DELL Technologies

Life Cycle Assessment (LCA) Report

Report produced September 2025

Life Cycle Assessment of Dell Server PowerEdge R760

From design to end-of-life and everything in between, we work to reduce the environmental impact of the products you purchase. A **lifecycle assessment (LCA)** is a standardized method for measuring those impacts across every phase of a product's journey—**raw material extraction, manufacturing, transport, use, and end-of-life**. By estimating impacts at each stage, we gain a complete picture of a product's footprint and identify opportunities for meaningful improvement.

The products selected for this LCA is Dell PowerEdge R760 server and represents a standard server product. The key assumptions and product typical market configuration is summarized in Table below.

Assumptions	
Lifetime of product	4 Years
Use location	EU & USA & CN
System Boundaries	Cradle-to-grave
LCIA Methodology	EF 3.1 (Environmental Footprint v3.1)
Software & Database	LCA FE 10.9.1.10 and CUP2024.2 database by Sphera
PowerEdge R760 Market Configuration	
Form Factor	2U 16G - U rack-mounted server; Height: 86.8 mm (3.41 in), Width: 482 mm (18.97 in), Depth (with bezel): 772.13 mm (30.39 in).
Processors	(x2) Intel Xeon Silver 4410Y 2G, 12C/24T, 16GT/s, 30M Cache, Turbo, HT (150W) DDR5-4000 12 core
Memory	32 DDR5 RDIMM slots, up to 8 TB max; speeds: up to 4800 MT/s (4th-Gen), up to 5600 MT/s (5th-Gen)
SSDs	1,92 TB type (2 units)
Storage Drive Bays	**Front Bays:** Up to 12 × 3.5″ SAS/SATA (max 240 TB); up to 8/16/24 × 2.5″ SAS/SATA/NVMe (max up to 368.64 TB) **Rear Bays:** Up to 2 or 4 × 2.5″ SAS/SATA/NVMe (max 61.44TB) Also supports up to 16 × EDSFF E3.S Gen5 NVMe
Cooling	Standard air-cooled chassis with Smart Flow for optimized airflow (x6 fans)
Power Supply Units	1100 W PSU (dual)
Generation	16th-generation PowerEdge server

Results Summary

The Life Cycle Assessment (LCA) of the Dell PowerEdge R760 server, conducted by Sphera for EPEAT compliance, reveals that the majority of environmental impacts stem from the use phase, which accounts for approximately 87–91% of the total Global Warming Potential (GWP), depending on the region. The total GWP is 4177.4 kg CO_2 equivalent for usage in the U.S. and 2896.0 kg CO_2 equivalent for usage in the EU, with the difference largely attributed to the higher fossil fuel content in the U.S. electricity grid. Manufacturing contributes around 10–15% of the total GWP, with electronics—particularly the motherboard, CPU, and SSDs—being the most impactful components despite their relatively low weight.

End-of-life recycling offers a credit of –62.2 kg CO_2 equivalent, primarily from recovering metals like steel and precious elements from electronics. Scenario analyses show that heavier workloads and less efficient energy use significantly increase the server's carbon footprint, while using renewable energy can substantially reduce it. The study concludes that optimizing server configurations, improving component design, and promoting energy-efficient usage and recycling strategies are key levers for reducing environmental impact.

Dell Server PowerEdge R760

Key Findings:

- **Total Global Warming Potential (GWP):**
  - US scenario: 4177.4 kg CO_2 eq,
  - EU scenario: 2896.0 kg CO_2 eq
  - Use phase contributes ~87–91% of total GWP
- **Manufacturing impacts:**
  - Electronics (motherboard, CPU, SSDs) account for ~76.8% of manufacturing GWP
  - These components represent only ~12.5% of the product's weight
  - Mechanical parts (e.g., chassis) make up ~45% of weight but only ~8% of GWP
- **Use phase energy consumption:**
  - Light-medium workload: ~7892.8 kWh over 4 years
  - Heavy workload: ~9630.7 kWh over 4 years (18% increase)
  - US grid mix results in 33% higher GWP than EU due to more fossil fuel use
- **End-of-Life (EoL) recycling:**
  - Offers a credit of –62.2 kg CO_2 eq
  - 52% of EoL credit from electronics (e.g., gold, palladium, copper)
  - 48% from mechanicals (e.g., steel, plastics, packaging)
- **Distribution impacts:**
  - Minimal contribution to overall GWP (<0.2%)
  - Transport modeled via truck and air (Mexico to US) and truck (Poland to EU)
- **Sensitivity analysis:**
  - Use of renewable energy grid mix could reduce GWP significantly
  - Energy-efficient usage practices (e.g., optimized workloads) can lower impacts

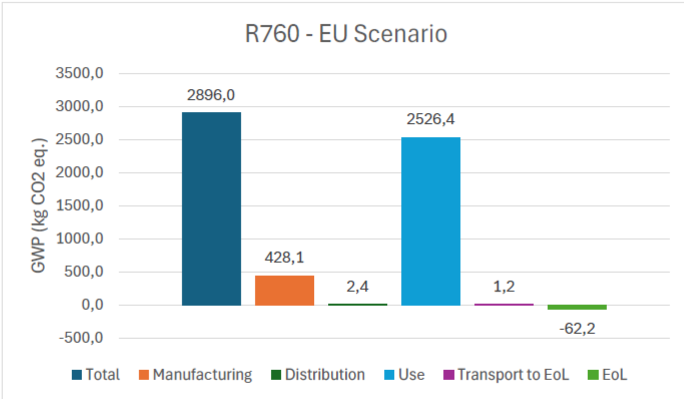

Figure 4-2: Contribution of the different stages of the life cycle to the global warming potential (GWP) of the Server R760 used in the EU

In addition to GWP, other impact categories such as acidification, eutrophication, photochemical ozone formation, resource use, and water use were assessed in detail.

