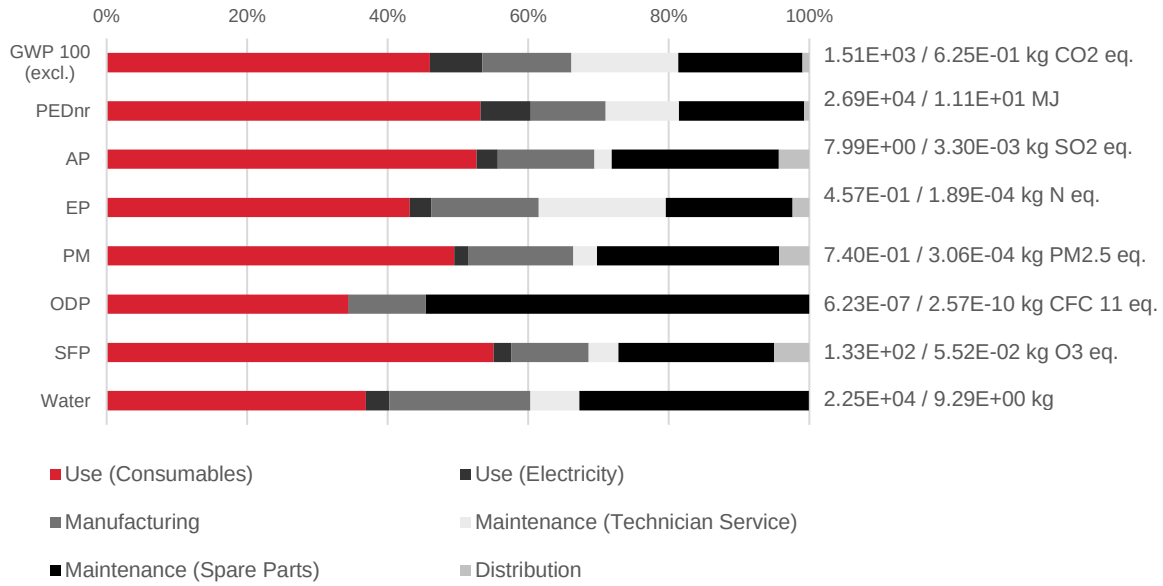

Figure 2 - Contribution analysis of environmental impacts of each printer life cycle stage, without paper manufacturing and disposal. The numbers on the right represent the total of each impact category per lifetime and per 1000 pages.

After including paper manufacturing and disposal in the device's total impacts, the printer was found to have a GWP 100 (excluding biogenic CO2) of 14,858 kg of CO2 eq. per printer lifetime and 6.14 kg of CO2 eq. per 1,000 pages (Table E-1). As shown in Figure 3, paper manufacturing has the largest contribution with a share of 78% of total life cycle GWP 100 (excluding biogenic CO2), followed by paper disposal with a share of 12%. Similarly, for most of the other evaluated impacts, such as AP, EP, PM, SFP, PEDnr, and water consumption, paper manufacturing and disposal contribute over 86% of these impacts.

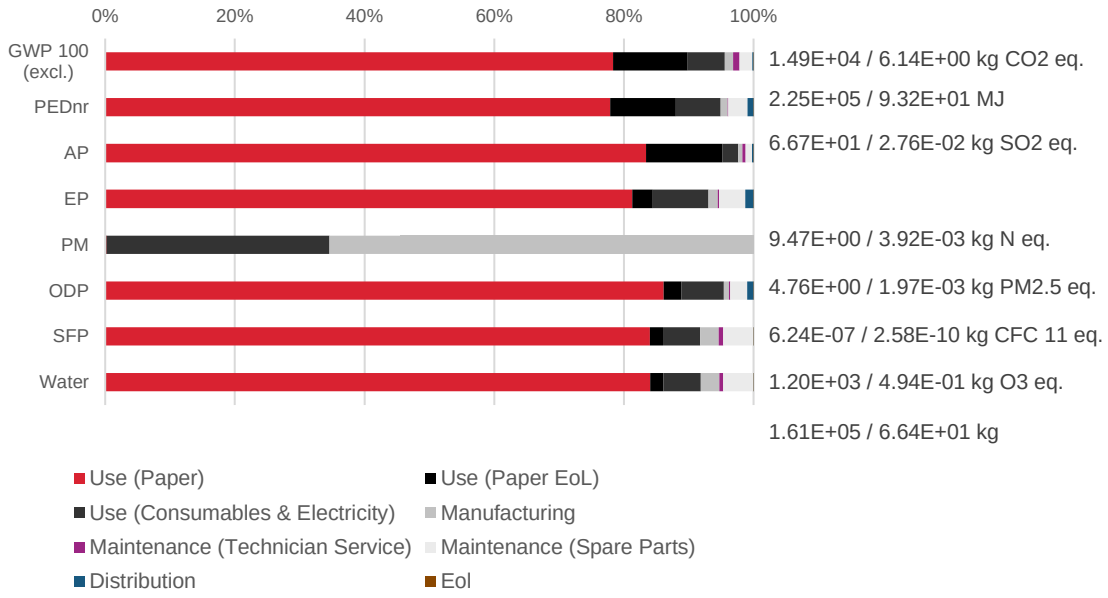

Figure 3 - Contribution analysis of environmental impacts of each printer life cycle stage, including paper manufacturing and disposal. The numbers on the right represent the total of each impact category per lifetime and per 1000 pages.

Assumptions and Limitations

This section discusses the main assumptions (e.g., a conservative approach used) in relation to the key finding presented in the previous subsections of results and sensitivity analyses. In addition, this section elaborates on the limitation of the results relative to the defined goal and scope.

