

Carbon Impact Benefits of Refurbishment

10 servers and 1 storage

Verified
Verified by impartial 3rd party

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Executive Summary

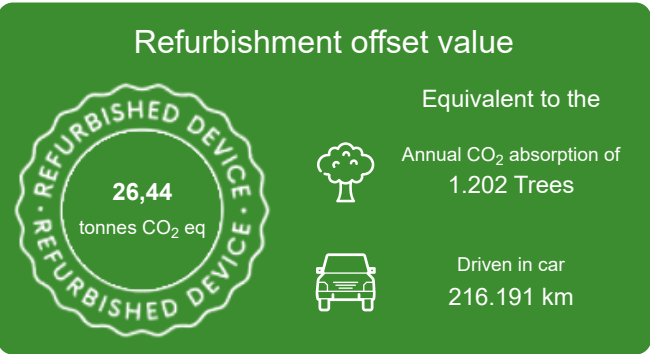
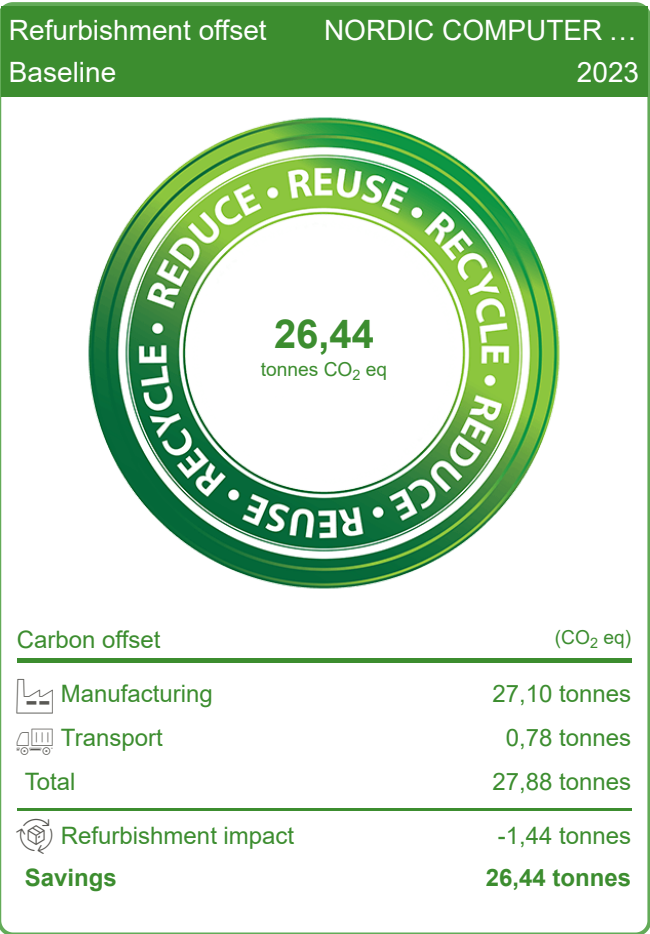
This summary highlights some of the key findings of the following report

What are the benefits to the climate if you send your used products for refurbishment, and how much does it benefit the environment? You will find the answers in this report.

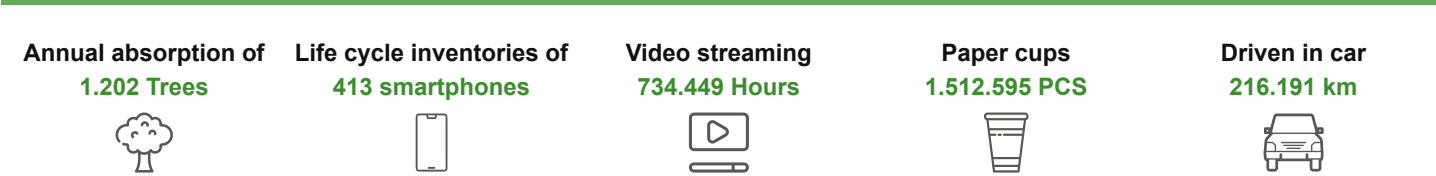
On this page, the most important results in the report are highlighted and the climate impacts are put into perspective. The purpose of the report is, through independent calculation basis, to highlight the differences in climate impact between refurbishment and reuse of products in relation to new production.

In the following pages, the report will shed more light on all figures and areas, thereby creating a more detailed foundation for future decisions. Data and figures can be used for planning that corresponds to the goals and ambitions of the company.

