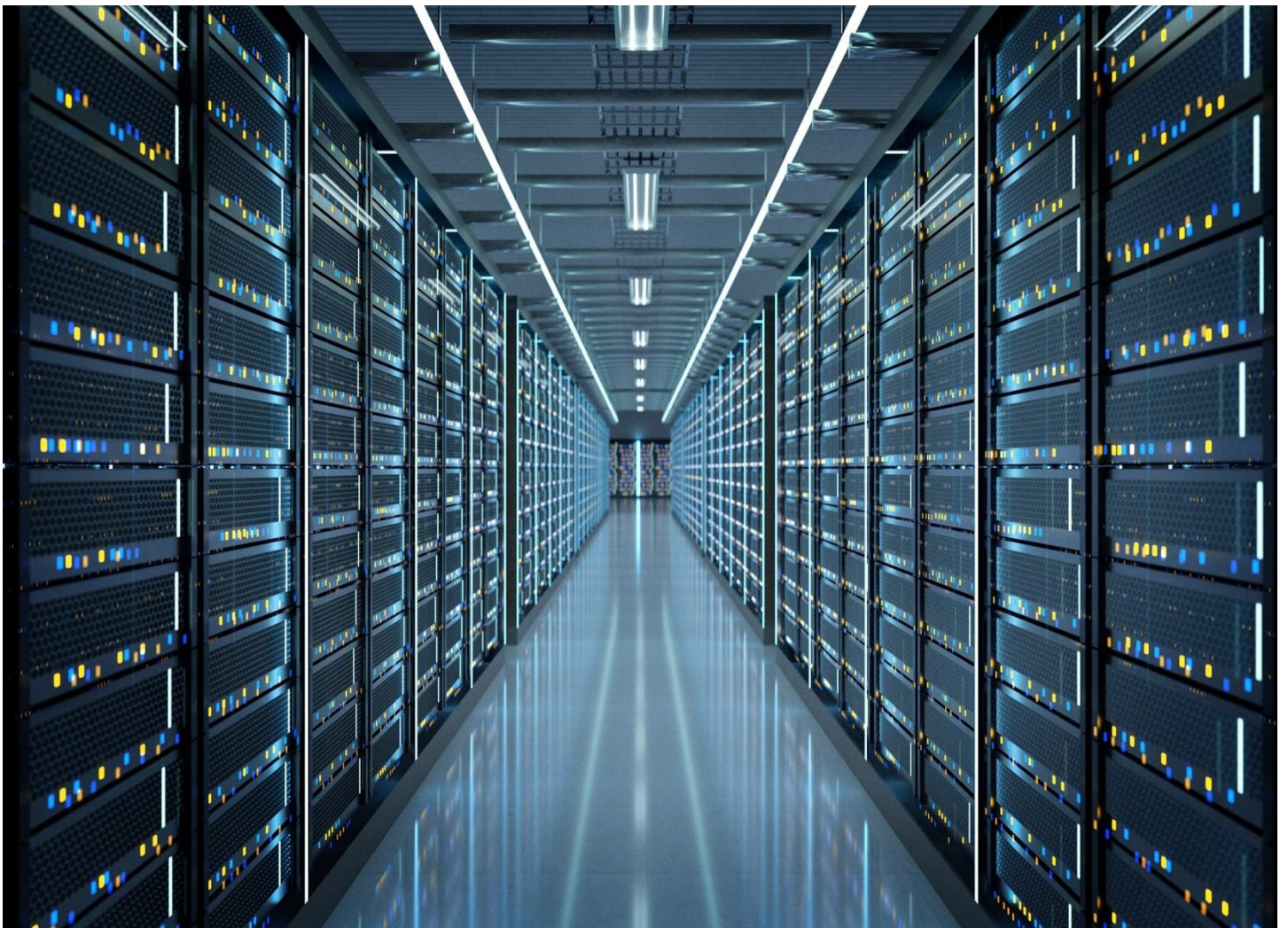


Infrastructure Quarterly: Q2 2024

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JUNE 2024



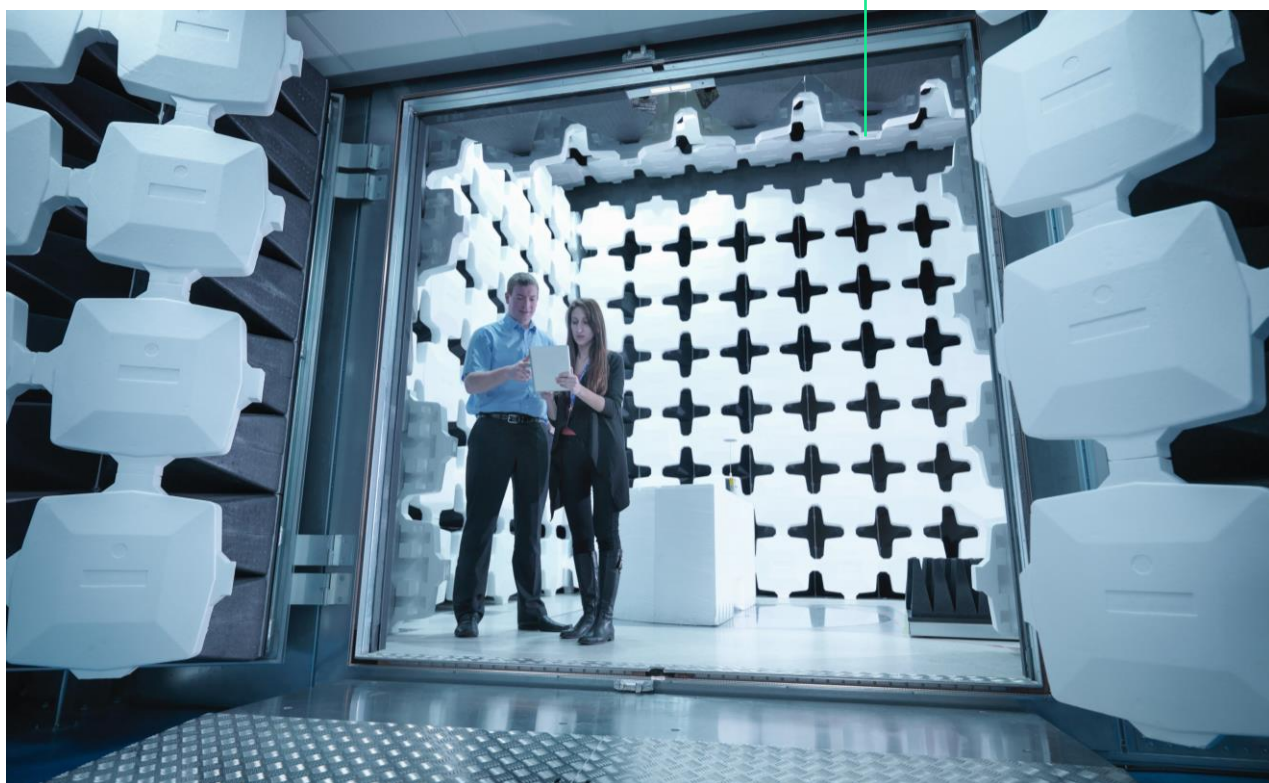
An extended slowdown

Mixed economic data in the first quarter of 2024 meant the financial markets remained volatile and the much-expected rate relief was delayed—at least for now. Inflation has proved to be much stickier particularly in the U.S. and geopolitical turmoil keeps the downside risk elevated. We expect inflation to moderate but remain at the target levels for central banks uplifted by the costs of deglobalization and the energy transition. In a structurally high inflationary environment, we continue to project strong earnings growth and recurrent dividend yield for most infrastructure sectors.

The fragile outlook calls for balanced and diversified infrastructure portfolios with a preference for themes benefitting from structural tailwinds, such as power utilities and data centers considering the upswing in power demand to fuel power-intensive AI applications. Renewable power is another sector which should benefit from data center owners and tenants seeking contracts for green electricity.

In this edition of Infrastructure Quarterly, we look at how the uncertainty about central banks' rate policies extended the slowdown in infrastructure fundraising and dealmaking in the first quarter of 2024. We also feature a Q&A with CBRE on North American data center trends and we explore the development constraints, power advancements and outlook for 2024 and beyond.

