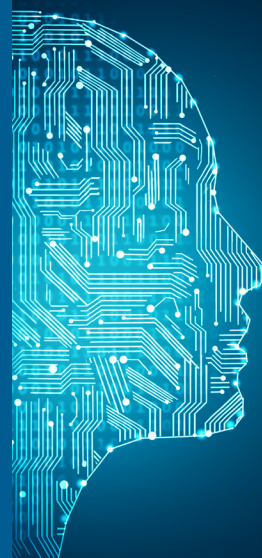


The Intersection of Virtual and Reality: Real Assets Benefit from Advancements in Artificial Intelligence



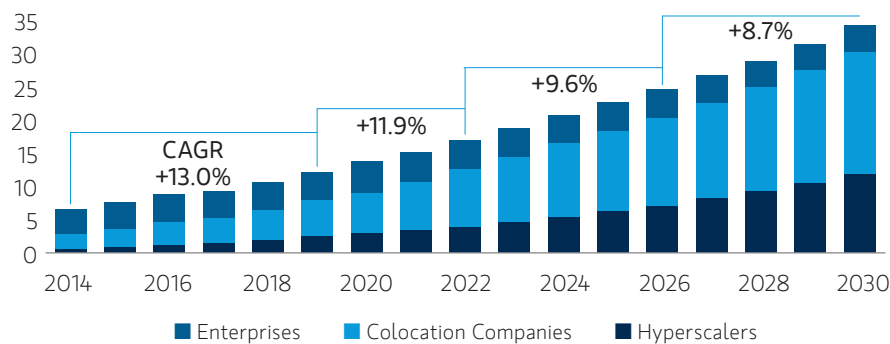
GLOBAL LISTED REAL ASSETS TEAM | August 2023

Data centers have benefitted significantly over the past two decades given the exponential growth in data, which has been supercharged by cloud computing and workloads being shifted into the cloud.

DISPLAY 1

U.S. Data Center Demand Anticipated to Grow by Approximately 10% per year through 2030

Data center power consumption, by providers/enterprises,¹ gigawatts



Source: McKinsey & Company

ENTERPRISES: Enterprise data centers are facilities that are typically owned or leased by a single company that can be housed on-premise of a corporate building.

COLOCATION COMPANIES: Colocation providers lease space to multiple tenants within a single data center asset that typically includes network capacity, power, cooling, and backup redundancy, while tenants will bring their own server equipment. Colocation data centers are highly interconnected with telecommunications, cloud computing providers, and other service providers.

HYPERSCALERS: Hyperscalers operate massive-scale data centers that provide cloud service infrastructure including storage and compute.

¹Demand is measured by power consumption to reflect the number of servers a data center can house. Demand includes megawatts for storage, servers, and networks.

AUTHOR



LAUREL DURKAY, CFA
Managing Director,
Head of Global Listed
Real Assets

“We’re seeing the infancy of demand drivers stemming from the adoption of and advancements in artificial intelligence”

More recently, we're seeing the infancy of demand drivers stemming from the more widespread adoption of and advancements in technology surrounding artificial intelligence ("AI"). Notably, this is a new wave of demand for data centers. Simplistically, AI requires more intense computing, and a more intense server with higher power requirements. Traditional data centers are filled with Central Processing Units ("CPUs"), but given compute and processing requirements of AI, Graphics Processing Units ("GPUs") are needed. GPUs allow for parallel processing and computing, and run thousands of jobs simultaneously. This intensity necessitates a higher power draw—so the power density of data centers housing artificial intelligence and GPUs will need upwards of 2x more power density than a traditional data center, with some estimates indicating 4x more power will be required!

These changes will not only require more power sourced from local utilities, but also slight modifications to the internal infrastructure of the data center as it relates to cooling the facility to enable optimal performance. All of this means new data center development is needed. Given the specialized nature of data center development and operations, and the unique challenges the broader adoption of AI may present with regard to power accessibility and data center design, we believe long tenured platforms and companies with expertise in data center design, evolution and construction are best suited to tackle the opportunity.

