

IBM z16

Product carbon footprint



IBM is committed to environmental leadership in all its business activities, from operations to the design of its products and use of its technology. As an expression of that commitment, we provide a product's carbon footprint (PCF) for representative products. A product carbon footprint can be used to estimate the full life cycle emissions of a product and identify areas for the greatest greenhouse gas reduction opportunity.¹

IBM z16™ configuration	
CPC drawer	
Module, DCM	4
PCIe Fan Out Gen 4	3
Integrated Coupling Adapter SR	3
PCIe+ I/O drawer	
FICON Express32S LX	8
OSA-Express 7S 10 GbE LR	6
Coupling Express2 LR	1
Crypto Express8S (2 HSM)	1
PCIe Interconnect Gen4	2

Table 1: Typical product configuration

1. Greenhouse Gas Protocol. Product Life Cycle Accounting and Reporting Standard.
https://ghgprotocol.org/sites/default/files/standards/Product-Life-Cycle-Accounting-Reporting-Standard_041613.pdf

The estimate

207,000 kg CO₂ eq

Will be used over the course of the IBM z16 CPC drawer lifecycle when used in the EU for 5 years.

All estimates of carbon footprint are uncertain. IBM reports the 95th percentile of the carbon footprint estimate to reflect that uncertainty. For this product, that estimate has a mean of 75,000 ± 45,000 kg CO₂ eq over a use period of 5 years.



Impact by phases of the product's lifecycle

The PCF for server equipment is driven almost entirely by the use phase which is highly variable based on the electricity generation source used to power the product, the expected use life of the product and the power profile. The analysis for this product shows that 82.7% of its carbon footprint occurs in the use phase. IBM focuses on improving our product energy efficiency and on providing mechanisms for our clients to measure, in real-time, the actual energy consumption of the product.

Figure 1 shows the estimated contribution for the individual phases of the product's lifecycle over a use period of 5 years, reported as the 95th percentile for each phase.

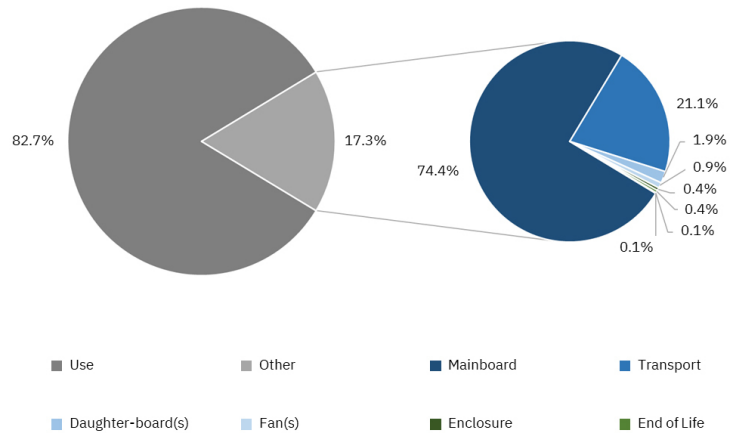


Figure 1: Carbon footprint impact by phases of the lifecycle for IBM z16 CPC drawer typical product configuration using the PAIA model; 82.7% occurs in the use phase and the remaining 17.3% is broken out by component contribution.

Figure 2 shows the uncertainty in the most significant aspects of the product's carbon footprint. Only categories that contribute more than 2% to the total product carbon footprint are shown for clarity.

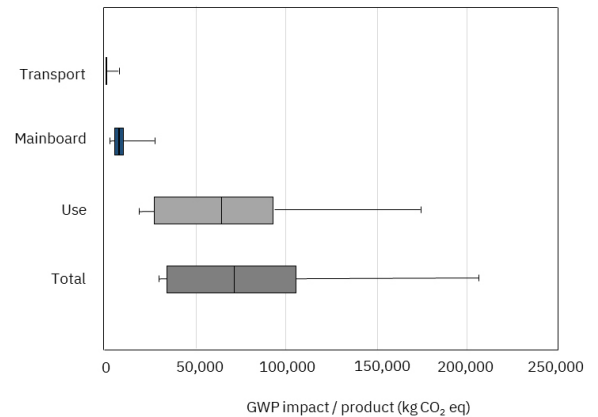


Figure 2: Uncertainty in the PCF estimate for IBM z16 CPC drawer typical product configuration; that estimate has a mean of 75,000 ± 45,000 kg CO₂ eq over a use period of 5 years.

The estimate

125,000 kg CO₂ eq

Will be used over the course of the IBM z16 PCIe+ I/O drawer lifecycle when used in the EU for 5 years.

All estimates of carbon footprint are uncertain. IBM reports the 95th percentile of the carbon footprint estimate to reflect that uncertainty. For this product, that estimate has a mean of 18,400 ± 19,500 kg CO₂ eq over a use period of 5 years.



Impact by phases of the product's lifecycle

Impact by phases of the product's lifecycle

The PCF for server equipment is driven almost entirely by the use phase which is highly variable based on the electricity generation source used to power the product, the expected use life of the product and the power profile. The analysis for this product shows that 90.0% of its carbon footprint occurs in the use phase. IBM focuses on improving our product energy efficiency and on providing mechanisms for our clients to measure, in real-time, the actual energy consumption of the product.