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Market performance

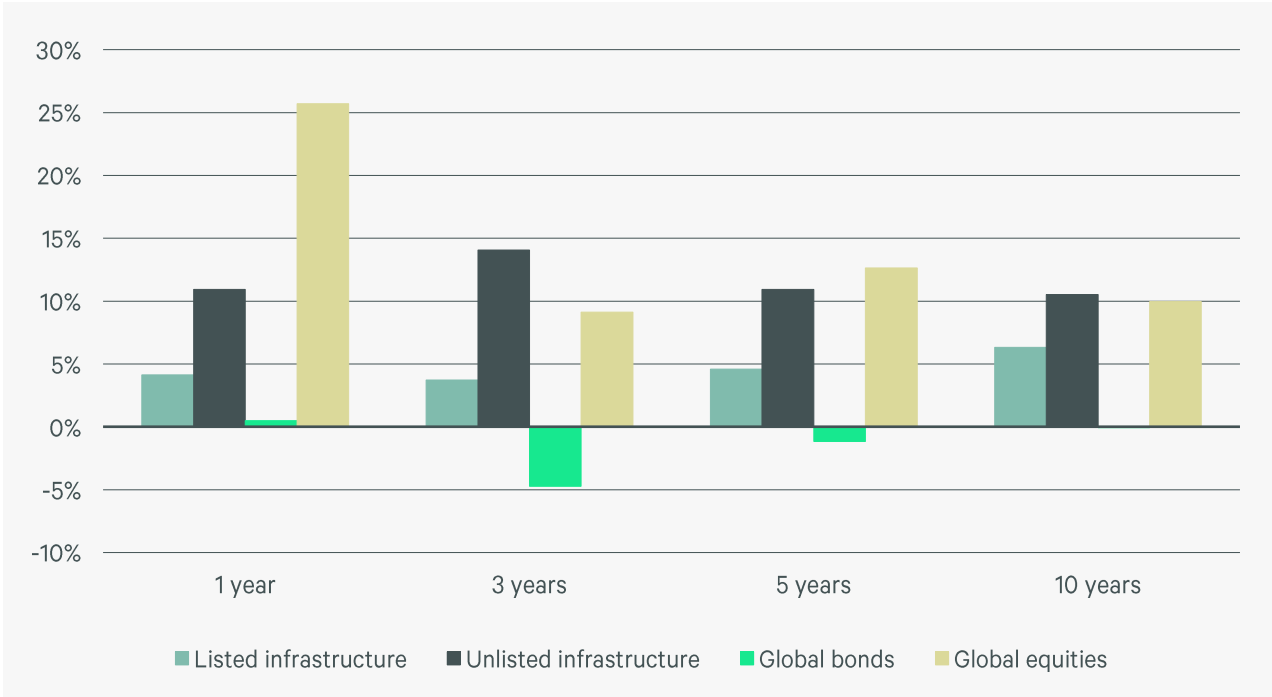
Diminishing pressure on valuations

In Q1 2024, financial markets priced in slower and more delayed interest rate cuts compared to the more positive expectations at the end of last year. There is still consensus that we have reached peak rates and central banks in Europe and the United States will start easing their monetary stance abating the pressure on capital values from rising discount rates. Combined with recurrent income yield, total unlisted infrastructure returns remain firmly in positive territory (**Figure 1**). By sector, transport and network utilities contributed the most to Q1 returns according to EDHECinfra. This is likely attributed to resilient transport volumes and the gradual re-adjustment of regulated earnings to higher funding costs and inflation. In Europe, power prices declined significantly as gas inventories were above seasonal levels. With lower power prices, unlisted merchant infrastructure has started to crest after several abnormally high quarters. Contracted infrastructure—with availability-based, mostly CPI-based revenues, and regulated infrastructure—have remained more stable over time. (**Figure 2**).

