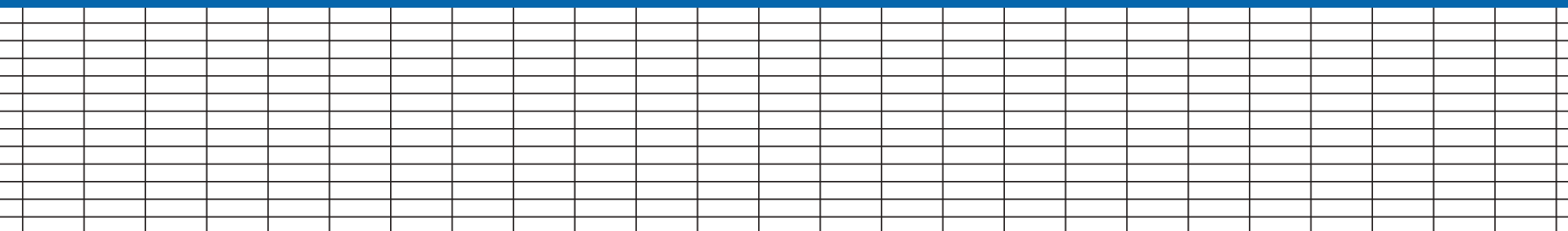

2023 U.S. Data Center Market Overview & Market Clusters

JANUARY 2024





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Introduction

Data centers play a crucial role in supporting the exponential growth of digitalization and data driven technologies within our increasingly interconnected world. This mission-critical infrastructure stores, processes and distributes vast volumes of data critical to businesses, governments and individuals worldwide. The rapid growth of emerging technologies like Artificial Intelligence (AI) is fueling demand for data center capacity, already driven higher by the cascade of digital innovations over the past decade such as content streaming, cloud computing, machine learning (ML), Internet of Things (IoT), ecommerce and more. While other commercial real estate sectors are experiencing a decline in construction pipelines, data center development has reached an all-time high and will continue to grow to meet demand. However, growth is increasingly constrained by land and power availability, supply chain challenges and construction delays, not to mention increasing resistance from some local jurisdictions. The complex landscape for the sector affects both established hubs and emerging markets, impacting users and investors, all while development continues to expand.

Newmark's Date Center report provides a comprehensive analysis of the sector's national market, including an examination of key regions, transactions and notable market activities, and an outlook for what's to come.

National Overview

The data center industry has experienced tremendous growth in recent years, fueled primarily by the expanding needs of major corporations (hyperscalers), major colocation operators and a plethora of smaller specialized providers. 3Q23 global spending on cloud infrastructure services was greater than \$68 billion worldwide, up 18% year-over-year.¹ This heightened demand has spurred a surge in new development and landbanking for future development, with the data center construction pipeline hitting new heights in 2023. This comes as development for many other commercial real estate sectors wanes due to the slowing economy and difficulty in sourcing construction loans.

In addition, sector and company growth in the form of merger/acquisition activity has substantially increased over the past decade and in particular within the past few years, where new records for largest-ever data center acquisition deal have been set and reset anew. KKR and Global Infrastructure Partners acquired CyrusOne for ~\$15 billion in 2022, currently the high-water mark in the sector. M&A activity in the data center sector, as with the market overall, has quieted in the last twelve months.



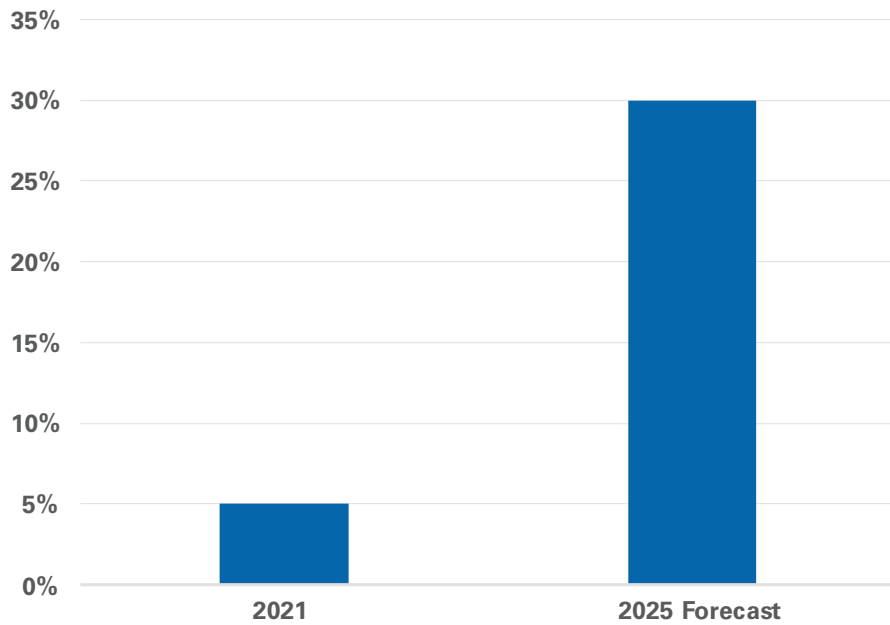
(1) SRG Research

Understanding the Impact of AI

AI's transformational potential is analogous to paradigm-shifting technologies like the advent of the internet or the mobile phone, and it has the potential to touch every sector of global industry. According to Bank of America Global Research, corporate AI implementation could boost S&P margins 250 bps, equivalent to ~\$65 billion in cost savings over five years, as implementation rapidly accelerates.

Estimated % of enterprises implementing A.I.- augmented development and testing strategies

Enterprises are expected to significantly increase usage of A.I. / M.L* for development purposes in the coming years.



Source: Bank of America Global Research

Top hyperscalers in the U.S. have already been increasing capital spending to boost cloud computing capabilities, an indicator of data center demand, spending approximately \$160B in 2022. The trajectory of spending growth is likely to see continued momentum despite near-term macroeconomic headwinds given the accelerative pace of AI breakthroughs.

Historical cloud capex trends

Cloud capex for top hyperscalers has grown at an average of 30% CAGR over the last five years

HYPERSCALER 5-YEAR CLOUD CAPEX (\$ BILLIONS)								
	2017	2018	2019	2020	2021	2022	Avg. CAGR 3 Yr Growth	Avg. CAGR 5 Yr Growth
Amazon	11	13	17	40	61	64	56%	41%
Google	13	23	24	22	25	32	10%	19%
Meta	7	14	15	15	19	31	28%	36%
Microsoft	9	14	13	18	23	25	22%	23%
Oracle	2	2	3	2	3	6	30%	24%
Total	42	66	72	97	131	158	30%	30%

Source: Bank of America Global Research

THEMES FOR AI-DRIVEN IMPACT ON DATA CENTER INVENTORY

Retrofitting Existing Inventory

Existing data center landlords could retrofit portions of their assets to handle AI requirements. In some ways, the industry has already experienced a similar transition when public cloud providers started taking larger blocks within enterprise colocation facilities. Data centers of the future could look more diversified and serve as one-stop shops for large-scale, small-scale, and AI deployments.