Table E-1: All impact categories – R760

	Manufacturing (EU)	Manufacturing (US)	Distribution (PLto EU)	Distribution (MEX to US)	Use (Average EU)	Use (Average US)	Transport to EoL	EoL w. rec.
EF 3.1 Acidification [Mole of H+ eq.]	3,95E+00	3,96E+00	2,49E-03	1,25E-02	5,46E+00	5,28E+00	1,24E-03	-1.8299
EF 3.1 Climate Change - total [kg CO2 eq.]	4,28E+02	4,27E+02	2,41E+00	5,04E+00	2,53E+03	3,81E+03	1,21E+00	-62.5256
EF 3.1 Ecotoxicity, freshwater - total [CTUe]	2,42E+03	2,41E+03	3,96E+01	4,26E+01	8,58E+03	1,13E+04	1,98E+01	-175.175
EF 3.1 Eutrophication, freshwater [kg P eq.]	1,25E-03	1,24E-03	6,46E-06	4,37E-06	5,33E-03	1,25E-03	3,23E-06	-3.1E-05
EF 3.1 Eutrophication, marine [kg N eq.]	4,20E-01	4,21E-01	8,68E-04	5,64E-03	1,31E+00	1,14E+00	4,34E-04	-0.08024
EF 3.1 Eutrophication, terrestrial [Mole of N eq.]	4,36E+00	4,38E+00	9,02E-03	6,17E-02	1,47E+01	1,25E+01	4,51E-03	-0.87571
EF 3.1 Human toxicity, cancer - total [CTUh]	1,52E-07	1,52E-07	5,32E-10	6,83E-10	8,10E-07	5,01E-07	2,66E-10	-6.1E-08
EF 3.1 Human toxicity, non-cancer - total [CTUh]	3,32E-06	3,31E-06	3,00E-08	1,58E-08	1,70E-05	7,30E-06	1,50E-08	-4.8E-07
EF 3.1 Ionising radiation, human health [kBq U235 eq.]	3,20E+01	3,20E+01	5,56E-03	1,53E-02	1,33E+03	5,06E+02	2,78E-03	-1.30386
EF 3.1 Land Use [Pt]	1,30E+03	1,29E+03	1,35E+01	4,31E+00	2,04E+04	5,85E+03	6,77E+00	-55.6767
EF 3.1 Ozone depletion [kg CFC-11 eq.]	9,67E-09	9,67E-09	2,82E-13	9,71E-13	5,68E-08	2,81E-08	1,41E-13	-4.8E-10
EF 3.1 Particulate matter [Disease incidences]	3,95E-05	3,97E-05	2,34E-08	5,12E-08	4,51E-05	4,87E-05	1,17E-08	-1.5E-05
EF 3.1 Photochemical ozone formation, human health [kg NMVOC eq.]	1,29E+00	1,30E+00	2,02E-03	1,57E-02	3,25E+00	3,29E+00	1,01E-03	-0.32634
EF 3.1 Resource use, fossils [MJ]	5,95E+03	5,95E+03	3,05E+01	6,56E+01	5,09E+04	6,24E+04	1,53E+01	-735.111
EF 3.1 Resource use, mineral and metals [kg Sb eq.]	5,62E-02	5,62E-02	1,59E-07	8,04E-07	5,18E-04	4,45E-04	7,94E-08	-0.02177
EF 3.1 Water use [m³ world equiv.]	8,50E+01	8,58E+01	9,59E-03	3,85E-02	6,25E+02	7,82E+02	4,79E-03	-11.9634

Conclusion

The Life Cycle Assessment of the Dell PowerEdge R760 server reveals that the use phase is the dominant contributor to its overall environmental impact, primarily driven by electricity consumption over its operational lifetime.

While electronic components such as the motherboard, CPU, and SSDs represent a small fraction of the product's weight, they account for the majority of manufacturing-related greenhouse gas emissions, underscoring the need for targeted design improvements. Regional differences in grid mixes significantly influence the server’s carbon footprint, with the US scenario showing 33% higher GWP than the EU.

End-of-life recycling, particularly of steel and precious metals, offers meaningful environmental credits, highlighting the importance of robust recovery strategies.

These findings support a dual focus on energy-efficient usage and environmentally conscious component design to reduce the server’s life cycle impacts.

How does Dell use the LCA Results?

- Support EPEAT standard regulations.
- Determine environmental hotspots over the product’s life cycle which can be used to support the development of more environmentally sustainable products.
- Provide answers to customer inquiries.