

PRINCIPAL REAL ESTATE

Data centers: Mitigating risks for continued growth



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The essential role of data in our lives is a secular trend that continues to accelerate, fueled by surging digital data creation, cloud computing, the adoption of new technologies, and the growing penetration of the internet in developing markets. As businesses, consumers, and new technologies use ever-increasing amounts of data, data centers have become the cornerstone of our data-dependent world.

At-a-glance

- **Data centers are the cornerstone of our data-dependent world** as demand for data processing and storage accelerates.
- **As with other niche property types, data center investing includes some unique risks**, such as availability of power, supply chain delays, and natural disasters.
- **Certain risks may create an advantage for investors**, establishing high barriers to entry for new supply, which enhances the potential for rent growth and tenant renewals.
- **Investment managers with the experience, knowledge, and resources** to mitigate these risks are better positioned to navigate this critical property sector.

Many characteristics of data centers make them appealing investments, including attractive supply/demand fundamentals, high barriers to entry, and defensive and complementary valuation attributes relative to traditional real estate portfolios. However, given the relative newness of the space for many investors, concerns about the technology and significant technical and location-specific expertise required for successful data center development and operation, many investors remain on the sidelines as they seek to better understand the risks involved in this fast-growing property sector. We outline some of the key risks here and how we believe they can be mitigated.

RISK: Technological obsolescence

When considering the potential risks of data center investing, technological obsolescence may come to mind. Given the breakneck speed of technology change, that's a reasonable concern for the technology housed within data centers.

However, the servers and other equipment most susceptible to technological obsolescence are owned, maintained, and managed by the tenants—not the data center owner.

Also, the fastest-growing segment of data center tenants—hyperscale providers such as Google, Amazon, Apple, Microsoft, and others—are themselves leading technological advancements. These innovators are making long-term commitments to data centers through long-term leases and their significant investment in their data center space, often two to four times the landlord's investment in the building.

Data center infrastructure, for which owners are responsible, has mostly remained constant over the past 15+ years. Of course, alternative data storage methods are continuously under development. Among them are molecular and biological data storage—that could help minimize the amount of electricity needed to store data—and quantum computing. However, game-changing technologies such as these are likely decades away, let alone commercially feasible.

RISK: Diminished demand

Considering data centers are built for a particular purpose, what happens if demand for these facilities decreases? While that's theoretically possible, it's highly unlikely.

Almost all of the world's rapidly growing online traffic—including 8.5 billion Google searches *per day*¹—goes through data centers, setting off a chain reaction of data storage and transmission. According to the International Energy Agency, “For every bit of data that travels the network from a data center to end users, another five bits of data are transmitted within and among data centers.”²

That's why the “internet of things” (IoT) increases the need for data centers. When someone turns on a dishwasher from their phone, for example, a data center processes the exchange and also stores the information. That data may then serve dishwasher-related ads to that person.

It's no surprise that the data center market is estimated to grow by \$616 billion from 2021 to 2026, with a compound annual growth rate (CAGR) of 22%. More than one-third (35%) of that growth will come from North America (primarily from the U.S.), as the North American data center market is projected to grow faster than the markets in Europe and the Middle East/Africa.³

Because of this growth and to allow for economies of scale, data centers are becoming larger, not smaller. As a result, a key distinguishing factor for data centers is the ability to expand—either by acquiring more land or accommodating more computing power in existing facilities. Our recent acquisitions, for example, all include additional land, and the designs of our data center buildings provide ample space for tenants to expand their capacity.

RISK: Interrupted access to power and water

Power is by far the biggest expense—and the most critical need—of a data center. Significant electricity is required to run the equipment, keep the facility at the appropriate temperature, enable security measures, and more.

Water is also a key resource for cooling equipment. However, as we'll discuss shortly, some approaches can significantly reduce the amount of water required on an ongoing basis.

Power availability

To ensure power is available without interruption, data center power should come from two separate, redundant sources. This helps mitigate the risk of power being cut accidentally, such as from construction- or utility-related digging (easements are then required to get the power from the source to the facility).

These requirements must be addressed in the predevelopment process and can significantly impact site planning and location selection. For instance, in two of the top three U.S. data center markets (Northern Virginia and

¹ Internet Live Stats, 2022

² “Data Centres and Data Transmission Networks,” International Energy Agency, Nov. 2021

³ [Technavio](#), May 20, 2022

Northern California), local utility companies have the power but not the equipment to distribute power to new data centers—resulting in power availability potentially being delayed for years.