Tertiary Market Development

The training phase of AI requires massive amounts of energy, but is not latency sensitive, therefore data centers dedicated for training a model could be constructed in low-cost tertiary markets. Downtime isn't a concern when training a model, so removing select infrastructure components could help reduce construction costs. These one-off assets are likely to be self-built by large hyperscalers.

Purpose Built Facilities

The largest AI-driven impact will be new data centers built to accommodate enhanced requirements. Once a model is trained and ready for use, primary data center markets will likely serve as the home for AI deployments to meet latency requirements. Third-party landlords will be eager to take on purpose built facility construction projects as they mirror existing facilities. Higher rental rates will be expected to cover build out costs.

Source: Green Street

The impact of AI on the data center market is manifold. Anticipated demand from AI/ML is projected to require significantly more power density requirements; hyperscalers currently require ~10-14kw per rack in existing data centers, while expected AI requirements would be ~40-60kw per rack. Foundation models (large, pretrained machine learning models trained on diverse, massive datasets) and AI applications require enormous computational power for both initial training and inferences to user prompts once in session. As AI and ML models and applications grow more complex, the computational resources required to train and run them are increasing exponentially. Training comes with a much heavier initial power requirement than inference, which, on the other hand, requires less energy despite involving more sessions.

The expanding requirements for increased power density impacts data center development as AI-focused centers use graphics processing unit (GPU) clusters, rather than the old standard of central processing unit (CPU) clusters. Power and space needs differ significantly between GPUs and CPUs: GPUs require up to 15x the energy of traditional CPUs and, therefore, require much more cooling, necessitating extra infrastructure and physical space. Data center capacity for GPU-based AI computing must expand rapidly, which is driving innovations like liquid cooling (as opposed to air-cooled systems), optimized AI chips, and new data center designs. Fundamentally, supporting accelerating AI/ML adoption requires more power and cooling than much of the existing data center inventory can accommodate. Not all existing data centers lend themselves to retrofitting, catalyzing demand for new product in both existing and emerging markets.

Those 'emerging markets' are increasingly a location of choice for developments focused on AI/ML use cases, from hyperscalers to a panorama of new entrants into the sector, like specialized cloud service provider CoreWeave. Northern Virginia, Dallas, Chicago, Phoenix, and Northern California remain primary data center markets, but data center development is now manifesting in over 20 metros nationwide

AI's impact on the data center industry is still in very early innings. On a macro scale, data center demand in the U.S. is expected to reach 35 GW by 2030, up from 17 GW in 2022.



Key U.S. Data Center Markets

Northern VA

Northern VA's unique blend of location, connectivity, incentives, established, robust power and transmission infrastructure has made it the largest data center market in North America, at over 30 MSF and more than 3,400 MW. "Data Center Alley" along the Dulles Greenway is home to more telecom and satellite companies than any other place on earth. Availability is limited amid increasing local opposition to new data center development and capacity challenges, which have slowed the process of bringing new centers online. Some new proposals are innovating in ways to address both power constraints and concerns around energy sustainability. For example, a new data center project in Virginia near an existing nuclear power plant plans to build a hydrogen production facility and multiple small modular reactors (SMRs) to meet the long-term needs of the proposed data center campus.

KEY STATS 4Q23

~3,400 MW market size

0.2% availability rate

1,400 MW projected supply growth '24-'27

Dallas/Fort Worth

Lower power costs, strong connectivity infrastructure, tax incentives, plentiful land and other features have attracted large data center developments to Dallas. Data center inventory in the region has grown 19% over 2019 measures. Texas has taken steps to improve power transmission and distribution systems in recent years, with numerous battery storage projects underway, which can store electricity when supply exceeds demand and dispatch it during peak times. Major battery plant projects totaling over 700 MW are being built across Texas to stabilize the grid and incorporate more renewable energy sources.

KEY STATS 4Q23

~1,128 MW market size

1.9% availability rate

320 MW projected supply growth '24-'27

Phoenix

Phoenix has ascended to the ranks as a top data center market, benefiting from cheaper power, a pro-business environment, plentiful land to develop, and great fiber connectivity. Hyperscalers have significantly ramped up absorption of space and landbanking for development as well, with the intention of building. Concerns about power in Phoenix are compounded by the ascendant growth of the semiconductor industry, which requires a similar very-heavy power profile. Phoenix's concerns about water for cooling pose a greater risk to the market than others, but there are solutions being innovated in real time.

KEY STATS 4Q23

~1,100 MW market size

3.8% availability rate

500 MW projected supply growth '24-'27

Bay Area/Silicon Valley

Northern California is a key data center market with many Silicon Valley tech companies choosing to collocate data centers near corporate HQs. Because of the ever-present possibility of earthquakes throughout the Bay Area, providers in the region have invested capital to mitigate risks to their buildings. Constricted land availability has led to perennially low availability rates and a development push out into emerging submarkets, especially for AI training facilities.

KEY STATS 4Q23

~750 MW market size

0.5% availability rate

320 MW projected supply growth '24-'27

Chicago

Chicago remains an attractive market for hyperscalers like Microsoft and Meta, as well as other firms, due to its connectivity at the center of the country, power infrastructure, and large talent pool. Major industries driving demand include technology, finance, and healthcare. Overall, data center inventory has expanded 35% from 2019 measures, yet availability remains under 2%.

However, delivering power capacity to support major new developments is becoming increasingly competitive. Developers have been given long lead times of three to five years for new substation infrastructure in some submarkets, and power availability could become a limiting factor, as could available land. Some data center firms are finding innovative ways to navigate these challenges, such as Compass Datacenters, which purchased Sears' 2.4 MSF headquarters campus in September of 2023. The company is expected to raze the campus to make way for data center development.