The recovery of listed infrastructure that started in Q4 2023 continues albeit at a slow pace. The defensive characteristics of listed infrastructure were tested extensively by macroeconomic headwinds over the preceding two years. A sense of calm is prevailing now. Moderating inflation and stabilizing interest rates are positive for infrastructure stock prices. The rebound in listed infrastructure indices was more broadbased by sector and region in comparison with the public equity markets which continued to be dominated by gains in U.S.-concentrated Big Tech stocks. The need-for-power story improved market sentiment for power and integrated utilities. A commodity price rally and solid earnings supported listed midstream companies.

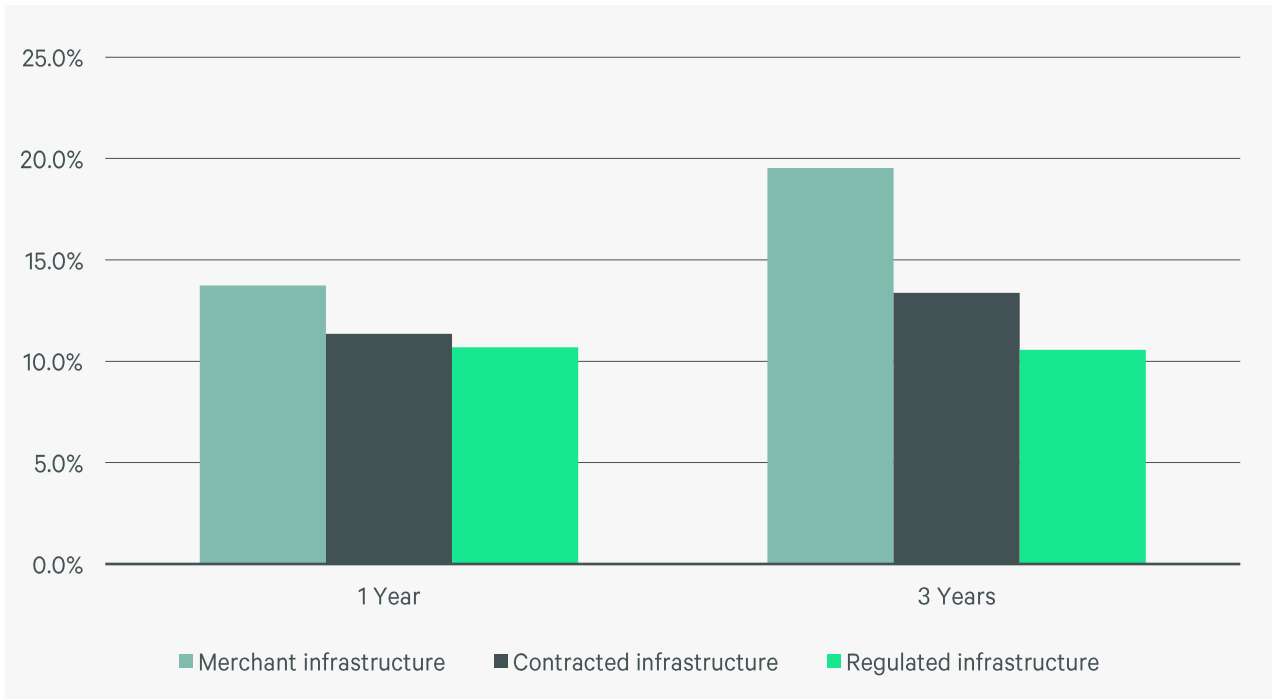


Figure 1: Infrastructure, bonds and equities annualized total returns (listed and unlisted infrastructure, bonds and equities as of Q1 2024)



Source: EDHECinfra, Factset. Unlisted infrastructure: EDHEC infra300 equally weighted, local currency as of Q1 2024, gross of fees. Listed infrastructure: FTSE Global Core Infrastructure 50/50 index in USD as of Q1 2024. Bonds: Bloomberg Global Aggregate Fixed Income index in USD as of Q1 2024. Equities: MSCI World index in USD as of Q1 2024. For illustrative purposes only. Current market conditions differ from prior market conditions; including during prior periods of stress and dislocation. There can be no assurance any prior trends will continue.

Figure 2: Unlisted infrastructure annualized return by business model (%)



Source: EDHECinfra as of May 27, 2024. Data as of March 31, 2024 for broadmarket merchant unlisted infrastructure equity, contracted unlisted infrastructure equity and regulated unlisted infrastructure equity. Quarterly returns annualized by CBRE Investment Management.

