Effective technologies for reducing the carbon footprint in Latin American data centers

The tech sector is an industry that is constantly evolving and growing – and as new technologies are developed, more energy is consumed. The tech sector's energy footprint accounts for a total of 7% of the world's electricity, though this could grow to 20% by 2025, [according to data from Greenpeace](#).

The search for energy efficiency continues to be one of the most important challenges for Latin America and the Caribbean, since it is expected that [the demand for energy services will double in the next 20 years](#), according to the IADB.

The energy panorama

The global data center sector is growing rapidly, with the use of audio and video solutions – and data more broadly – leading to continued growth in energy use.

Between 1% and 3%
of the world's energy is used by data centers.[1]

0,5%
of CO2 emissions are generated by data centers.[2]

60%
of a data center's operating costs go towards energy use.[3]

100 MW
The required power capacity of some of the world's largest data centers.[4]

Efficient technologies for data centers

A data center has many kinds of equipment, ranging from those needed for data processing, security, external and internal network infrastructure and VoIP equipment to power management equipment and data storage on disks and tape. All of this equipment consumes energy, and the older the equipment is, the more costs it generates.

Considering that the construction of data centers in Latin America will grow at a compound annual growth rate (CAGR) of 7.52% between 2021 and 2026[5], rolling out technologies that will help reduce the carbon footprint of digital infrastructure must be a priority for the region. Efficient technologies like server virtualization and the use of smart cooling systems have become established as major partners in this mission.

Some efficient technologies for data centers are:

Server Virtualization:

Server virtualization makes it possible to execute multiple operating systems on a single physical machine, which reduces the required number of servers and energy use.

This technology also enables users to monitor the performance and resources of each virtual machine, which makes identifying and solving problems easier.

15% to 30%
Average reduction in data center electricity demand due to server virtualization and consolidation.[6]

Efficient cooling systems:

Cooling systems are a crucial part of any data center, but they are also one of the largest energy consumers.

Efficient cooling systems such as indirect cooling systems or water-cooling systems can significantly reduce energy use in data centers.

38%
Of all energy use in data centers goes to IT thermal management systems, highlighting the need to choose a precision cooling system that is designed to provide reliability and efficiency.[7]

Use of renewable energy:

The use of renewable energy, such as solar or wind power, can significantly reduce data centers' carbon footprint.

That is why data centers are being installed – or relocated – to areas with low-cost renewables. For example, Facebook's data centers in Denmark and Sweden use both hydroelectric and wind power, while also employing renewable electricity to recover the waste heat from data centers and recycle it to meet the local community's heating needs.

40%
Potential reduction in data centers' carbon dioxide emissions thanks to the integration of renewable energy.[8]

Optimizing energy management:

In data centers, the optimization of energy management can reduce energy use and, in turn, carbon dioxide emissions.

This includes the use of energy management systems and the implementation of energy efficiency policies for equipment management.

13.2%
Potential cost savings from pairing robust, coordinated energy management with a holistic incentive-based demand response and multiple energy-saving technologies.[9]

Smart lighting:

Lighting design also plays an important role in savings.

When light shines on a dark, opaque and matte surface, it is almost completely absorbed and transformed into heat, while white has a much higher reflectance value and distributes much more light through the space.

37%
Potential reduction in the number of light sources when smart lighting is put in place.[10]

Modular design:

Modular data centers are gaining prominence in operators' sustainability strategies thanks to their capacity for integrating new efficient technologies in the design and manufacturing processes.

By designing and manufacturing with efficiency in mind and allowing the use of newer technologies like liquid cooling and smart power supply systems, modular and prefabricated data centers can reach levels of PUE that are much higher than the current industry average, resulting in a lower carbon footprint.[11]

Benefits obtained from these technologies

The use of these technologies can translate into significant **savings in energy costs and a reduced carbon footprint.**

Better data center performance, greater processing capacity and less downtime.

Greater data center profitability, as savings in energy costs can be reinvested into additional improvements for the data center.

Improves the corporate image of the company by showcasing its commitment to sustainability and the environment.

Digital technologies to compensate future emissions

Data centers are necessary for the development of advanced technologies like 5G, the Internet of Things and Artificial Intelligence.

By implementing these digital solutions in various sectors of the economy, total global emissions of carbon dioxide equivalent (CO_2e) could fall by 12 gigatons (Gt) by 2030, an important step on the path to sustainable growth.[12]

These tools can help to reduce global carbon emissions by up to 15%, or about one third of the 50% reduction proposed by 2030.