KEY STATS 4Q23

~1,000 MW market size

1.6% availability rate

300 MW projected supply growth '24-'27

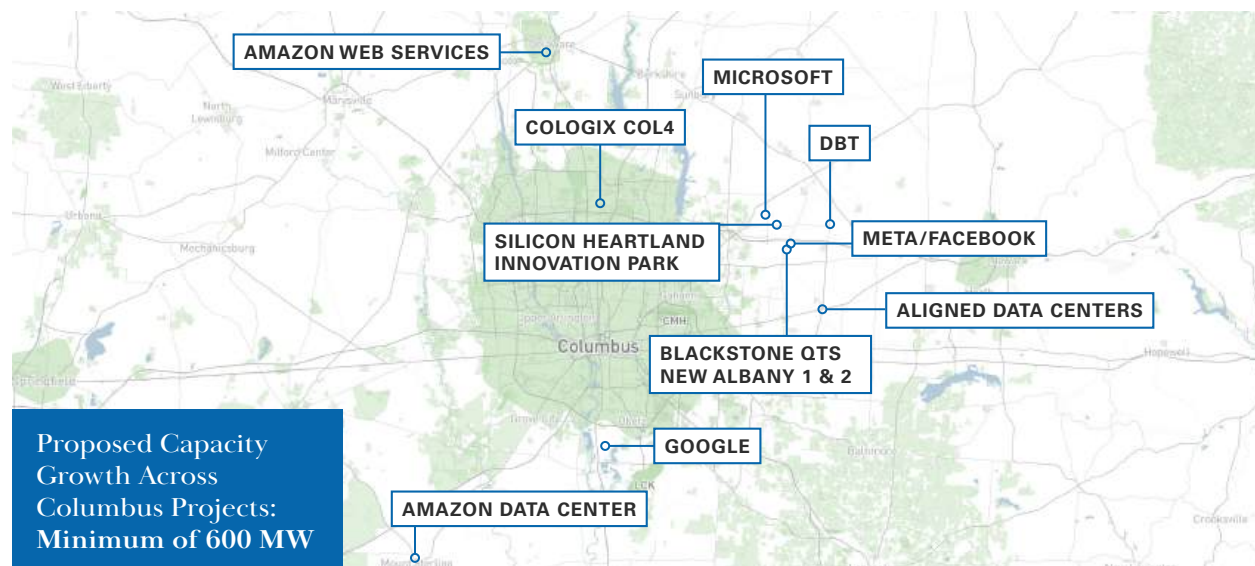
Emerging Market Spotlight: Columbus, OH

Even before Intel announced plans in January 2022 for a \$20 billion, 1,000-acre semiconductor facility in New Albany, Ohio, the Columbus metro area had quietly emerged as a prime location for mega investments in future-looking industries, including information technology infrastructure. Columbus saw 146% data center inventory growth between 2012-2021 and now has roughly 4.6 MSF of data center space across approximately 40 data centers run by 25 companies, and numerous major projects recently announced will add to this volume significantly.

Central Ohio's abundant, large swaths of commercial land has proven advantageous. Of the major new projects announced over the last 18 months, the average site size for data center landbanking transactions was 218.9 acres. These projects alone are or will be built on just over 2,407 acres of land, which represents a total land sale value of \$380.3 million. As for still-available land for sale in the Columbus market, approximately 11,000 acres of commercial, industrial or agricultural land was marketed as of October 2023 (although, not all would be amenable to the needs of data center development). For comparison, the entirety of Manhattan is approximately 14,000 acres.

Additional data center-related advantages in the region include a lower incidence of natural disasters, availability of tax incentives, reliable, comparably low-cost power, a 0% corporate income tax, access to top tech talent, and a robust economic development ecosystem. The Ohio Data Center Tax Abatement Program offers a 100% exemption of sales tax on construction materials, computer equipment, mechanical and electrical equipment, cooling systems, and power infrastructure – once a company meets an investment requirement of \$100 million or more in a three-year period, along with an annual payroll greater than \$1.5 million.

The following are some of the key proposed, planned, and under-construction data center developments in the Columbus metro that were announced within the last 18 months as of November 1, 2023.



In August 2023, Google announced it would invest \$1.7 billion to support three data center campuses in Central Ohio, one that it operates in New Albany and the other two of which are planned for Columbus and Lancaster. Combined, the campuses are estimated to measure upwards of 850,000 square feet on 600-plus acres of land the company acquired in 2021. In all, with the expansion of its existing data center and the addition of two more, Google's investment in the Columbus area will reach \$2.0 billion.

AMAZON/AMAZON WEB SERVICES

In 2019, Amazon announced plans to develop a 170,000-square-foot data center on just over 100 acres on the northeast corner of Harrison Road and Innovation Campus Way. New Albany City Council approved a 15-year, 100% property tax abatement for the new site. In return, the company pledged to create 35 jobs with total annual payroll of \$2.45 million. This is an under-construction project, with plans to deliver in November 2023. At the end of September 2023, the company announced a \$3.5 billion expansion of its data center footprint, part of a wider \$7.8 billion master plan for Central Ohio. The five buildings would total 1.25 million square feet along Beech and Miller Roads in New Albany. Under the Amazon Web Services moniker, the company will receive a 100% tax exemption for the first 15 years of the data center campus's lifecycle, then a 75% exemption for the next 15 years. Construction for the expansion is reportedly due to begin in 2025 and run until 2030. This new investment will result in 230 direct new jobs and an estimated 1,000 support jobs, according to said JP Nauseef, president and CEO of JobsOhio.

META/FACEBOOK

Meta, the parent company of Facebook, is expanding its New Albany data center footprint, taking its total investment to \$1.5 billion. Its campus will total 2.5 million SF. The company's current location measures around 1.4 million SF when the fourth and fifth buildings are complete. Overall, Meta has invested \$90 million in 740 acres of land in Central Ohio, allowing for a potential expansion to a total of seven data centers spanning 3.5 million SF.

BLACKSTONE/QTS

QTS, a portfolio company of Blackstone, plans to build four new data centers on two sites in New Albany. Land records show that the company purchased 94 acres of land on Beech Road SW for \$15.6 million in April 2022. New Albany City Council approved community reinvestment area agreements for QTS which will allow the company to invest roughly \$1.5 billion in the projects. New Albany 1, at 675 Beech Road SW, will offer 144 megawatts across the 56-acre site. New Albany 2, at 785 Beech Road SW, will offer 78 megawatts across two buildings on a 37-acre site. The buildings at the first site will reportedly span 885,600 SF, while the buildings at the second site will measure 612,600 SF. QTS is a co-location provider, providing flexibility for the company to lease data center space to several tenants in one building.

LINCOLN RACKHOUSE/HARRISON STREET

With an estimated first phase delivery date in December 2023, Lincoln Property Company and Harrison Street secured a 15-year, 100% real estate tax abatement, with general employment zoning in order to accommodate a wide range of uses and industries for a multi-use technology data center park in New Albany. The company acquired 191 acres at 0 Horizon Ct./Jug Road for \$23.5 million in May 2022 for the project. To be known as Silicon Heartland Innovation Park, the joint venture intends to construct 1.2 million square feet of up to seven hyperscale data centers that have the potential to support 144 megawatts.

COLOGIX

Cologix already serves large-capacity deployments out of its first three facilities in the Columbus area, and is developing a 32–40-megawatt fourth data center, named COL4, that will span 250,000 to 287,000 square feet. With an estimated delivery date in March 2024, Cologix received a 75% tax abatement for 10 years for COL4. Public record shows the company purchased 7.5 acres at 7500 and 7474 Alta View Blvd. in October 2020 for \$2.7 million. The new, \$160 million site is adjacent to the company's existing campus and will be connected to it by fiber.