The ReuseWheel® shows the avoided climate impact achieved by reusing products rather than purchasing new. Later in the report, the climate results are calculated in more detail. The documentation and calculation methodology on which the report is based are based on the guidelines of the GHG protocol.



Carbon offset equivalence



Life Cycle Assessment

The included life cycle stages show the avoided climate impact that is achieved by refurbishing and reusing products resulting in extended operational life of products and solutions.

Life cycle stages

Life cycle assessment (LCA) is a method of assessing the environmental impact of products throughout their entire life cycle - from the extraction of raw materials, manufacture and transport, the use of the solution and up to and including disposal and / or recycling.

The report documents exclusively on the climate impact that arises through refurbishment and reuse in relation to buying new, also known as 'Cradle to Gate'. The product use -and end of life stages are not included in this report.

Manufacturing

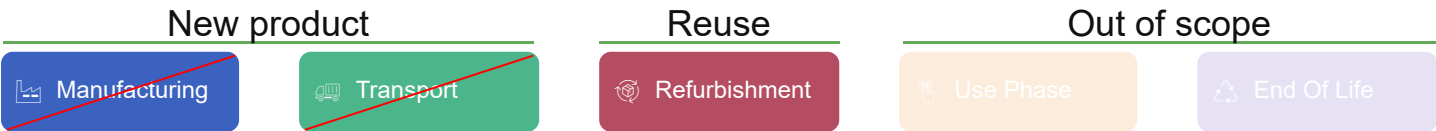
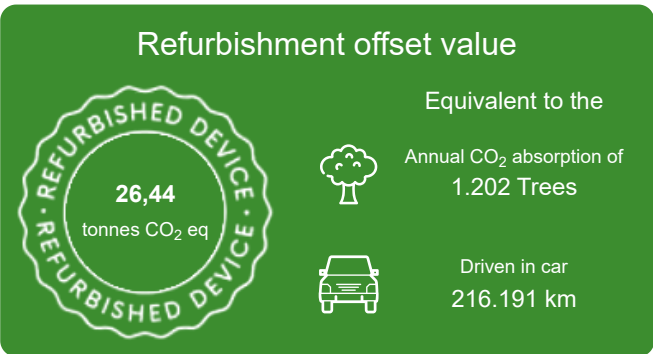
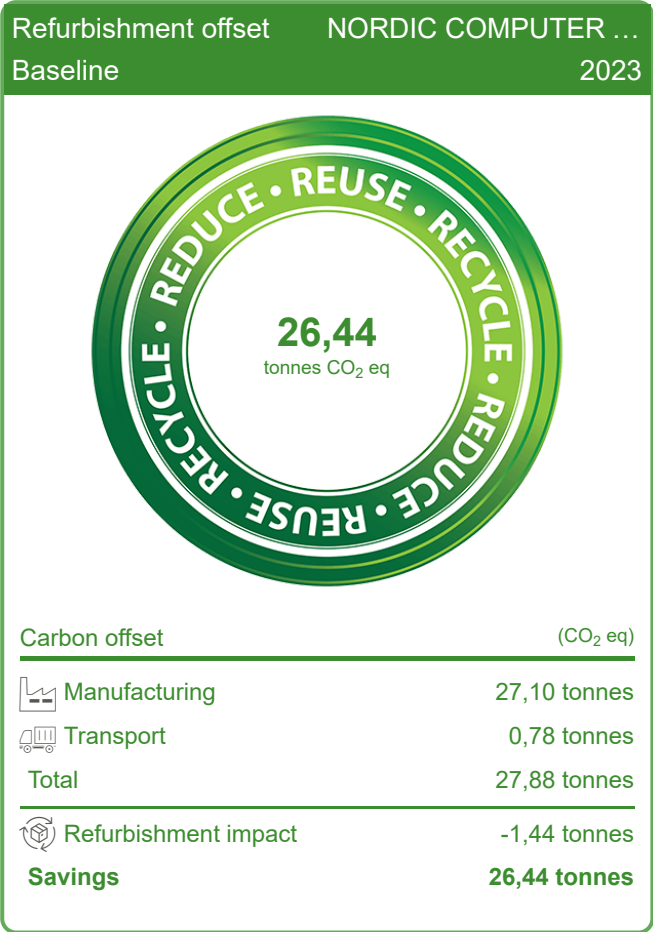
This part also covers resources (raw material acquisition) and processing (including production of parts and components) and production of the main product.

Transport

Transport (airplane, freight ship and light and heavy-duty trucks) from supplying companies, resale, and transport to customers.