- The weight of some components in the BOM, such as display, grease, and small labels, was not available, and therefore they are not included in the model. In this study, the difference between the weight estimated based on the BOM and the actual weight of the device is less than 1%, making the impact of these gaps on the results not significant.
- The GWP of technician service is dependent on two separate assumptions: technician travel distance and number of service visits. The former was assumed to be 15 miles per drive, or 30 per trip, based on internal estimates. The latter is estimated based on the rounded-up average number of spare parts required per product lifetime. As there is a lack of direct-input data, these estimates may not be representative of actual service technical impacts.
- Although the printer, consumables, and spare parts are assumed to be 100% recycled by the recycling programs at Xerox, a small portion of these products may not be captured by the program and may end up in municipal solid waste management. However, the impact on the results is deemed insignificant because the printer's materials are primarily inert, and landfill is the primary waste management method in the U.S., causing minimal environmental impact.

- The paper dataset developed by Sphera is based on the EU scenario and may differ from the scenario in the U.S., which may cause a discrepancy in the paper manufacturing impacts.
- The energy consumption associated with the final product assembly is not taken into account. This data gap is deemed not to have high significance since the final assembly primarily relies on manual labor and is not considered an energy-intensive process, however, there is still some energy consumption involved within the assembly facility. Consequently, this data gap may lead to a slight underestimation of the overall impacts.

Critical Review Statement

Below are the critical review statement, comments, and opinions from the third-party reviewer in their assessment of the full version of this LCA report.

EarthShift Global
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Final Critical Review Statement

Date	April 2, 2024
Title of the study	**Life Cycle Assessment for the Xerox VersaLink B620 Single Function Printer**
The commissioner of the LCA study	Xerox
The practitioners of the LCA study	Izzy Updike, Xerox
The exact version of the report to which the critical review statement belongs	January, 2024
The reviewer	Tom Etheridge, EarthShift Global, LLC Juanita Barrera Ramirez, EarthShift Global, LLC
Description of the review process, including information on:	
— **whether the review was performed based on ISO 14044:2006, 6.2 or 6.3;**	The review was based on ISO 14044:2006, section 5.2 and 6.2.
— **whether the review was performed in parallel or at the end of the study;**	The review was performed at the end of the study
— **whether the review included or excluded an assessment of the LCI model;**	Inventory provided by Xerox was not independently verified. It was assumed accurate as presented for the study. The inventory was reviewed to ensure that aspects, likely to be material, were not omitted. Assumptions for modeling of inventory were reviewed. Boundary conditions and excluded processes were reviewed to ensure they were properly documented in the report.
— **whether the review included an analysis of individual data sets;**	Individual data set selections were reviewed at a high level across the study, with special focus on datasets that result in high impacts and on unique components where selection of datasets could be challenging or debatable.
Description of how comments were provided, discussed, and implemented;	Comments were provided to Xerox in writing on February 12, 2024. Comments and recommended changes were provided on March 30, 2024 and these were accepted and finalized on April 2, 2024.
Panel Decision	The study meets the ISO 14040 and 14044 standards for third-party reports.
Applicability of Study Results	The study applies to the Xerox VersaLink B620 Single Function Printer produced by Xerox. The results of the study are specific to this product and the data and assumptions used. The results are not considered to be representative of all printers, and the study results should be viewed in context of potential variations in product features and in product use.

Critical Review Summary

A Critical Review of **Life Cycle Assessment for the Xerox VersaLink B620 Single Function Printer** has been carried out by Tom Etheridge and Juanita Barrera Ramirez, EarthShift Global, LLC. The review has been carried out according to ISO 14044:2006 for a third-party LCA report. This review statement in no way endorses the products mentioned in the study.

The study report and supporting documents were reviewed to determine if the following conditions were met:

- The methods used to carry out the LCA are consistent with the ISO 14040 and 14044 standards;
- The methods used to carry out the LCA are scientifically and technically valid;
- The data used are appropriate and reasonable in relation to the goal of the study;
- The interpretations reflect the limitations identified and the goal of the study; and
- The study report is transparent and consistent.

To conduct this critical review, after a review of adherence to ISO 14044, the reviewers carefully reviewed the assumptions and data used to develop the models to ensure the data were transparent and consistent and the data and assumptions were reasonable. The methods were reviewed for validity and consistency and the results were reviewed to ensure they were not over or understated. The study went through two rounds of revisions based on reviewer comments. After the final round there were no objections, and this final review statement was prepared.

Final Review Statement

There were no issues raised by the reviewer. Some minor editorial suggestions for punctuation, spelling, and grammatical changes were made by private communication but these were not material to the study, its results, or its compliance with ISO requirements. As such, the reviewer assesses that the LCA study is in compliance with, and fulfills the requirements of, the ISO 14040 and 14044 standards for third-party LCA reports.

Are the methods used to carry out the LCA consistent with the ISO 14040 and 14044 standards?

The reviewers find that the study is consistent with the ISO LCA standards. The methodology is clearly described, and all modeling assumptions are documented and explained.

Are the methods used to carry out the LCA scientifically and technically valid?

The reviewers find that the methods used to carry out the LCA are scientifically and technically valid.

Are the data used appropriate and reasonable in relation to the goal of the study?

The reviewers find that the use of data is appropriate and reasonable in relation to the goal of the study.

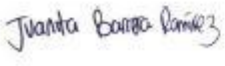
Do the interpretations reflect the limitations identified and the goal and scope of the study?

The reviewers find that the interpretations reflect the limitations identified and the goal of the study.

Is the study report transparent and consistent?

The reviewers find that the study report is transparent and consistent.

Tom Etheridge



Juanita Barrera Ramirez