DBT-DATA

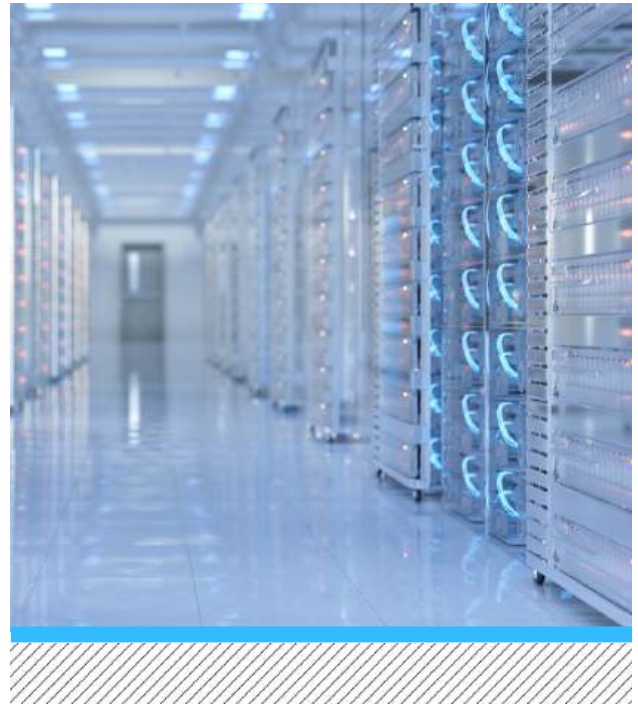
DBT-Data, a Washington, D.C. firm, is planning up to three "power shell facilities" that span up to 1 million square feet at New Albany International Business Park, not far from Intel's campus. DBT-Data acquired 94 acres for \$20.7 million in August of 2022 for the project. It is the company's first project in Ohio, for which the investment is \$1 billion. DBT-Data is under exclusive negotiations with an unnamed company that could occupy the entire site.

MICROSOFT

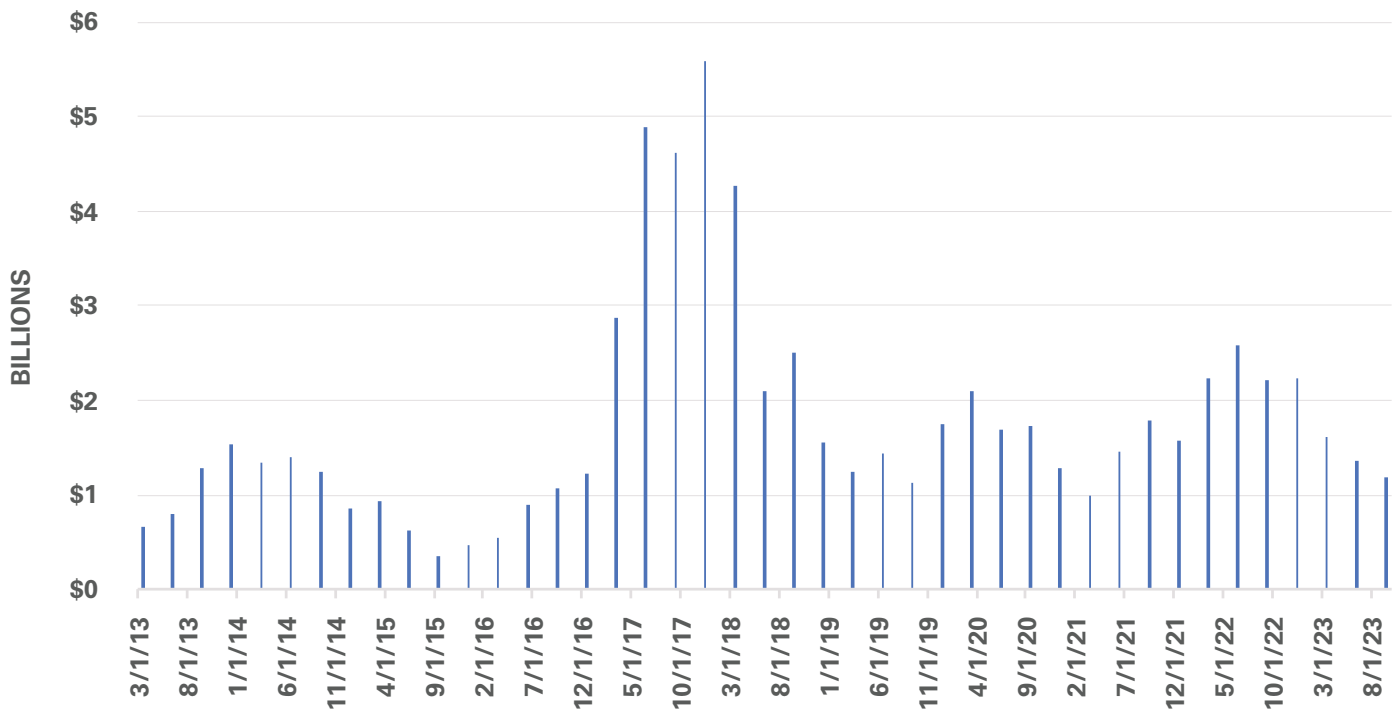
The company purchased 184 acres at 3287 Beech Road in June 2023 in New Albany for just under \$57 million and has signaled its intentions to use that land for "supporting digital transformation with the Microsoft cloud." Filings with the Ohio Environmental Protection Agency indicate a possible \$10 billion in construction costs for the two sites for an "undisclosed, confidential user."

Capital Markets Activity: Focused on Funding Growth

Like the M&A market, the data center sales market has diminished this year over last. In the rolling four quarters ending in September 2023, \$1.2 billion in transaction activity closed, down 46% YOY and 32% below the long term average. The decline in transactions is partially rate-driven but the significant amount of M&A in the past few years has limited the number of remaining scaled assets. There is also an increasing divergence between buyer and seller views on valuation, which is well above build costs. The majority of recent data center deals are trading between a 5.5% and 7.5% cap rate range, depending on the asset type.