Refurbishment impact

Refurbishment impact refers to the GHG emissions in regards to repair, component replacement and packaging need for making a product ready for resale. When purchasing refurbished product the refurbishment impact have a negative impact but nevertheless an impact that is considerable lower than the raw material acquisition, manufacturing and transport need in a new product.



Refurbishment Results

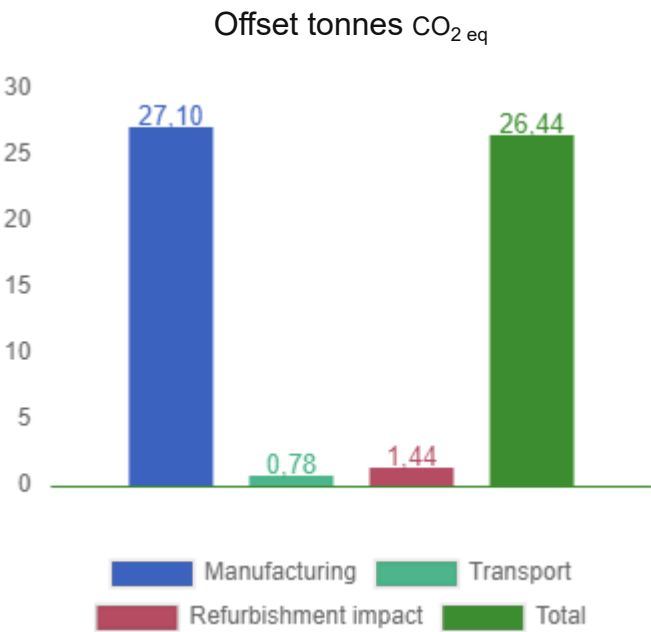
The purpose of this page is to highlight greenhouse gas emissions from the preparation and repair of products for reuse, which is compared to the much greater climate impact that occurs with the purchase of newly produced products.

GHG emissions CO ₂ eq					
Category		Manufacturing Offset	Transport Offset	Refurbishment impact	Total Offset
	Server	15,94 tonnes	0,53 tonnes	-0,85 tonnes	15,62 tonnes
	Storage	10,73 tonnes	0,24 tonnes	-0,57 tonnes	10,41 tonnes
	Data Center				
		0,43 tonnes	0,01 tonnes	-0,02 tonnes	0,42 tonnes
	Accessories				
Total		27,10 tonnes	0,78 tonnes	-1,44 tonnes	26,44 tonnes

*Total offset is Manufacturing offset + Transport offset – Refurbishment impact

The total amount of greenhouse gases emitted directly and indirectly from the covered products during their production and transport stage divided into relevant categories.

The total greenhouse gas emissions across the entire product range in the report are summarized in the graph, which visualizes the extraction of raw materials, manufacturing, and repair prints as well as the total benefits of reuse (offset value).















Disclaimer

The reports reflect results based on available data and best practices. These results represent the typical energy consumption for products or solutions under standard use patterns, and carbon footprints are likewise calculated in accordance with the guidelines in the GHG Protocol.

Appendix - Baseline - Buy 10 servers and 1 storage refurbished

This page contains the life cycle inventory of the included products separated into the relevant categories. The included life cycle phases are visualized by the corresponding icons.

Device list

Category	Model	LCA phases	Amount	CO ₂ eq per product	CO ₂ eq total
 Storage	CA (Nordic Computer - HPE 3Par StoreServ 8200 2-node...		1	71,5 kg	71,5 kg
 Server	CA (Nordic Computer - HPE SER DL380 G10 8SFF CTO NC...		10	66,4 kg	664,0 kg
 Data Center Accessories	CA (Nordic Computer - Xeon Gold 5118 12C 2.3GHz 16.5MB...		20	1,1 kg	22,7 kg
 Server	CA (Nordic Computer - HPE 32GB 2Rx4 PC4-2666V-R...		80	2,3 kg	185,7 kg
 Storage	CA (Nordic Computer - HPE HDD 300GB 12G 10K 2.5" CH S...		20	1,4 kg	28,1 kg
 Storage	CA (Nordic Computer - HPE 3Par HDD 3.84TB 2.5" SSD 200...		24	19,4 kg	466,6 kg

CA Category Average data: Average values for environmental factors within a product category.



LCA - Baseline - Buy 10 servers and 1 storage refurbished

Calculations are made to complement ISO 14040 and ISO 14044 for the environmental assessment of the life cycle impact of goods.