Figure 3 shows the estimated contribution for the individual phases of the product's lifecycle over a use period of 5

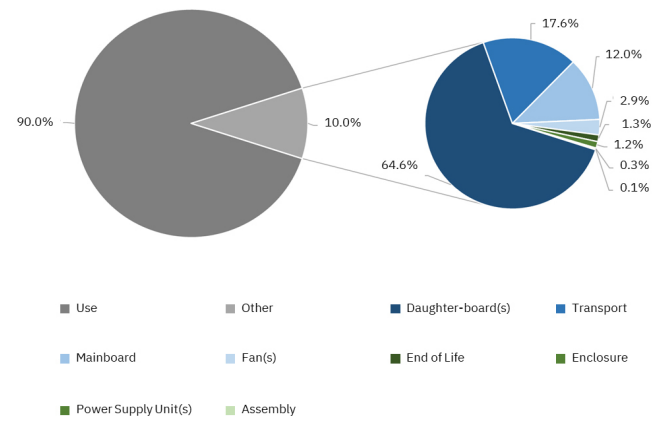


Figure 3: Carbon footprint impact by phases of the lifecycle for the IBM z16 PCIe+ I/O typical product configuration using the PAIA model; 90.0% occurs in the use phase and the remaining 10.0% is broken out by component contribution.

Figure 4 shows the uncertainty in the most significant aspects of the product's carbon footprint. Only categories that contribute more than 2% to the total product carbon footprint are shown for clarity.

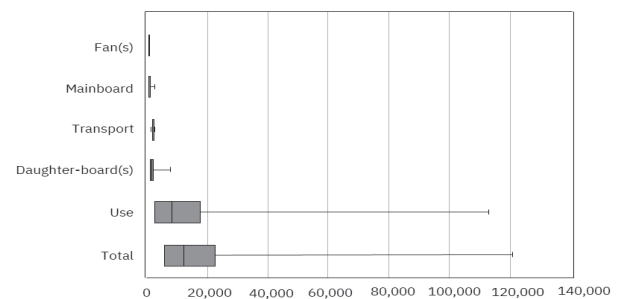


Figure 4: Uncertainty in the PCF estimate for IBM z16 PCIe+ I/O drawer typical product configuration; that estimate has a mean of 18,400 ± 19,500 kg CO₂ eq over a use period of 5 years.

PAIA input assumptions

The PCF assumes a typical configuration of the product as described in Table 1. The numbers for your specific configuration might be different. The data used in the PAIA server tool is provided in Table 2 for the IBM z16 CPC drawer and Table 3 for the IBM z16 PCIe+ I/O drawer.

Product configuration and PAIA input information	
Server type	Rack
Server quantity	1
Number of PSU	4
Number of fans	5
Server weight	83.0 kg
Packaging weight	18.8 kg
Motherboard	
PWB area	2374.6 cm ²
CPU Quantity	4 TB
CPU package area	56.4 cm ²
DRAM total capacity	3.58 TB
Daughterboard	
Sub card total PWB area	2374.6 cm ²
Sub card main chip package area	251.5 cm ²
Sub card chip count	91
PSU	
PSU weight	1.13 kg
PSU dimensions	19.2 cm x 10.0 cm
Use	
Product lifetime	5 years
Yearly energy consumption	25447 kWh
Location	
Assembly location	US
Use location	EU
Transportation	
To country of use	
by air	6120 km
Within country of use	
by truck	300 km
End of life	
Fraction recycled	0.97
Fraction shredded recycling	0.00
<p>Note: Power consumption data is obtained using the IBM Power Estimation Tool for 3931, a web-based tool for estimating power requirements for IBM z16. This tool estimates typical power requirements for a specific system configuration under normal operating conditions. The power consumption assumes that the product operates 24 hours a day, 365 days a year for its product lifetime.</p>	

Table 2: PAIA input information for IBM z16 CPC drawer

Product configuration and PAIA input information	
Server type	Rack
Server quantity	1
Number of PSU	4
Number of fans	5
Server weight	83.0 kg
Packaging weight	18.8 kg
Motherboard	
PWB area	2374.6 cm ²
CPU Quantity	4 TB
CPU package area	56.4 cm ²
DRAM total capacity	3.58 TB
Daughterboard	
Sub card total PWB area	2374.6 cm ²
Sub card main chip package area	251.5 cm ²
Sub card chip count	91
PSU	
PSU weight	1.13 kg
PSU dimensions	19.2 cm x 10.0 cm
Use	
Product lifetime	5 years
Yearly energy consumption	25447 kWh
Location	
Assembly location	US
Use location	EU
Transportation	
To country of use	
by air	6120 km
Within country of use	
by truck	300 km
End of life	
Fraction recycled	0.97
Fraction shredded recycling	0.00
<p>Note: Power consumption data is obtained using the IBM Power Estimation Tool for 3931, a web-based tool for estimating power requirements for IBM z16. This tool estimates typical power requirements for a specific system configuration under normal operating conditions. The power consumption assumes that the product operates 24 hours a day, 365 days a year for its product lifetime.</p>	

Table 3: PAIA input information for IBM z16 PCIe+ I/O drawer



Limitations of PAIA

PAIA results represent a streamlined Life Cycle Assessment (LCA). While the product carbon footprint provides a high-level estimate of the emissions associated with the product, it should not be used for emissions inventory, formal carbon footprinting exercises or comparing products. LCA results are strongly influenced by the assumptions made by the analyst; if those assumptions are inconsistent, comparisons are not likely meaningful. Furthermore, PAIA may not be compliant with the primary data requirements of some LCA standards. The results from the PAIA tools are liable to change over time as the methodology is improved and data is updated. More information on these limitations, as well as general guidance for interpreting this report, is available in the publication [“Assessment of lifecycle carbon footprints of products”](#)

This PCF estimate was produced using the Product Attributes to Impact Algorithm (PAIA) model, developed by the Massachusetts Institute of Technology’s Materials Systems Laboratory and partners, Version 1.3.1, March 10, 2022, copyright by the ICT Benchmarking collaboration including the Massachusetts Institute of Technology’s Materials Systems Laboratory and partners.

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