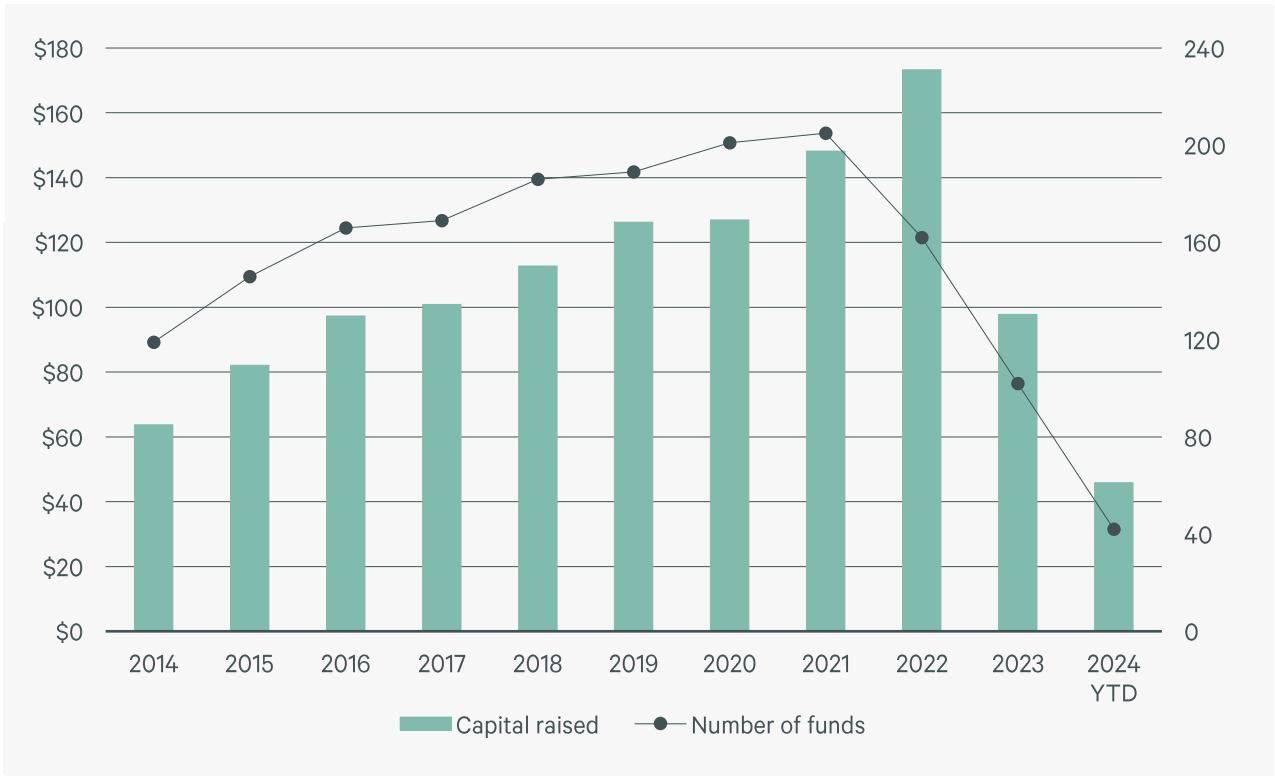
A drag on infrastructure fundraising

Infrastructure funds raised just over \$40 billion to date in 2024 as the slowdown in fundraising continued almost halfway through the year (**Figure 3**). High interest rates and challenges in selling assets have affected fundraising activity. More certainty on asset valuations is needed for investment activity to rebound and unlock liquidity by institutional investors for the rest of the year. According to Infralogic, the second quarter of 2024 looks promising with 46 strategies looking to raise \$72 billion by the end of June.

Consolidation and ever-rising fund sizes continue to be major themes in the asset class. The top 10 funds in the market account for 34% of all capital being sought (Infrastructure Investor Q1 Fundraising report). The buyout of infrastructure managers is on an upswing. The race to the top for the major players continues and at the same time, multi-asset or private equity managers seek exposure to the relatively stable infrastructure industry. For independent asset managers, the buyout route is a way to gain access to larger distribution channels and tap high net-worth and affluent investors as the private markets universe expands with new long-term investment formats.

Infrastructure funds raised just over \$40 billion to date in 2024 as the slowdown in fundraising continued almost halfway through the year.

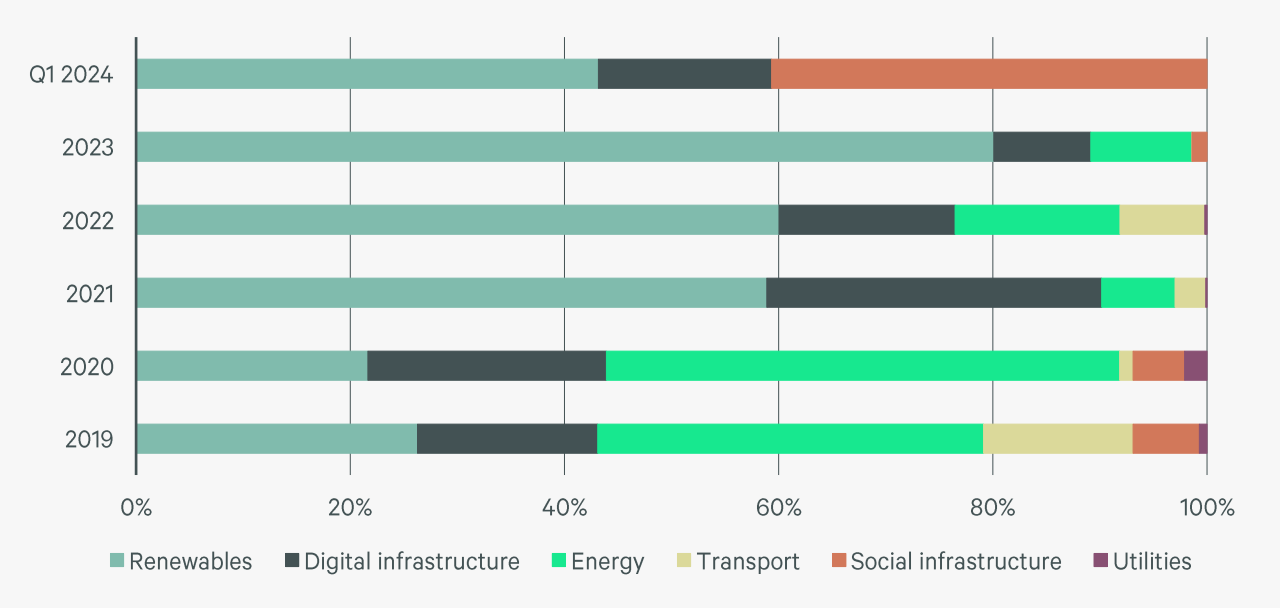
Figure 3: Historical infrastructure fundraising, value (\$ billions) and number of funds (rhs)



Source: Preqin, May 25, 2024. For illustrative purposes only. Current market conditions differ from prior market conditions; including during prior periods of stress and dislocation. There can be no assurance any prior trends will continue.

Structural tailwinds and geopolitical tensions explain the sectoral and geographic preferences in infrastructure fundraising. Analyzing capital raised for sector-specific strategies (**Figure 4**), renewable energy and energy transition funds dominate with several of them in the mid- and small-market. Digital infrastructure is now a distant second, which is surprising given the ongoing sizable investment activity in data centers. Most generalist funds in the market list digital infrastructure as one of their target areas. Multi-region funds continue to be the norm. An interesting development in Q1 2024 is the close of several Asia Pacific strategies which accounted for 36% of all capital raised, according to Infrastructure Investor.

Figure 4: Sector breakdown (% of total sector-specific capital raised)



Source: Infrastructure Investor, Q1 2024 Fundraising report. Social infrastructure in Q1 2024 includes an Iberian car park continuation fund. For illustrative purposes only. Current market conditions differ from prior market conditions; including during prior periods of stress and dislocation. There can be no assurance any prior trends will continue.



