PURESTORAGE®
Uncomplicate Data Storage, Forever

BUSINESS WHITE PAPER

FlashArray//X70 Life Cycle Analysis

Executive Summary

Pure Storage® is a global leader in storage and data management. Our mission is to redefine the storage experience by simplifying how people consume and interact with data, all while focusing on positively impacting customers, partners, and employees. We at Pure Storage believe we can make a significant impact in reducing data center emissions worldwide through our environmental sustainability efforts, including designing products and solutions that enable customers to reduce their own carbon and energy footprints.

As part of our ongoing commitment to accuracy in reporting and product sustainability, Pure commissioned WSP USA Inc. to develop a Life Cycle Analysis (LCA) to determine the cradle-to-grave fossil-based global warming potential (GWP)—also referred to as greenhouse gas (GHG) emissions—non-renewable primary energy demand (PED), and blue water consumption (BWC) for our most popular FlashArray™ model: the FlashArray//X70. The study also included a comparison of FlashArray//X70 use phase impacts against two commonly encountered competitive products and a comparison of FlashArray//X70 production impacts to a similar product from a market competitor.

We undertook this Life Cycle Analysis (LCA) because we know our customers are becoming more interested in the environmental impacts of their data centers and the infrastructure in them. As a result, energy efficiency and sustainability are becoming more common as decision criteria in IT purchasing decisions. There are different ways of approaching LCA, and at Pure Storage we strongly believe the best approach is one that will provide the most certainty and the highest transparency for our customers. That is why we chose to employ an ISO standard LCA framework. This produced a precise and actionable LCA report that helps customers better understand the true cradle-to-grave impact of our products.

We could have chosen a less specific or "streamlined" life cycle analysis framework, which would have made the LCA reporting exercise a lot easier and faster, but would have created significant tradeoffs for our customers. Streamlined LCA frameworks are not specific to a given vendor product. Instead, they are based on generic assumptions and tear down data from a small set of storage vendors. The streamlined analysis is then based on probability modeling using the limited generic dataset. As a result, the streamlined LCA framework does not provide specific actionable recommendations for a vendor's products or a complete understanding of the cradle-to-grave impact of a product. We at Pure feel that our approach using an ISO standards-based LCA framework, with its requisite third-party critical analysis, provides the most useful, reliable, and actionable information for our customers.

The FlashArray//X70 LCA was conducted in accordance with ISO standards 14040 and 14044 on LCA. A critical review of the FlashArray//X70 LCA was completed by three independent experts in December of 2022. The reviewers' credentials, report certification, and overall findings are summarized in the verification statement contained within the completed LCA report.

Key findings of the LCA Include

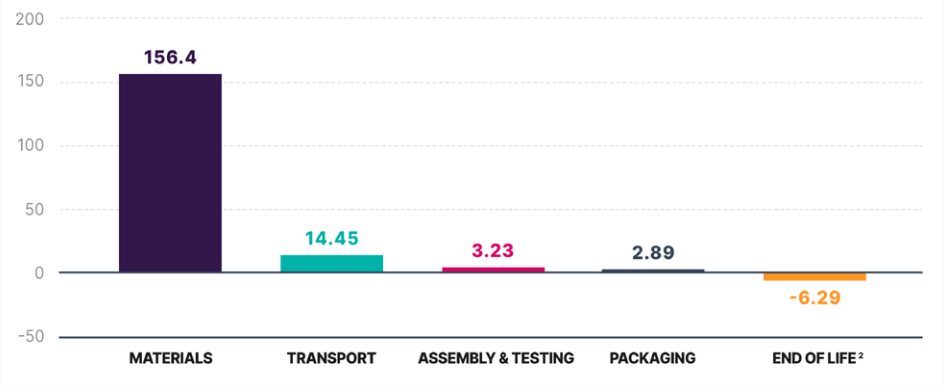
The top contributor to GHG emissions is electricity consumption during the use phase (operation) of the array—roughly 96% of overall GHG emissions.

The total GHG emissions (including use phase) for a typical Pure Storage FlashArray//X70 w/2.3 PB effective capacity is 4.1 metric tons of CO2e per PB per year or 9.5 metric tons of CO2e per array per year. According to the epa.gov GHG equivalencies calculator this is equivalent to CO2 emissions from of any of the following:

ENERGY	LITERS	PROPANE TANKS
1.2	**4047**	**388**
HOMES' USE FOR ONE YEAR	LITERS (1,069 GALLONS)	USED FOR HOME BARBEQUE GRILLS

Excluding use phase, the total GHG emissions work out to 390 kg CO2e per array and 170 kg CO2e per PBe.

NON-USE PHASE kgCO2e PER PBe



According to the epa.gov GHG equivalencies calculator this is equivalent to CO2 emissions from of any of the following:

ENERGY	LITERS	PROPANE TANKS
1	**167**	**16**
BARREL OF OIL	LITERS (44 GALLONS)	USED FOR HOME BARBEQUE GRILLS

The FlashArray//X70 comparative analysis showed a reduction in total energy demand of up to 85% compared to the competitive products that were analyzed.

The modular chassis design, Evergreen® subscription, product recycling, and internal supply recycling programs found in FlashArray reduced non-use phase carbon emission impact by approximately 4% overall.

The FlashArray//X70 LCA report from WSP USA (linked below) concluded that the Pure Storage portfolio of products has a high recycling rate with approximately 75% of end-of-life FlashArray systems being recycled (only 25% were landfilled) in CY2019

Including use phase, the total blue water consumption of the FlashArray//X70 array is 59 1000L per array and 26 1000L per effective PB.

With rising energy uncertainty and skyrocketing volumes of data, enterprises need to address data center power utilization to contain costs and meet sustainability goals. Pure Storage delivers sustainability benefits throughout our portfolio of products and services from a combination of technology, design philosophy, and a ruthless focus on driving the best outcomes for our customers.

Pure Storage is the most sustainable choice in storage and data management because of key technologies that we have developed and design decisions we have implemented:

- DirectFlash® technology from Pure Storage delivers unparalleled density and efficiency from flash, driving significant energy reductions above what is possible with SSDs.
- The built-for-flash software from Pure Storage, combined with DirectFlash technology, delivers more reliable products, longer service lifetimes, and three times the industry average SSD reliability, dramatically reducing e-waste.
- Always-on data-reduction further enhances storage efficiency, reducing effective energy usage without compromising performance. Because there are none of the performance trade-offs typically associated with competitive storage data reduction capabilities, Pure Storage customers can realize the benefits of full efficiency and lower emissions from their storage.
- Our ethos of delivering performance and simplicity allows customers to consolidate their IT environments, reduce their overall footprint, and drive higher utilization and reuse.
- The unique architecture of Evergreen® Storage means that our products don't become obsolete or require wholesale replacement like traditional systems. This architecture enables our arrays to be upgraded non-disruptively, allowing our customers to benefit from the latest hardware and software technology and reduces unnecessary product replacements and associated e-waste.
- We design our packaging to be recyclable and promote reuse in order to reduce waste, benefiting both our customers and the environment.

Learn More

To see how FlashArray can help your business achieve NetZero goals and reduce energy consumption within your datacenter(s), contact your Pure Account Team, Pure Sales Partner, or Pure Reseller.

To access the full FlashArray//X70 Life Cycle Analysis Report created by WSP USA Inc, click here.

1 Actual percentage of use phase emissions may vary based on the location where the product is used. In some cases, the use phase emissions may be lower than 96% of overall emissions.

2 The end-of-life impact is negative because of GHG credits from the reuse and recycling of components of the FlashArray//X70 through the Evergreen//Forever program and internal supply recycling programs.

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