The potential carbon dioxide (CO_2) reductions by 2030[13] by sector would be as follows:

- Smart power 15%
- Smart manufacturing 22%
- Agriculture 17%
- Construction (smart buildings) 16%
- Teleworking 33%
- Connected private transportation 5%

In Latin America, this can offset some of the negative effects of the production and use of these technologies, which require 1.4% of global energy production.

Vertiv™ Solutions

At Vertiv, our solutions keep making data centers more efficient. These include:

Power management

UPS units and latest-generation, high-performance power transfer and distribution systems.

The Vertiv™ Liebert® EXM2 UPS offers power capacities between 100 and 250kVA, delivering extraordinary double conversion efficiency of up to 97%, further increasing to 98.8% with Dynamic Online mode.

The Vertiv™ Liebert® EXL S1 UPS, is a monolithic, transformer-free unit with power capacity of 300 to 1200kVA. It occupies a low footprint and offers high power density per square meter.

The Vertiv™ Liebert® Trinergy™ Cube UPS enables hot scalability up to 3 MW in a single UPS and up to 27 MW in parallel. It offers high operating efficiency for greater cost savings and provides solid protection of power supply.

Lithium-ion batteries

these batteries require less space to provide the same amount of power. In general, they have a greater service life and are lighter, charge more quickly and can operate at higher temperatures, reducing the use of air conditioning systems.

Effective technologies for reducing the carbon footprint

Thermal management

With over 60 years of experience, Vertiv solutions for cooling equipment and critical environments have industry-leading controls. They are available for perimeter and row cooling, including indirect free cooling.

Vertiv™ Liebert® PEX4, direct expansion

Perimeter thermal management solution with premium efficiency. It considerably reduces operating costs with an improved capacity that adapts to a compact space. Available from 35 to 120 kW.

Can be disassembled for easier access to the room.

Vertiv™ Liebert® CRD 10kw, direct expansion

Complete row cooling solution for the edge and other small spaces that require scalable capacity and high energy efficiency with controls that adapt to the load.

Vertiv™ Liebert® CRV4, direct expansion

A row-based thermal management solution that is designed to provide maximum cooling in a compact space. Unsurpassed efficiency and reliability. Available from 25 to 60 kW, the highest net capacity available in the world with the smallest footprint.

Vertiv™ Liebert® CRC, chilled water

The in-row chilled water-cooling system provides highly efficient cooling directly in front of a row of IT racks, delivering chilled air with precise regulation right where it is needed most. Available from 30 to 60 kW and just 30 cm wide

Modular technologies

Prefabricated data center solutions allow owners and operators to reduce their turnaround time and meet their objectives more quickly. In addition, they help address high energy use issues thanks to their adaptability, which enables switching to the most innovative technologies on the market without having to change the entire data center design.

Vertiv™ SmartMod™ is a flexible platform that is optimized for simplified implementation of your critical IT assets. For IT deployments in small rooms with 4 to 12 racks and 100 kW or less of IT load, SmartMod™ offers a simple way to install capacity in a fraction of the time of a typical IT build might take. With integrated, pre-designed and prefabricated infrastructure, you can quickly achieve high efficiency with an all-in-one solution.

Vertiv™ MegaMod™ offers a high-quality modular, prefabricated data center solution for IT loads of up to 2 MW. The units can begin with 0.5 MW and increase up to 2 MW in a single location or implement immediate connection capacity in a versatile manner to support IT loads of 0.5 MW to 2 MW in multiple locations.

Modular systems offer many advantages compared to traditional data centers:

- Modular construction can reduce carbon emissions throughout the material production phase compared with an equivalent structure made from reinforced concrete.

- Vertiv uses the mains power to assemble modular systems in factories, making it a cleaner option than the diesel power supply used by construction crews to build data centers on-site.

- PFM uses steel, which is fully recyclable.

- Simplified logistics saves additional trips by suppliers and helps to reduce the overall carbon emissions relative to traditional constructions.

- Optional remote advanced monitoring, which can reduce travel for maintenance and repairs.

At this Vertiv link, you can see a calculation of the energy saved by using one of our rectifier modules with 98% efficiency.

References:

- [1] y [2] Green IT, quoted by [Data Center Market](#)
- [3] [BNAmericas](#)
- [4] [Data Center Dynamics](#)
- [5] [Mordor Intelligence](#)
- [6] Gartner, quoted by [Sustained Data Center](#)
- [7] [Vertiv](#)
- [8] [Agencia Internacional de Energías Renovables (IRENA)](#)
- [9] [Science Direct](#)
- [10] [Datacenter Dynamics](#)
- [11] [Vertiv](#)
- [12] [Cepal eLAC 2022](#)
- [13] [CEPAL](#)