Deals

Similar to fundraising, the number of closed infrastructure deals in Q1 2024 stalled to their lowest level in five years (**Figure 5**). This reflects the significant gap between buyers’ and sellers’ expectations over the preceding quarters. While more clarity on central banks’ next moves is still desired, the investment pipeline shows signs of revival. Since the start of 2024, Infralogic’s database lists more than 700 infrastructure transactions that moved forward in the investment process; out of them, more than 300 deals are M&A transactions worth \$91 billion.

Investors are watching large ticket deals in the digital infrastructure space, such as the sale of Global Switch’s Australian data center portfolio or the potential disposal of the AUD 15 billion Australian data center business AirTrunk. The lure to gain data center exposure is attracting a wide range of investors, boosted by reports of the bulging generative artificial intelligence (GenAI) demand. In less than two quarters in 2024, greenfield activity in data centers equaled the total annual activity in 2022.

In the first quarter of 2024, there were several closed or announced deals in European airports. French tollroad conglomerate Vinci acquired a 50% stake in the Edinburgh Airport for an estimated EV/EBITDA multiple of just over 20x. Except for Sydney Airport, there has been very little M&A activity in airports since the pandemic. The new deals—including an announced sale of a stake in Italian 2i Aeroporti—could help price discovery. In terms of the number of transactions, solar photovoltaics (PVs) ranked first, followed by onshore wind and data centers. Battery storage is also picking up momentum with larger project sizes lining up financing. All values are based on Infralogic data.

Figure 5a: Private infrastructure dealmaking, values by deal type (\$ billions)

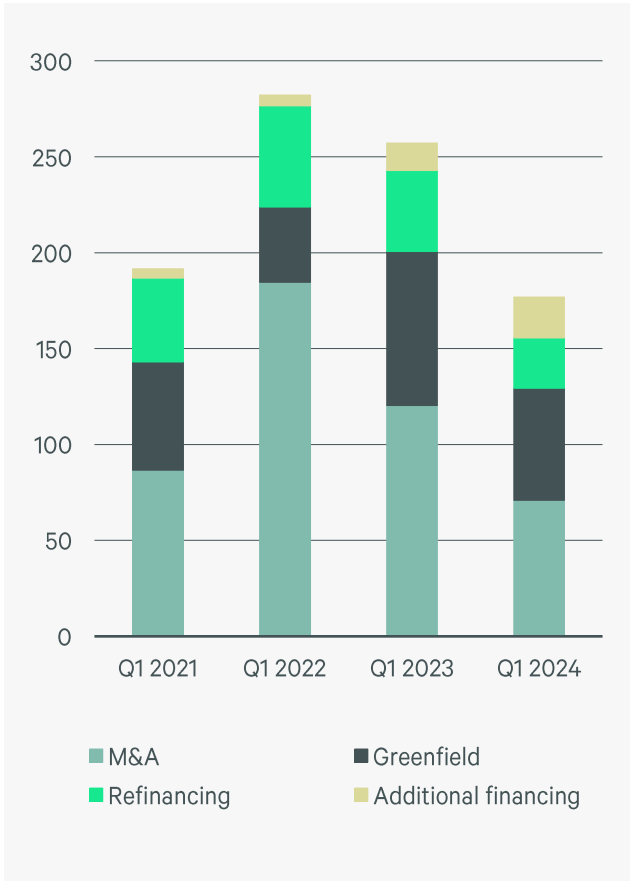
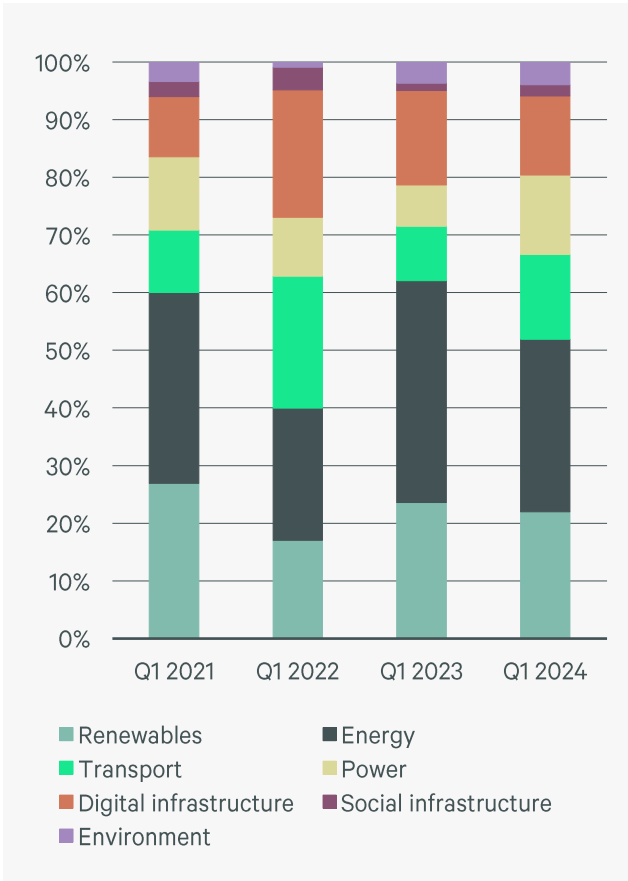


Figure 5b: Private infrastructure dealmaking, market share by sector (%)



Source: Infralogic Ranking report, Q1 2024.

Q&A

In this edition of Infrastructure Quarterly, we speak with Gordon Dolven, Director—CBRE Data Center Research Team, about insights and findings from CBRE’s report on North American Data Center trends H2 2023. [Gordon Dolven | CBRE](#).



Gordon Dolven
Director – CBRE Data Center Research Team

Question

Answer

How are challenges with electrical power availability timelines driving data center investment and development in North America?