The AI data center will not be a substitute for the traditional CPU based data center, and instead will likely be incremental

CPUs are often described as the "brains" of the computer or device. The GPU is oftentimes referred to as the "soul".

CPU – CENTRAL PROCESSING UNIT	GPU – GRAPHICS PROCESSING UNIT
Serial processing	Parallel processing
Handful of threads; Better at processing one large task at a time	Thousands of threads simultaneously; Better at processing several smaller tasks at the same time
Generalist component	Specialized component

and additive. Traditional workloads will continue to grow, alongside growth in workloads related to AI, the Internet of Things, virtual reality, and autonomous driving. While this demand won't manifest itself overnight, it will fuel robust growth over the next decade. Ultimately, data centers will become increasingly valuable and in-demand.

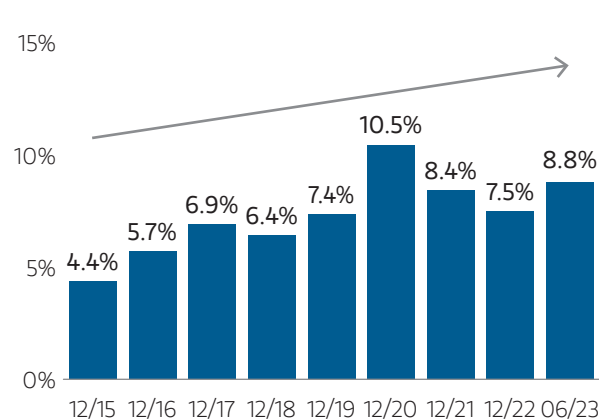
Within the U.S. listed REIT market, Digital Realty Trust (DLR) and Equinix (EQIX) are examples of how we can gain exposure to preeminent owners and operators of long tenured data center platforms who possess expertise in data center design, evolution and construction.

As shown in *Display 2*, U.S. data center REITs have experienced dramatic growth in terms of weight and market capitalization within the FTSE Nareit All Equity REITs Index and we expect this growth to continue. This growth has

DISPLAY 2

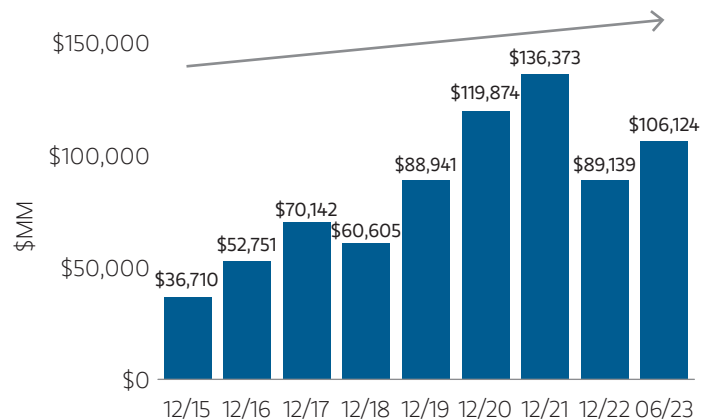
Growth of U.S. Data Center REITs within FTSE Nareit All Equity REITs Index

Data Center Weight within FTSE Nareit All Equity REITs Index



Source: FTSE Nareit, FactSet

Data Center Market Cap (\$MM) within FTSE Nareit All Equity REITs Index



DISPLAY 3

U.S. Data Center REIT M&A Activity

INITIAL ANNOUNCE DATE	ACQUIRER	TARGET	TYPE	PURCHASE PRICE	PREMIUM TO SHARE PRICE
6/19/2017	Digital Realty Trust	DuPont Fabros Technology	Public-to-public	\$7.7 Billion	15%
6/7/2021	Blackstone	QTS Realty	Take-private	\$10.0 Billion	21%
11/15/2021	American Tower	CoreSite Realty	Public-to-public	\$10.1 Billion	2%
11/15/2021	KKR/Global Infrastructure Partners	CyrusOne	Take-private	\$15.0 Billion	6%

Source: Company filings and Morgan Stanley Investment Management

Deals subject to shareholder approval and terms may be subject to change. Purchase price provided in USD terms.