Transaction Volume: Data Centers



Source: MSCI Real Capital Analytics

Global Data Center Mergers & Acquisitions, 2021-2023 YTD

COMPANY	BUYER / INVESTOR	GEOGRAPHY	DATE CLOSED	VALUATION (\$M)	ADJ. LQA EBITDA MULTIPLE ¹
Hyperscale Centric					
Compass	Brookfield, Ontario Teachers	North America, EMEA	Pending	\$5,500	24.0x
Serverfarm	Manulife	North America, EMEA	Sep-23	ND	ND
ODATA	Aligned Data Centers / SDC Capital Partners	Latin America	23-May	\$1,860	24.4x
EdgeCore	Partners Group	North America	22-Nov	ND	ND
VIRTUS Data Centers	Macquarie Asset Management	EMEA	22-Aug	ND	30.8x
Safe Host	IPI Partners	EMEA	22-May	ND	25.0x
CyrusOne	KKR/GIP	North America, EMEA	22-Mar	\$15,453	24.8x
DigiPlex	IPI Partners	EMEA	21-Jul	ND	28.0x
Green Mountain	Azrieli	EMEA	21-Jul	\$858	33.2x
Average				\$5,752	27.7x
Interconnection Centric					
Irideos	Asterion Industrial Partners	EMEA	22-Jul	\$400	24.7x
Cologix	Stonepeak	North America	22-Apr	\$4,275	29.5x
Teraco	Digital Realty	EMEA	22-Jan	\$3,500	28.9x
CoreSite	American Tower	North America	21-Dec	10,217	29.4x
Average				\$5,754	28.5x
Wholesale Centric					
Switch	Digital Bridge / IFM	North America	22-Dec	\$10,601	30.5x
Databank	Swiss Life Asset Partners / EDF	North America, EMEA	22-Aug	\$5,936	27.3x
QTS	Blackstone	North America, EMEA	21-Aug	\$8,455	25.8x
Supernap	IPI Partners	EMEA	21-Mar	ND	27.0x
Digital Realty	Ascendas	EMEA	21-Mar	\$672	16.6x
Sila Realty Trust	Mapletree	North America	21-Jul	\$1,300	19.0x
Average				\$5,393	24.4x
Overall Average				\$8,269	26.8x

(1) Includes adjustments for booked-but-not-billed ("BBnB") revenue, known-churn, and other one-time adjustments.

Select Private Market Transactions

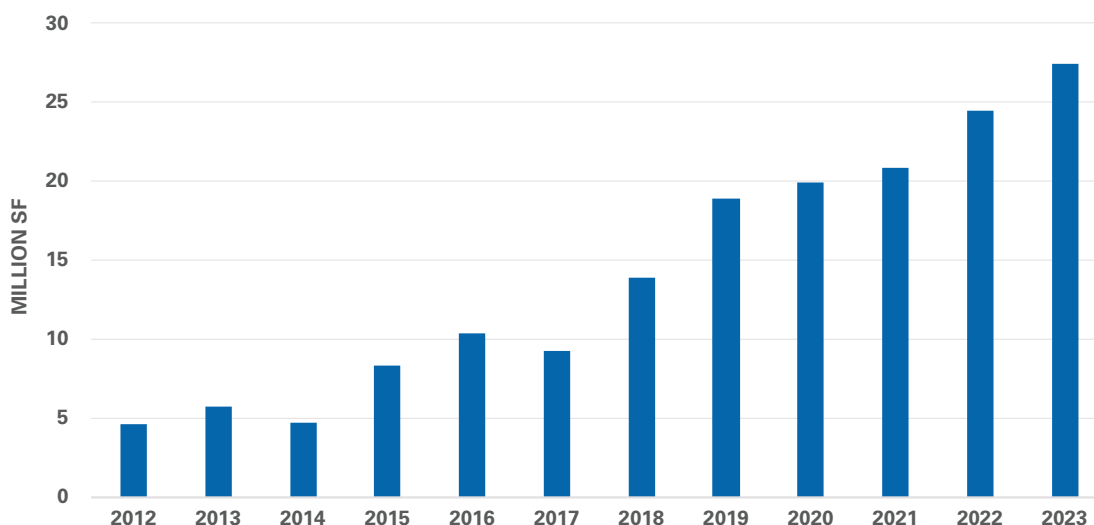
PROPERTY / COMPANY	DATE	VALUATION / PRICE (\$ MILLION)	ESTIMATED CAP RATE
DLR Ashburn Data Centers	Jul-23	\$1,500	6.00%
DLR Chicago Data Centers	Jul-23	\$900	6.50%
Toronto Network-Dense Portfolio	Jun-23	\$1,000	5.00%
Dallas Powered Shell	Jun-23	\$150	5.50%
Ashburn turn-key data center	Apr-23	\$150	5.50%
Vantage DC Europe (Recap)	Apr-23	\$2,700	5.50%
NoVA Powered Shell Portfolio	Jan-23	\$275	5.50%
NoVA Powered Shell	Aug-22	\$205	4.50%
Manassas, VA Data Center (DC-6)	Jan-22	\$225	5.10%
CyrusOne Houston Portfolio	Jan-22	\$670	5.20%

Sources: Company disclosure and Green Street

\$26B in dry powder remains with data center allocation potential, but most activity is focused on new development and value add opportunities, given the amount of demand and attractive unlevered development yields. Returns can vary greatly by market, but U.S. profit margins are generally >50%. There is robust financing interest from a panorama of capital providers, benefiting both existing players and new entrants in the sector. Along with ongoing support from traditional project finance and infrastructure investors, new banks and private credit groups are actively looking to provide funding, drawn by favorable long-term trends, solid sector fundamentals, and the industry's growth trajectory. While AI/ML is a generational injection of demand, the growth of hyperscalers and traditional enterprise technology continues to grow as well, also impacting the need for more capacity to be built.

Data center operators will continue to recycle capital to fund development by selling non-core assets and contributing stabilized assets to joint ventures. The joint venture structure will also continue to be employed to capitalize both pre-leased and speculative development, balancing opportunity, risk, and return between operators and capital providers. Recent transactions (DLR / Blackstone, DLR / TPG, EQX / GIC) provide a framework for these types of executions, which will be replicated by public and private operators, merchant developers, and new markets entrants.

U.S. Data Center Development Pipeline



State of the Debt Capital Markets

Despite broader macroeconomic conditions and rising interest rates, there continues to be a strong willingness from a variety of capital sources to provide financing solutions across the data center sector. For both established and nascent data center operators and developers, an abundance of debt capital is available for opportunities throughout the lifecycle of an asset. From corporate and term debt to value-add and ground up to land and pre-development opportunities, there are lenders eagerly seeking to deploy capital which has, and will continue to, allow sponsors to keep up with rapidly growing hyperscale capacity requirements.

A key component to the data center financing trend is the diverse pool of debt providers who have entered the space. In addition to the traditional project finance and infrastructure groups who continue to finance opportunities, a number of new bank and private credit providers are actively engaged with mandates to transact. These new entrants often approach opportunities with different lending methodologies, allowing borrowers to explore diverse structures, incorporating structural aspects from real estate, corporate, leveraged, or project and infrastructure finance principles into the ultimate execution.