Storage



Data - Storage

 Product count	45
 Refurbishment impact per unit	12,58 kg CO ₂ eq

LCA results	Part	CO ₂ eq
Manufacturing	97,8%	10.733,31 kg
Transport	2,2%	238,78 kg
Total	100,0%	10.972,09 kg
Refurbishment impact	5,2%	-566,16 kg
Savings	-	10.405,93 kg

Reuse

Refurbishment of storage(s) have remarkable environmental benefits saving the procuring entity GHG emissions. These impacts include a refurbishment impact from the refurbishment process but removes the manufacturing and transport stage from the products.

Refurbishment impact
566,16 kg (CO₂ eq)





LCA - Baseline - Buy 10 servers and 1 storage refurbished

Calculations are made to complement ISO 14040 and ISO 14044 for the environmental assessment of the life cycle impact of goods.

Server



Data - Server

 Product count	90
 Refurbishment impact per unit	9,44 kg CO ₂ eq

LCA results	Part	CO ₂ eq
Manufacturing	96,8%	15,94 tonnes
Transport	3,2%	0,53 tonnes
Total	100,0%	16,47 tonnes
Refurbishment impact	5,2%	-0,85 tonnes
Savings	-	15,62 tonnes

Reuse

Refurbishment of server(s) have remarkable environmental benefits saving the procuring entity GHG emissions. These impacts include a refurbishment impact from the refurbishment process but removes the manufacturing and transport stage from the products.

Refurbishment impact
0,85 tonnes (CO₂ eq)





LCA - Baseline - Buy 10 servers and 1 storage refurbished

Calculations are made to complement ISO 14040 and ISO 14044 for the environmental assessment of the life cycle impact of goods.

Data Center Accessories



Data - Data Center Accessories

 Product count	20
 Refurbishment impact per unit	1,14 kg CO ₂ eq

LCA results	Part	CO ₂ eq
Manufacturing	97,5%	428,85 kg
Transport	2,5%	11,15 kg
Total	100,0%	440,00 kg
Refurbishment impact	5,2%	-22,70 kg
Savings	-	417,30 kg

Reuse

Refurbishment of data center accessories(s) have remarkable environmental benefits saving the procuring entity GHG emissions. These impacts include a refurbishment impact from the refurbishment process but removes the manufacturing and transport stage from the products.

Refurbishment impact
22,70 kg (CO₂ eq)



Appendix - References



Trees

22 kg CO_{2eq} per year

One year average absorption from a mature tree.

Key facts European Environmental Agency.



Smartphones

64 kg CO_{2eq} per unit

Total life cycle impact based on 2021 Apple Iphone.

Apple product environmental report – Iphone 13



Video Streaming

0.036 kg CO_{2eq} per hour

According to the revised study from the International Energy Agency.

The carbon footprint of streaming video: fact-checking the headlines.



Paper Cups

0.01748 kg CO_{2eq} per unit

Total life cycle impact of a paper cup.

Cradle-to-grave life cycle assessment of single-use cups made from PLA, PP and PET



Driven In Car

0.1223 kg CO_{2eq} / km

Average carbon dioxide emissions from new passenger cars sold in Europe.

EEA – CO₂ performance of new passenger cars in Europe. European Environmental Agency 2019.

Appendix - Methodologies

Methodologies correlates with known corporate GHG accounting standards by applying the use of primary data sources to create industry averages.

Geographical representativeness: Country specific carbon emissions intensity is used to calculate use phase emissions to provide greater accuracy and greater insight into the GHG impacts.

A life cycle assessment is the compilation and evaluation of the inputs, outputs and potential environmental impacts of a product system throughout its life cycle' –ISO 14040: 2006.

Data and results include GHG's whose 100-year GWP values have been identified by the IPCC.

Products specific data based on industry averages in accordance with the average data method GHG protocol Product life cycle accounting reporting standard.

ICT product industry averages is based on manufacturers PAIA PCF's. PAIA (Product Attribute to Impact Algorithm)is used by most manufactures in the ICT sector asses the product carbon footprint of products. PAIA is a streamlined LCA tool developed by MIT's Materials System Laboratory in concert with Arizona State University, and University of California at Berkeley.

Recommended use

“Using product-level GHG data based on the Product Standard as a source of data to calculate scope 3 emissions associated with selected product types.”

Source: GHG protocol Product life cycle accounting reporting standard 1.6.

“In fact, data collected from a supplier may actually be less accurate than industry-average data for a particular product”

Source: GHGProtocol Scope 3 calculation guide – Chapter 1