Premium to last closing share price prior to initial official announcement. In certain cases, premium to unaffected share price may be significantly higher due to share price increases related to market speculation of a potential sale of certain companies.

Past performance is not indicative of future results.

taken place alongside significant M&A activity as shown in *Display 3*, as the data center space has consolidated with four publicly traded data center REITs taken private or the subject of public to public REIT mergers since 2017.

While U.S. Data Center REITs have performed well as shown in *Display 4*, current valuations remain compelling (see *Display 5*) in light of forecasted growth.

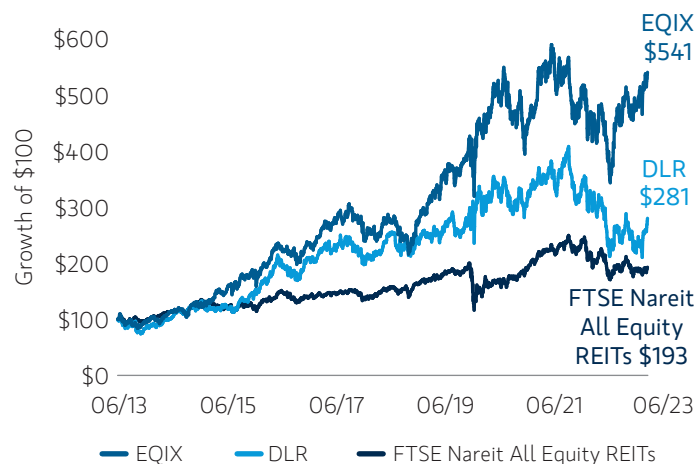
Conclusion

The sectoral composition and differentiation among different REIT sectors is very important when thinking about and analyzing the underlying risk/reward profile and performance of real estate

securities, and helps create opportunities for active managers within listed real estate investing. We believe data center REITs provide a compelling investment opportunity for investors not only over the short term, but potentially for the next decade, as the sector is likely to benefit from the strongest long-term secular growth drivers within the REIT universe. At Morgan Stanley Investment Management, we seek to take advantage of secular trends, such as those benefitting data centers, in addition to cyclical trends, as we ultimately seek to identify the real estate securities with the best forward total returns.

DISPLAY 4

U.S. Data Center REIT Performance vs. FTSE Nareit All Equity REITs Index



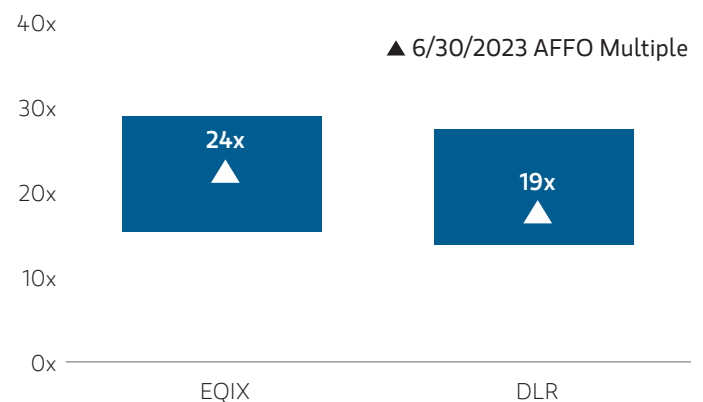
Source: FactSet, FTSE Nareit

Data provided in USD. Past performance should not be construed as a guarantee of future performance. It is not possible to invest in an index. Provided for illustrative purposes only.

DISPLAY 5

EQIX and DLR Historical Adjusted Funds From Operations (AFFO) Multiples

8-Year AFFO Multiple Range Ending June 30, 2023



Source: Citi Research. Range based on quarterly AFFO multiples dating back 8 years, the longest period of time in which data was available to allow for a consistent analysis for both EQIX and DLR. 1Q and 2Q of each year use current year's (FY 0) AFFO multiple; 3Q and 4Q of each year use next year's (FY + 1) AFFO multiple. Past performance should not be construed as a guarantee of future performance. It is not possible to invest in an index. Provided for illustrative purposes only.

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