Key Takeaways

- Abundance of liquidity available for data center and broader digital infrastructure backed financings
- Availability of capital has been driven by two main factors:
 - Highly desirable industry fundamentals increasing the credit worthiness of opportunities
 - New lending entrants who are aggressively prioritizing sector exposure
- Debt capital available through the life cycle of the asset from large land/pre-development facilities to term financings
- Borrowers have been able to benefit from diverse lending structures that incorporate various lending methodologies



Data Center Lending & Pricing Update

The following summaries provide general feedback on data center pricing and sizing. It's important to note that each deal is unique, and there may be outliers.

LAND / PRE-DEVELOPMENT FINANCINGS

One of the most significant impacts supported by the tremendous industry tailwinds occurring in the data center space has been the willingness of lenders to take on exposure during the land acquisition and pre-development phases of construction. From both single site financings to large revolving facilities, a growing pool of lenders are currently open and able to provide financing up to 75% of cost, a stark difference to what we are seeing across other CRE asset classes. Although the pool of lenders playing in the space is still well below the appetite for vertical development financings, there is a strong and growing mix of lenders who are convicted on the opportunity. These groups see this not only as an attractive risk adjusted return, but also as a very unique, and less competitive, way to gain exposure into the data center space.

Please see table below for broader pricing guidelines:

LAND/PRE-DEVELOPMENT FINANCINGS

Active Lender Types: CRE Banks, Private Credit & Hedge Funds

Lender	Term	Fixed/Float	Characteristics	Key Sizing Parameters	Leverage Constraints	Recourse	Spreads
CRE Banks	2-5 Yrs	Float	Low Leverage	LTC / LTV	LTC: 50-55%; LTV: < 50%	Yes	4.5%-5.0%
Private Credit	2-5 Yrs	Float/Fixed	Low-Max Leverage	LTC / LTV	LTC: 50-75%; LTV: < 55%	No	5.25%-7.5%
Hedge Funds	2-5 Yrs	Float/Fixed	Max Leverage	LTC / LTV	LTC: 65-75%; LTV: < 55%	No	6.5%-7.5%



VERTICAL DEVELOPMENT FINANCING

Most of the data center debt capital market activity is occurring on both build-to-suit and credit-tenant anchored development opportunities. There was record setting transaction volume in 2023, a pace that is not slowing down, with another \$18 billion of development financings underwritten for Q1 2024, led by Asian and European banks, which currently have more pricing power than their counterparts. Although this activity is positive and expected to continue, banks have reduced internal hold amounts, which is placing increased reliance on the syndication markets. To ensure more comfort around successful syndications, banks are prioritizing and giving the most aggressive terms to repeat issuers and/or groups with in-place ABS master trusts, which provide greater comfort around lender takeout.

For opportunities that are not a fit for project finance lending, we are seeing a number of more traditional CRE banks and private-credit groups aggressively chasing these financings as they seek additional exposure in the data center sector. Despite lenders not generally being able to compete on pricing with project finance groups, they are often able to provide flexible and borrower friendly structures, take on more speculative lease up risk, and commit to larger underwritten amounts. Although this may not fully bridge the gap in economics, it does provide groups more accretive executions based on the respective business plans, as well as providing higher certainty of executions which is extremely meaningful for more nascent sponsorships.

Please see table below for broader pricing guidelines:

DEVELOPMENT FINANCING - HYPERSCALE

Active Lender Types: Project Finance Banks, CRE Banks, RE & Infrastructure Private Credit

Lender	Term	Fixed/Float	Characteristics	Key Sizing Parameters	Cash Flow Constraints	Leverage Constraints	Spreads
Project Finance Banks	3-5 Yrs	Float	Max Leverage	DSCR / LTC	DSCR: Sculpted-1.05x-1.25x	90% LTC	2.25%-2.75%
CRE Banks	3-5 Yrs	Float	Moderate Leverage	DY / LTC	DY: 9% +	70% LTC	3.00%-4.00%
Private Credit	3-5 Yrs	Float	Max Leverage	DY/ EBITDA Multiple / LTC	DY: 8%-9%; EBITDA Multiple: 11x-12x	75%-90% LTC	3.50%-4.50%

DEVELOPMENT FINANCING - COLOCATION

Active Lender Types: Project Finance Banks, CRE Banks, RE & Infrastructure Private Credit

Lender	Term	Fixed/Float	Characteristics	Key Sizing Parameters	CF Constraints	Leverage Constraints	Spreads
Project Finance Banks*	3-5 Yrs	Float	Moderate Leverage	DSCR / LTC	DSCR: 1.25x +	60-70% LTC	3.25%-3.50%
CRE Banks*	3-5 Yrs	Float	Moderate Leverage	DY / LTC	DY: 10% +	60-65% LTC	4.00%-4.50%
Private Credit	3-5 Yrs	Float	Max Leverage	DY/ EBITDA Multiple / LTC	DY: 9%-10%; EBITDA Multiple: 10x-11x	70-75% LTC	4.00%-5.00%

*Likely to require hyperscale anchor

TERM FINANCINGS

The respective lender pool for data center operators and developer financing is determined by the inherent credit metrics and asset vintage, but also more meaningfully by the size of the financing. For large asset and/or portfolio financings the SASB and ABS markets, in addition to existing sponsorship credit/warehouse facilities, continue to be the most reliable and called upon outlets for acquisition, recapitalization, and/or construction takeout executions. For smaller financing opportunities, there is a wider lender pool including banks (CMBS and balance sheet), life insurance companies, and private capital who are actively trying to find ways to gain exposure to the space, while also staying within their respective credit constraints. Given the scale in which data centers are growing, lenders on smaller financings will likely be most active and competitive where the collateral is either powered-shell, enterprise and/or colocation assets.

An overview of the varying executions and sizing mechanics can be found below:

- **SASB** - Although the rise of base rates has resulted in higher coupons that constrain leverage and generally makes SASB unappealing for many asset classes, data centers are becoming one of the few property types that are receiving fairly aggressive treatment from bond buyers on both pricing and leverage. This treatment, largely driven by industry tailwinds, stable and credit worthy cash flows, as well as the fact that data centers were historically a niche property in the market limiting existing bond buyer exposure, has made SASB executions a favored financing option to effectuate large refinancings and/or capital recycling efforts, as demonstrated by both QTS and Digital Realty this year. From a timing perspective, SASB execution will remain most efficient relative to “clubbed” bank deals, so long as the syndication market is choppy and banks are limiting their maximum holds. Considering the size of new data centers, in combination of the large capital recycling efforts ongoing across the space, it is the expectation that operators and developers, especially those without an in-place ABS master trust, will have a growing reliance on this market to take out their construction debt.