One way to significantly mitigate this risk is by building an on-site substation to power the data center directly. That gives the data center owners control over their primary power source, removing the risk of accidental power-line cuts and eliminating the need for easements.

Another way to ensure access to power is by securing power agreements with local utility companies. These agreements provide advance assurance of power availability and cost during the predevelopment stage.

Site selection also plays a role in managing this risk. Consider a site's proximity to a grid, the grid's age, and comparative costs per kilowatt-hour. Owners and tenants may also want to explore green power sources, such as wind or solar.



Water availability

Some data centers use significant amounts of water to control equipment temperature—as much as 3-5 million gallons per day.⁴ This has led to considerable concern from an environmental perspective and significant pushback from drought-stricken communities.

A more forward-thinking approach can significantly reduce the amount of water needed for equipment cooling over time. This involves using a closed-loop water system where chillers reuse the same water day after day—eliminating the need for a constant supply of fresh water and only using a fraction of the water.

RISK: Security threats

Security of the entire data center space—both physical and digital—is a top priority. In the best-managed data centers, cybersecurity and physical security go hand-in-hand. Without protections on both fronts, bad actors can render card readers, video cameras, air handlers, power systems, or HVAC units unusable—ultimately resulting in damage or even access to a tenant's assets.

Multiple, diverse barriers between the uncontrolled area beyond the data center's property and the tenant's equipment can help to mitigate this risk. These barriers can include virtual local area networks (VLANs), segregated networks, doors, cameras, turnstiles, and more. Between those

barriers are intervention zones where detection and response occur. If someone compromises the first barrier, for instance, the intervention zone is in place before the second barrier.

Holding compliance certifications is a mark of a responsibly managed data center. For example, the ISO/IEC27001 governance standard is regarded as the gold standard of information security. It defines how to implement, monitor, maintain, and continually improve the information security management system (ISMS). It also prescribes best practices that include documentation requirements, divisions of responsibility, availability, access control, security, auditing, and corrective and preventive measures.

⁴ [NBC News](#), June 19, 2021

RISK: Supply chain delays

Data centers aren't immune to global supply chain issues. Transportation bottlenecks, labor shortages, and lack of raw materials are causing major delays for the expansion of existing data centers and the construction of new facilities.⁵ Critical equipment is often delayed by 18-24 months.

Vendor agreements are key to overcoming these delays. Principal Real Estate and our partners have developed and managed a vendor management program, allowing us to hold our spot in production lines. This helps us get the equipment we need faster and gives us more certain lead times. In turn, we can provide copies of purchase orders to current and potential tenants so they know we'll have the needed equipment to meet their timing needs.

RISK: Natural disasters

An 83% increase⁶ in climate-related disasters over the last 20+ years means that the risk of natural disasters—fire, flood, wind, earthquakes, and more—is very real. Several steps must be taken to minimize the risk of natural disasters on data centers.

Careful site selection is the first step. This involves more than avoidance of areas prone to natural disasters and extreme weather. The site's ground elevation should be outside FEMA's 500-year flood plain. The site must also have access to robust fiber, utility power, and water. Ideally, land would be available for an optional on-site power station.

In addition to site selection, these strategies help to minimize natural disaster risk:

- Advanced sensors and controls allow for early detection of potential problems
- Structures built to help withstand hurricanes, tornadoes, major flooding, seismic activity, and more
- Uninterruptible power supply (UPS) systems
- Diesel-powered generators, along with the climate appropriate fuel or fuel additive
- Leading-edge fire prevention and extinguishing systems
- Physical presence of on-site, round-the-clock security staff

Opportunities abound

There's no doubt that data center investing brings risks. But the sector may hold significant opportunities for those working with managers and partners with the experience and resources to help overcome those risks.

In fact, the risks themselves may present opportunities by preventing less-experienced players from entering the market—making data center supply even more limited and allowing experienced providers to differentiate themselves. Combined with long-term leases and tenants with top-tier credit, data center investing offers the potential for extremely stable cash flows and a compelling return profile.

For a deeper dive into the data center opportunity, read our paper "[Data centers: Empowering a data-driven world.](#)"

⁵ [Data Center Frontiers](#), March 23, 2022

⁶ [Yale School of the Environment](#), Oct. 13, 2020

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