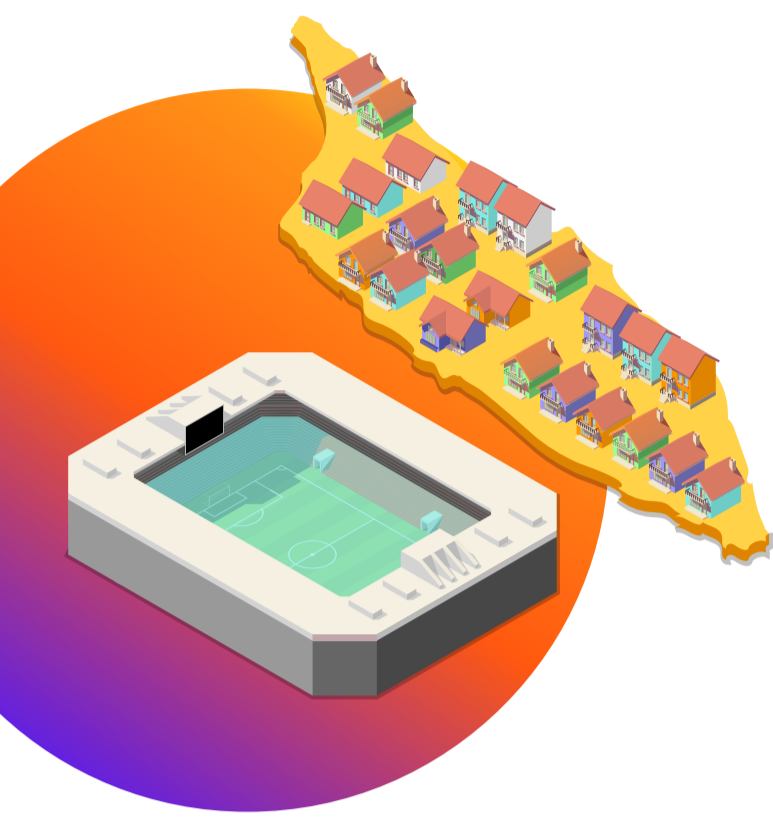


It's All About Energy, Environment, Speed, Simplicity



1. More Regulation

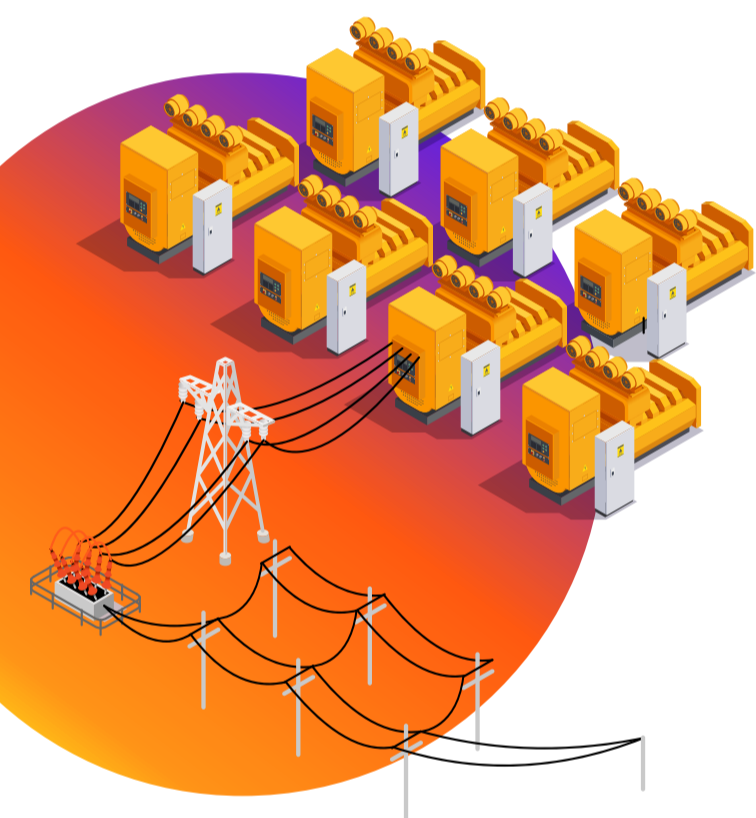
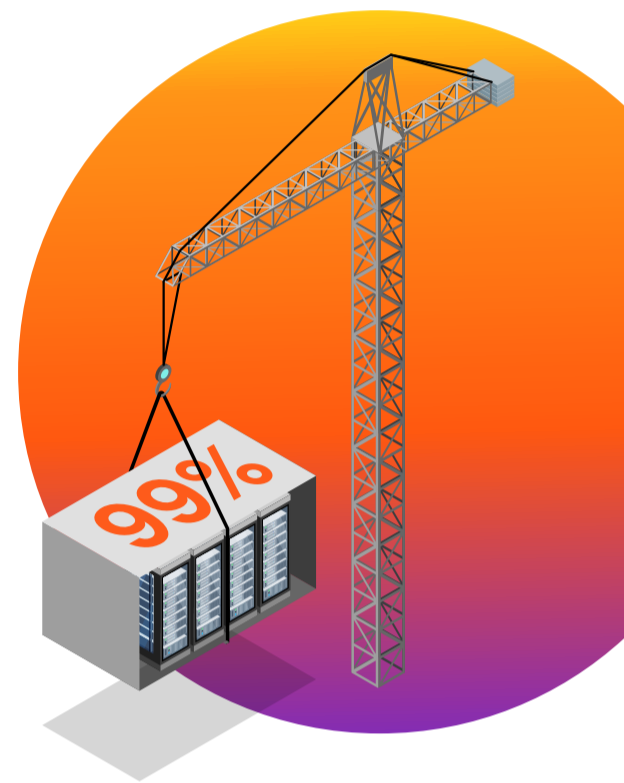
Data center operators are increasing their focus on efficiency and sustainability even as compute-hungry applications and technologies demand more energy. A large data center can consume enough electricity annually to power every home in Aruba¹ and enough water daily to fill a 10-foot-deep swimming pool the size of a professional soccer field². That kind of resource consumption will lead to increased scrutiny in 2023.