FIXED			
Security	DC 2023-DC	Data 2023-Cntr	JPM 2022-Data
Pricing Date	8/22/23	6/30/23	6/8/22
Sponsor	Digital Realty	Data Mortgage Trust	Calpers and GI Partners
Location	Ashburn, VA	Chicago, IL	Sterling, VA
Senior Loan Amount	\$990,000,000	\$450,000,000	\$319,050,000
Loan Per MW	\$9,519,231	\$6,676,558	\$6,905,844
CMBS Coupon	7.15%	5.75%	3.95%
AAA Spread	1.90%	2.40%	1.55%
SASB LTV	65%	50%	45%
SASB DY	10.0%	14.0%	9.2%
WALT (Yrs)	4.1	3.2	5.5
% IG	67.2%	60.8%	100.0%

FLOATING			
Security	BX 2023-VLT3	BX 2023-VLT2	BX 2021-VOLT
Pricing Date	11/1/23	5/26/23	9/15/21
Sponsor	Blackstone	Blackstone	Blackstone
Location	Phoenix, AZ	Various	Various
Senior Loan Amount	\$500,000,000	\$800,000,000	\$3,200,000,000
Loan Per MW	\$11,904,762	\$9,937,888	\$14,545,455
CMBS Spread	2.43%	4.25%	1.56%
AAA Spread	2.00%	2.28%	0.70%
SASB LTV	60%	72%	56%
SASB DY	11.2%	8.2%	9.3%
WALT (Yrs)	15.4	6.8	2.6
% IG	100.0%	73.8%	97.3%

- **ABS** - The Digital Infrastructure sector has become an rapidly growing piece of all esoteric ABS issuances. Driven by Fiber and Data Center issuances, the sector bounced back from a slow 2022 in a big way with issuance volume approaching 2021 numbers, a record year in the ABS market. The demand for data transmission, both on an institutional and consumer level, continued to scale and the demand for longer duration ABS deals grew from both existing and first time bond buyers, with a noticeable uptick in insurance investors. The entrance into the ABS market was not only from bond investors, but also from first time issuers such as TierPoint who entered the market in large way in July. As investors continue to develop a broader understanding of the asset class, it is the expectation that this issuance continues to scale, with Barclays expecting \$14.5 billion in esoterica ABS issuance in 2024, including \$7 billion in data center, \$5 billion in fiber or small cell, and \$2.5 billion in wireless tower.

RECENT HYPERSCALE ABS TRANSACTIONS							
Security	SPONSOR	Pricing Date	Issuance Size	5-year Spread / Yield	NOI Multiple	WALT ¹	Investment Grade Lessees
CYRUS 2023-2	Cyrus One	Nov-23	\$488mn	+300 bps / 7.442%	11.35x	6.0 years	77.2%
ADC 2023-2	Aligned Data Center	Nov-23	\$300mn	+250 bps / 7.020%	11.69x	5.8 years	79.0%
SDIC 2023-3	Stack Infrastructure	Nov-23	\$290mn	+245 bps / 6.967%	N/A	6.3 years	92.2%
VDCR 2023-1/2	Vantage Data Center	Sep-23	\$1.4bn	+285 bps / 7.286%	11.33x	6.6 years	94.2%
ADC 2023-1	Aligned Data Center	Aug-23	\$540mn	+250 bps / 6.632%	11.39x	5.4 years	74.0%
SIDC 2023-2	Stack Infrastructure	Jul-23	\$250mn	+241 bps / 6.50%	11.30x	6.4 years	70.3%
CYRUS 2023-1	Cyrus One	Apr-23	\$701mn	+300 bps / 6.73%	10.09x	5.2 years	70.3%
SDCP 2023	Sabey	Apr-23	\$175mn	+265 bps / 6.34%	13.10x	6.3 years	78.0%
VDC 2023	Vantage Data Center	Mar-23	\$370mn	+286 bps / 6.40%	12.26x	7.7 years	89.2%
SIDC 2023	Stack Infrastructure	Mar-23	\$250mn	+210 bps / 6.44%	11.30x	6.6 years	85.1%

RECENT COLOCATION ABS TRANSACTIONS							
Security	SPONSOR	Pricing Date	Issuance Size	5-year Spread / Yield	NOI Multiple	WALT ¹	Investment Grade Lessees
TPDC 2023-1/2	TierPoint	Jun-23	\$835mm	+400 bps / 7.98%	3.9x	1.5 years	N/A
COLO 2023-1	Data Bank	Feb-23	\$715mm	+295 bps / 7.07%	11.45x	1.8 years	49.5%
EDGE 2022	Edge	Apr-22	\$375mm	- / 4.88%	N/A	2.9 years	82.0%
FLX 2022-1	Flexential	Apr-22	\$150mm	240 bps / 5.09%*	8.52x	1.8 years	N/A
CLGIX 2022-1-CAN 2	Cologix	Jan-22	\$619mm	+361 bps / 5.26%	8.72x	1.6 years	54.5%
CLGIX 2021-1	Cologix	Dec-21	\$1.0bn	+231 bps / 3.56%	10.00x	1.5 years	45.5%
FLX 2021-1/2 3	Flexential	Nov-21	\$2.0bn	+281 bps / 4.24%	8.27x	1.8 years	N/A
COLO 2021-2	Data Bank	Oct-21	\$332mm	+123 bps / 2.44%	11.07x	2.2 years	52.9%

*7-year Spread

- **Life Insurance Companies** - Life companies are starting to be more active in the data center space, pursuing high-quality opportunities that present a relative value to corporate and CMBS yields. Life companies are pricing fixed rate, max leverage opportunities in the T + 200-230 range. Lower leverage opportunities are priced as low as T + 170. Floating rate, max leverage pricing is in the SOFR + 200-275 range. Asset quality and location remain key focal points for life companies, who tend to prefer newer properties.

