

# Understanding the Stakes:

## The Rise of Data Centers & Powering the Future

As digital transformation accelerates, the rise of data centers and their accompanying technologies have become a global business phenomenon. These real-world repositories of virtual information are shaping the future of our landscape, revolutionizing industries, and raising essential questions about energy supply, security, and the environment. With nearly **\$1.4 trillion** invested globally in data center capital projects, the stakes have never been higher.

## THE SURGE IN DATA CENTERS

Data centers – cryptocurrency mining, colocations, and all data storage - have become indispensable in supporting the shift toward a more digitized lifestyle. The proliferation of remote work, online shopping, and digital services, particularly during the pandemic, has significantly increased data center spending and has created a remarkable demand for more and more of these large warehouses. Online services businesses, such as Amazon, Microsoft, Google, and META, have become major investors in these projects, with key regions such as the US, Europe, and Asia emerging as prime locations for data centers.

With over 5,000 operational or under-development data center sites, and additional structures for enterprise, managed, cloud, and colocation, the boom is tangible. And, with this surge comes a staggering demand for energy.

## THE POWER CHALLENGE

However, a significant challenge is emerging - a worldwide power shortage. Sourcing power has become a top priority for operators in all regions. The continuous power shortage is generating increases in rent for data center capacity and is significantly inhibiting the global data center market's growth. These data centers are true powerhouses that require an around-the-clock power supply to operate efficiently and effectively.

In fact, power usage at U.S. data centers could double or triple and consume up to approximately 12% of the country's total electricity by 2028, according to a new report, "2024 Report on U.S. Data Center Energy Use," from the U.S. Department of Energy (DOE). In addition, total data center electricity usage climbed from 58 terawatt-hours (TWh) in 2014 to 176 TWh in 2023, according to the report, and the agency estimates an increase between 325 to 580 TWh by 2028.



According to a related press release, the DOE's "key strategies" for meeting data center demand are as follows:

- **Enabling** data center flexibility by utilizing onsite power generation and storage solutions
- **Leveraging** energy community opportunities to re-use infrastructure at retired coal facilities for data centers and associated power infrastructure
- **Engaging** with stakeholders on innovative rate structures to support data center expansion while maintaining affordability
- **Commercializing** key enabling technologies such as next-generation geothermal, advanced nuclear, long-duration storage, and efficient semiconductor technologies.

"U.S. electricity demand is projected to account for data center expansion and the rise of artificial intelligence (AI) applications, domestic manufacturing growth, and electrification of different industries," said the DOE.



## THE IMPORTANCE OF **SUSTAINABILITY**

Data centers are placing increased emphasis on green energy and environmental standards. New technologies and process improvements are continually being implemented to reduce energy consumption and environmental impact. Water reclamation has become a priority, particularly in regions where water usage is a concern.

The trends within the data center market also reflect a move towards sustainability and efficiency. Innovations such as liquid cooling systems and advanced energy management technologies are becoming more commonplace in an effort to tackle one of the sector's most pressing issues: power consumption. Data centers consume an enormous amount of electricity, not only to power the servers but also to keep them cool. This has led to significant scrutiny regarding their environmental impact, particularly in regions where electricity generation relies heavily on fossil fuels.

Moreover, as these warehouses expand, they increasingly encroach upon local power grids, sometimes straining resources and prompting concerns among residents and environmental advocates alike. The industry's response has been a shift towards renewable energy sources and the exploration of off-grid solutions to mitigate these challenges. However, balancing operational demands with environmental responsibilities remains a complex endeavor for companies investing heavily in data center development.

Technology companies, including industry giants such as Google, Microsoft Corporation, Facebook and Instagram parent Meta Platforms Incorporated, and Amazon are increasingly signing power purchase agreements (PPAs) and partnering with renewable energy developers to source renewable and low-carbon forms of power.

# THE DATA CENTER ECONOMY



Several key trends are driving the booming data center economy. The advancement of artificial intelligence (AI) is foremost among these, with high-performance computing requiring rapid innovation in design and technology to cope with escalating power density needs. Other trends, including cloud computing, international expansion, sustainability, and industry innovation, contribute to an increasingly complex and dynamic global data center landscape.

## CHALLENGES AHEAD

Despite these opportunities, the data center sector faces several challenges, including a projected workforce shortage by 2030. Effective collaboration between supply chains and the value chains is critical to ensure the success of data centers.

Securing precise market data and making the right connections can enable your products to find a place within this rapidly expanding market. Aligning with heightened environmental standards can also provide a competitive edge, as can mobilizing resources strategically in response to the projected workforce shortage.

## TIGHT-LIPPED CORPORATIONS

In the digital age, data centers have become the backbone of global connectivity, supporting everything from cloud computing to streaming services. This critical role has spurred a surge in investments within the sector, with billions being funneled into constructing and upgrading these technological fortresses. As demand for data storage and processing skyrockets, companies are aggressively expanding their infrastructure. Yet there's a veil of secrecy that often shrouds these projects; companies tend to be tight-lipped about the specifics of their data center operations and locations. This clandestine approach is partly due to security concerns, as any information leakage about the infrastructure could potentially be exploited by cybercriminals. Information about locations, operating capacity, power usage, etc. is almost impossible to find. But what if it wasn't?



## THE IMPORTANCE OF **MARKET DATA**

The rapid rise of data centers represents an exceptional opportunity. To take advantage of this market expansion, it is vital to secure accurate market data on locations and timelines of these data center projects. In this fast-paced environment, access to timely, accurate, and comprehensive market data is essential. Industrial Info's unparalleled data can provide invaluable insights into the locations and timelines of data center projects, enabling connections with the right people at the right time.

Industrial Info is tracking more than **\$1.4 TRILLION** worth of active and planned capital-spending data center projects in the U.S.

In conclusion, while the expansion of data centers is essential for supporting our increasingly digital lives, it comes with its own set of challenges. Companies must navigate secrecy, security concerns, and substantial power requirements while also addressing growing calls for sustainability within this booming sector.

Since 1983, Industrial Info has been providing companies like yours with the most accurate and timely plant and project intelligence to help you reduce the time it takes you to qualify project opportunities and get to market faster.