Technologies to watch:
High-efficiency UPS systems, lithium-ion batteries, water-free cooling.

2. Data Centers Shop off the Rack

A 2022 Omdia study found 99% of enterprise data center operators plan to use prefabricated modular designs in their facilities³. Vertiv predicts hyperscalers will join the party in greater numbers in the new year as the prefabricated modular approach becomes the dominant design method across the data center ecosystem.

Technologies to watch:
Integrated rack, row, aisle and room solutions; power, cooling and IT modules and skids.



3. Diesel Generators See Real Competition

On average, diesel generators used for backup power emit about 0.79 metric tons of carbon dioxide for every megawatt-hour of energy produced — more than twice as much as the United States electricity grid⁴. As data center operators ramp up their efforts to shrink their carbon footprint in 2023 and beyond, their crosshairs will settle on those generators.

Technologies to watch:
Hydrogen fuel cells, lithium-ion batteries and emerging battery technologies.

4. Higher Densities Alter Thermal Strategies

More than a third of data center operators say their rack densities have rapidly increased in the past three years⁵ and 1 out of every 5 large data centers house racks of at least 40 kilowatts. This reflects increasing confidence in liquid-cooled server technologies and portends more widespread deployment of liquid-cooled high-density racks in the coming year.

Technologies to watch:
Rear-door heat exchangers, direct-to-chip liquid cooling, immersion cooling, intelligent controls.



5. 5G Meets the Metaverse at the Edge

The number of 5G subscribers will increase to 5.8 billion by 2027⁶ — more than 8 times greater than it is today. In 2023, expect those ultra-dense networks to support expanding metaverse applications.

Technologies to watch:
Integrated rack, row, aisle, and room modules; intelligent, high-efficiency UPS systems with lithium-ion batteries; air and liquid cooling solutions for deployments of varying density; intelligent monitoring and management systems enabling remote management, control, and service; DC power systems and controls.

¹ [afihyperscale.com/articles/now-thats-interesting/what-makes-hyperscale-hyperscale/](https://www.hyperscale.com/articles/now-thats-interesting/what-makes-hyperscale-hyperscale/)
² [nbcnews.com/tech/internet/drought-stricken-communities-push-back-against-data-centers-n1271344](https://www.nbcnews.com/tech/internet/drought-stricken-communities-push-back-against-data-centers-n1271344)
³ Omdia
⁴ [feace.com/single-post/the-carbon-footprint-of-diesel-generators#:~:text=Comparing%20GHG%20Emissions%20of%20Diesel,Megawatt%2Dhour%20of%20Energy%20produced.](https://www.facebook.com/single-post/the-carbon-footprint-of-diesel-generators#:~:text=Comparing%20GHG%20Emissions%20of%20Diesel,Megawatt%2Dhour%20of%20Energy%20produced.)
⁵ [uptimeinstitute.com/uptime_assets/6768eca6a75d792c8eeede827d76de0d0380dee6b5ced20fde45787dd3688bfe-2022-data-center-industry-survey-en.pdf](https://www.uptimeinstitute.com/uptime_assets/6768eca6a75d792c8eeede827d76de0d0380dee6b5ced20fde45787dd3688bfe-2022-data-center-industry-survey-en.pdf)
⁶ [omdia.tech.informa.com/OM017728/Mobile-Subscription-and-Revenue-Forecast](https://www.omdia.tech.informa.com/OM017728/Mobile-Subscription-and-Revenue-Forecast)