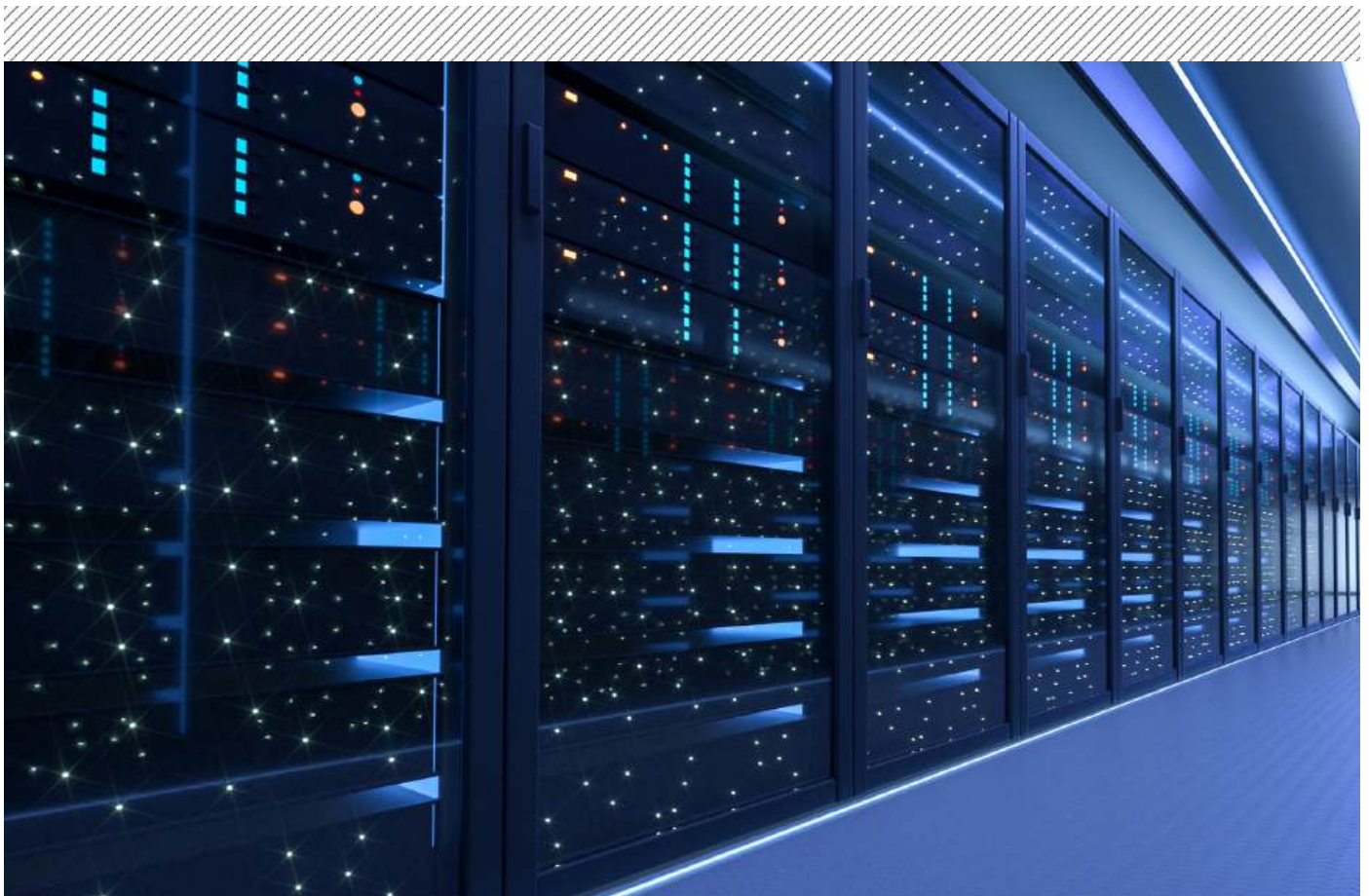
A differentiating factor for insurance companies in this market has been their ability to offer some creative prepayment flexibility on five-year fixed-rate loans, including options for prepayment after 24-36 months, either at par or on a step-down schedule. Additionally, in some cases, life companies can offer a competitive advantage by providing more loan proceeds, accepting lower initial debt service coverage ratios and relying on stabilized NOI at exit. The expansion of bridge lending offerings and stretch senior loans by many life companies- fueled by acquisitions via large private equity firms - has also added another unique execution for borrowers.

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- **Banks** - Regional and money-center banks have been notably less active on cash flowing, balance sheet financing opportunities given decreased liquidity and tightening credit requirements. For opportunities that banks do quote, they continue to offer competitive pricing for floating rate loans on high-quality opportunities with strong sponsors- particularly existing relationships that interact with the bank's other business lines (deposits, treasuries, wealth management, etc.).

Low and modest leverage bank loans are priced in the range of SOFR + 180-230. However, loan spreads for more transitional assets are typically pricing in the range of SOFR + 250-325, with leverage capped closer to 55%-60%. Leverage has been significantly impacted as sizing parameters are correlated to rising interest rates in tandem with potential cap rate widening that could impact stabilized property values. Loan terms are now primarily governed by a combination of in-place and exit DY/DSCR constraints, rather than LTC/LTV.

- **Private Credit** - Despite continued challenges securing accretive leverage, private credit pricing has held largely stable for the past 60-90 days. For a subset of finance companies, best pricing for 65% leverage loans can be as low as in the SOFR + 260-275 range, while fuller leverage loans are typically pricing from SOFR + 325 and up. The pricing and leverage available in the market heavily rely on cash flows, with warehouse and repo lenders maintaining tighter parameters and limiting advance rates. Therefore, we've seen those capable of "unlevered" lending gain material market share while simultaneously promoting "certainty of execution". To maintain competitiveness, certain lenders have started factoring in the costs of an "in the money" SOFR cap, essentially creating a fixed-rate product to compete with shorter-term, fixed-rate loan options.

An alternative route these lenders are taking, especially given challenges around securing leverage, is earmarking capital dedicated to preferred equity or similar subordinate opportunities. Targeted returns are anywhere from ~10% for cash flowing deals to mid-teens + for highly levered or more complicated pre-dev/development transactions at up to 90%+ spot LTV.



Outlook

The data center industry is positioned for continued expansion due to hyperscaler demand, ample investment, and paradigm shifting technological innovations that will necessitate more and newer data centers to support. A record volume of state-of-the-art data centers coming online over the next decade will accelerate the obsolescence of older product, opening up opportunities for renovation. The shifting futures of some sectors of CRE also pose adaptive-reuse opportunities, particularly well-connected campus layouts.

Energy is the number one challenge for the data center market. Data centers require massive amounts of energy- a hyperscaler's data center can use as much power as 80,000 households²- which also draws attention to sustainability. By financing renewable power solutions investors can promote sustainability while positioning data centers for compliance with climate edicts and local community concerns. Alternative power solutions include hydrogen, solar, wind, and nuclear, and firms in this space are innovating in a panorama of ways from repurposing decommissioned fossil-fuel power plants with clean energy solutions, to investing in new technologies like small nuclear reactors (SMRs) which could be deployed to generate sustainable power within the next decade if regulatory hurdles are cleared. There are early signs that hyperscale tenants will be focused on dual purpose locations (providing both power scale and fiber density / low latency), though power remains the critical factor in impacting deployment decision making. A renewed focus on net-zero carbon impact and attaining sustainability growth is also driving data center development derisions.

The amount of capital required to holistically fund every interconnected aspect of data center growth, from infrastructure and development to creating renewable power sources and repurposing carbon-producing assets, is forging new partnership opportunities as well in development and capital deployment, between alternative energy providers and data center operators, and more.

The ability to fund future growth will require both existing and new investors to deploy both equity and debt capital at scale. As development yields continue to increase, there will be a focus on driving growth through greenfield development vs. M&A. There is no near-term shortage of demand, and increasing development yields, improving capital costs, and overall risk adjusted returns (for both equity providers and lenders) continue to make data centers a bright spot.

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