While demand continues to drive new inventory in Northern Virginia, investors and operators are seeking out new frontiers due to delivery timeline delays for power requests in primary markets. Across the U.S., supply-chain delays with transformers, breakers and generators for new substation developments can delay projects 12-72 months. We have observed a premium on land in areas of the country with existing power capacity at already constructed substations. While historically fiber and connectivity were driving site selection decisions, power is now the top priority. Markets that are uniquely positioned with land availability, existing transmission and distribution infrastructure, power availability and tax incentives continue to draw increased interest from developers.

With growing interest in renewables and sustainable energy, what advancements are you seeing in data centers?

Data centers provide mission critical infrastructure for our daily lives. Essential servers, hardware, and equipment within these facilities require significant electrical power. We see many advancements, including closed-loop liquid cooling, requiring less energy than air cooled facilities, waste heat being used in greenhouse facilities adjacent to data centers, improved efficiency with construction and design, zero carbon concrete and more to reduce the carbon footprint of data centers.

What is your outlook for data centers in 2024 and beyond?

Digital infrastructure is the plumbing that enables information to flow. Not only are we sending more emails and taking more pictures driving increased demand for data centers and new development, but the overall adoption and use of digital applications require more storage, computing and processing. We remain confident demand will continue to grow throughout 2024 and into 2025. As of H2-2023, preleasing activity in primary markets is strengthening, with 2,553.1 MW (83%) of the 3,077.8 MW under construction preleased. Cloud providers continue to lease most available power capacity, but artificial intelligence (AI) is also driving significant demand. Additionally, an all-time high of 3,077.8 MW was under construction in primary markets, a 46% year-over-year increase.

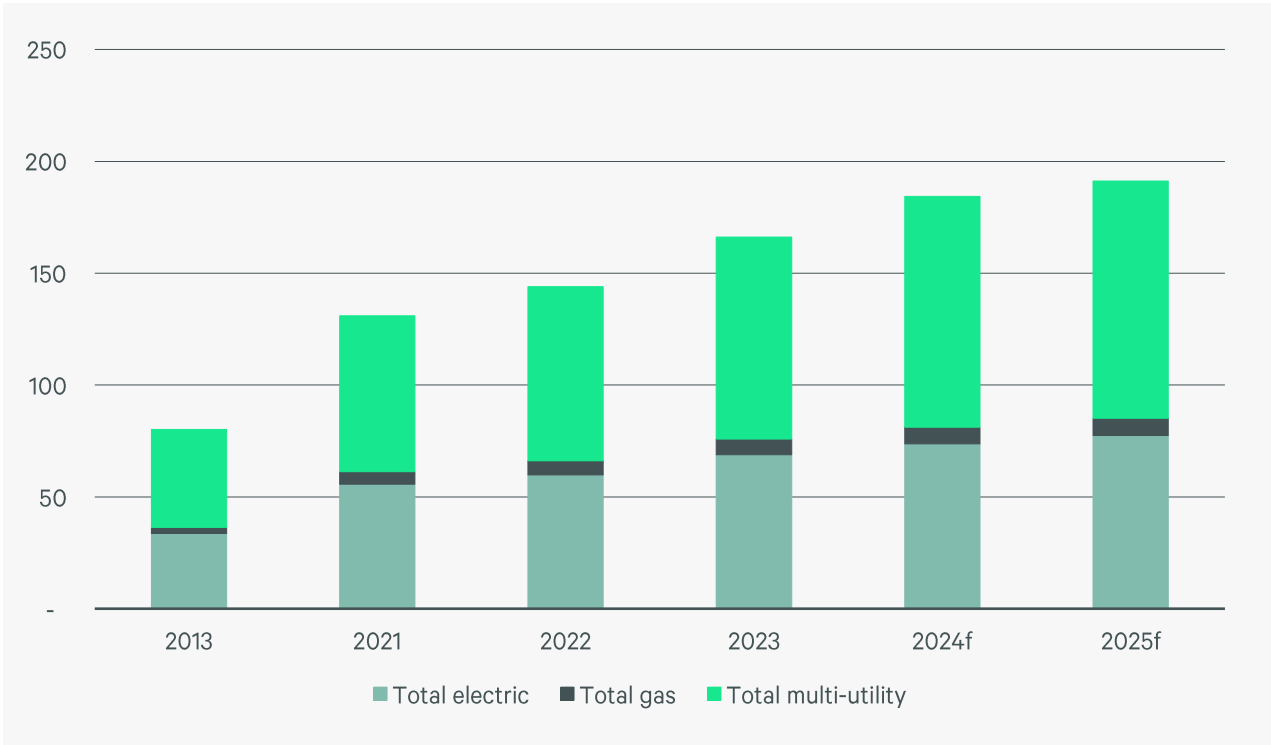
For more information, link to the report. [North America Data Center Trends H2 2023 | CBRE](#)

Sector insights

Power and utilities

Required capital expenditures (capex) on power infrastructure are hitting records across the globe driven by rising electricity demand, the need to connect clean energy generation, electric vehicles adoption and domestic manufacturing growth. Data centers and GenAI are becoming a rapidly growing source of power loads. Regulatory Research Associates (a subsidiary of S&P Global Commodity Insights) estimates 11% higher spending levels in 2024 compared to the previous year for a sample of large, publicly-listed U.S. energy utility companies (**Figure 6**). The European Union’s Action Plan on Grids considers a 60% increase in power demand by 2030 and outlined approximately €584 billion of required grid investments this decade.

Figure 6: Historical and forecast utility capex (\$ billions)



Source: Regulatory Research Associates, a group within S&P Global Commodity Insights. Data compiled March 27, 2024. For illustrative purposes only. Current market conditions differ from prior market conditions; including during prior periods of stress and dislocation. There can be no assurance any prior trends will continue. There can be no assurance any forecasts will be realized.

Infrastructure companies are also investing to increase resilience to physical climate risks. In the U.S., the National Oceanic and Atmospheric Administration (NOAA) released its outlook for the 2024 Atlantic hurricane season, predicting higher-than-normal hurricane activity. NOAA forecasts a range of 17 to 25 total named storms, which might incur direct costs to utilities and power plants in high-risk areas. Key in the assessment of utilities is the regulatory recovery mechanisms and whether they allow full or near-full recovery of storm-related costs.

In Europe, power prices have fallen rapidly materially changing the short-term outlook. As the penetration of renewables increases, so does day-hour power price volatility and the need for flexible generation, providing structural support for battery energy storage (BESS). Governments and grid utilities increasingly recognize the crucial role of energy storage and incorporate targets in their National Energy and Climate plans. The business models that are emerging contain a high degree of market-sensitive trading and ancillary revenues; however, proposals in Europe suggest the introduction of more predictable capacity market auctions and offtake contracts.

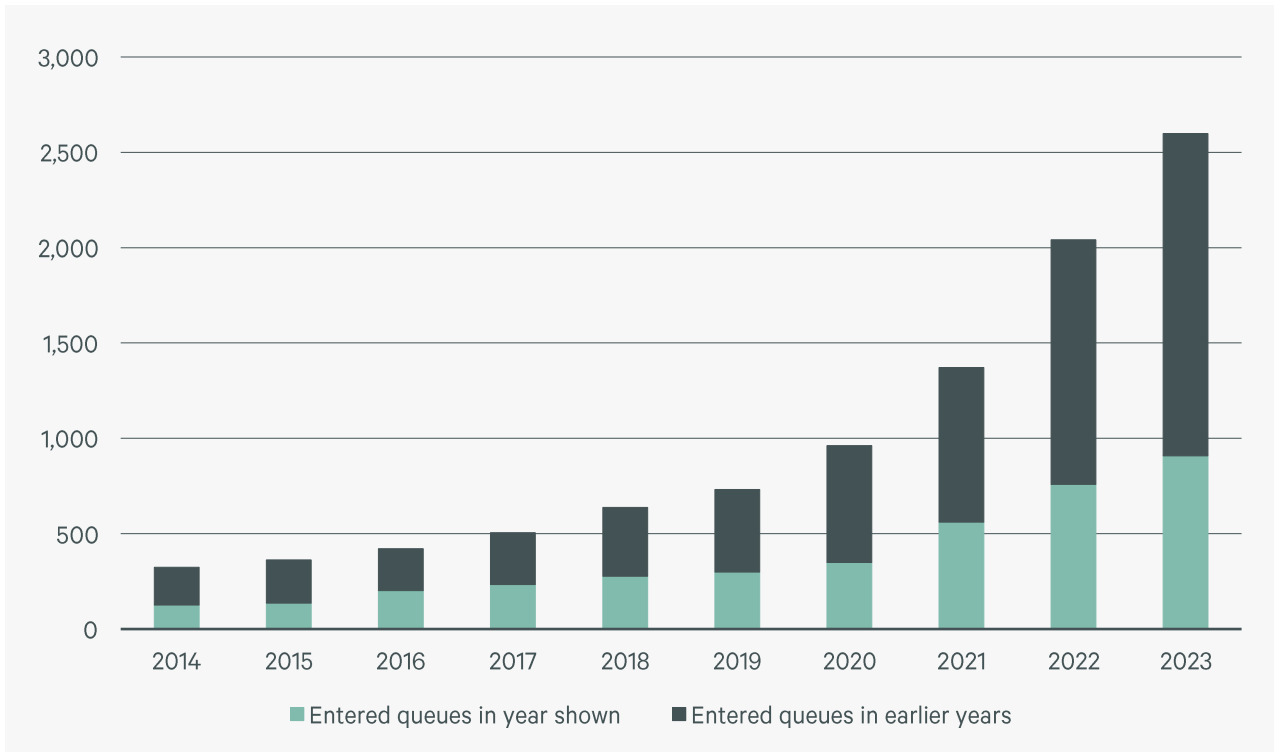
Renewables

Worldwide policy stimuli are giving boost to renewable capacity. According to the Lawrence Berkeley National Laboratory, over 1,200 gigawatts of solar, storage and wind capacity have requested interconnection in the U.S. following the passage of the Inflation Reduction Act. The additional tax incentives are leading to increased developer interest in clean energy. The wait times, however, are increasing. The typical project built in 2023 took nearly five years from the request to connect to reach commercial operation. U.S. regional utilities have a hard task as the interconnection queues are expanding and currently stand at twice the installed power plant capacity nationwide (**Figure 7**). This will prompt regulatory agencies to improve data transparency, coordinate interconnection and transmission planning as well as ease permitting requirements.

Market demand is a strong factor as well. The Big Tech’s drive for zero emission power is gaining speed. Talen Energy sold its hyperscale data center campus to Amazon Web Services while simultaneously entering into a long-term power purchase agreement (PPA) to supply the data center with nuclear energy from one of Talen’s power plants. In another example, Microsoft signed a framework agreement with Brookfield Renewable Partners for 10.5 gigawatts (GW) of renewable power. This improves the market sentiment for renewable development and the project economics as hyperscale offtakers often agree to premium PPA prices.

Climate policies are front and center in election campaigns and 2024 as a major election year will test the energy transition ambitions. The European Union is voting for members of the European Parliament in June 2024 and the U.S. general elections are scheduled for November. Climate policies such as the EU Green Deal and the U.S. Inflation Reduction Act are being implemented at a time of rising energy costs, a war in Ukraine, concerns about a cost-of-living crisis and the efforts of governments to bring clean energy manufacturing home. A recent trade ban on Chinese solar panels by the U.S. is an example of the latter. While protecting local manufacturers, the ban is exacerbating the oversupply of solar components in Europe.

Figure 7: Total active capacity in interconnection queues in the United States (2014-2023 in gigawatts)



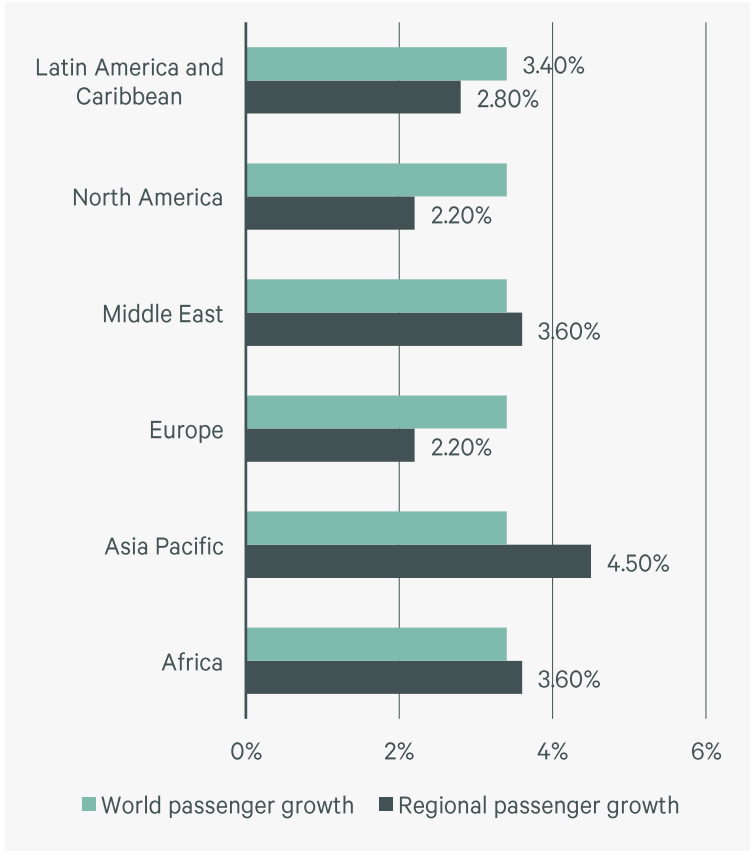
Source: Lawrence Berkeley National Laboratory, April 2024, funded by the U.S. Department of Energy. Data based on 7 ISO/RTOs and 44 non-ISO balancing areas.

Transport

Transport volumes are holding up despite the adverse macroeconomic impacts on consumer disposable incomes. Travel demand is being driven by leisure and in aviation, the opening of China’s international routes.

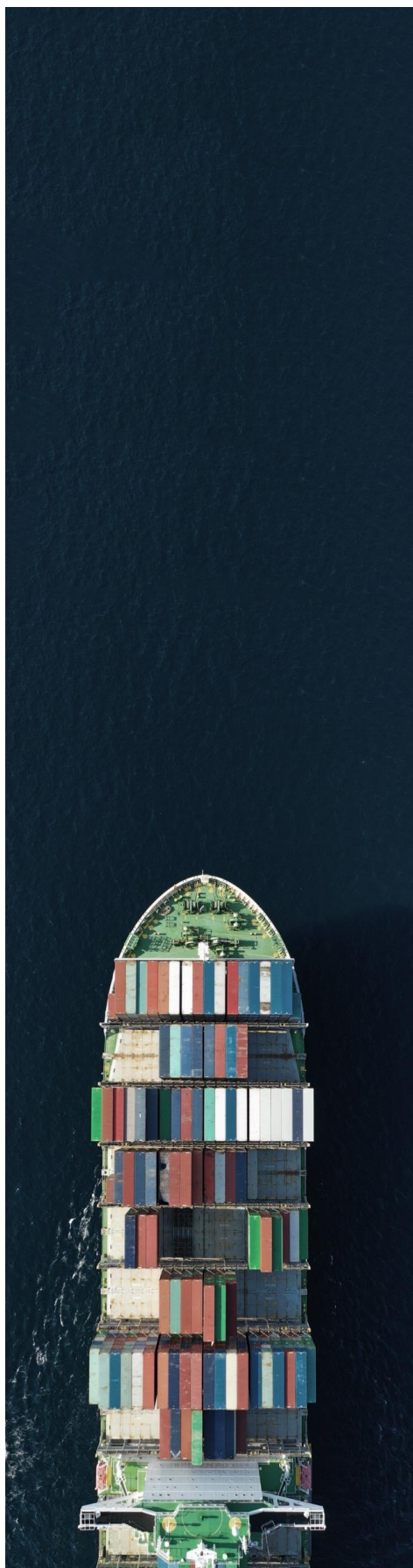
According to the International Air Transport Association (IATA), air passenger growth will continue to increase albeit at a slower rate compared to the years of pandemic recovery. The agency expects that passenger journeys will double from the 2019 level to 7.8 billion by 2040 (**Figure 8**). Asia Pacific is leading the growth, and India in particular, is forecasted to achieve a growth rate of 6% over the next 20 years. The short-term uncertainties revolve around the passenger demand if jet fuel becomes more costly, or sticky inflation and mortgage rates pressure disposable income. In the longer term, the carbon footprint and related costs of aviation could cool consumer demand. IATA expects the industry to increase the use of sustainable aviation fuels (SAF) and use more carbon emissions offsets.

Figure 8: Air passenger forecast summary, combined annual growth rate (2019–2040)



Source: International Air Transport Association (IATA), Global Outlook for Air Transport, A Local sweet spot, December 2023.





Ports are facing a slowdown in world trade—as measured by the ratio of world exports to GDP—and a change in trade patterns due to geopolitical conflicts. The onshoring of supply chains and trade disruptions are slowing world trade while friendshoring—manufacturing and sourcing from countries that are geopolitical allies—is affecting regional port dynamics. Energy flows that were originally aimed for Europe are now redistributed to BRIC countries and trans-shipment hubs in the Red Sea are still disrupted due to the conflict in the Middle East.

The investment outlook for transport is positive given the urgent need to decarbonize; transport accounts for nearly one-quarter of global energy related carbon emissions, according to the International Energy Agency. The major contributor of emissions is road travel and in particular medium and heavy vehicles. The electrification of transport is proceeding at a rapid pace; battery prices continue to decline and improve the parity with internal combustion engines. In March 2024, the Transport for London (TfL) launched a concession to upgrade the EV charging infrastructure which will support its operational fleet of approximately 1,000 zero emission vehicles.

The decarbonization of transport will need to look beyond electrification as there are segments such as maritime shipping that are hard-to-abate. A number of transition fuels are being explored, from green hydrogen to renewable gas but they are in different stages of technological readiness, efficiency and production cost. In May 2024, the Portuguese government launched an auction for green hydrogen and biomethane to incentivize their production by purchasing €14 million over a period of 10 years (Infralogic).

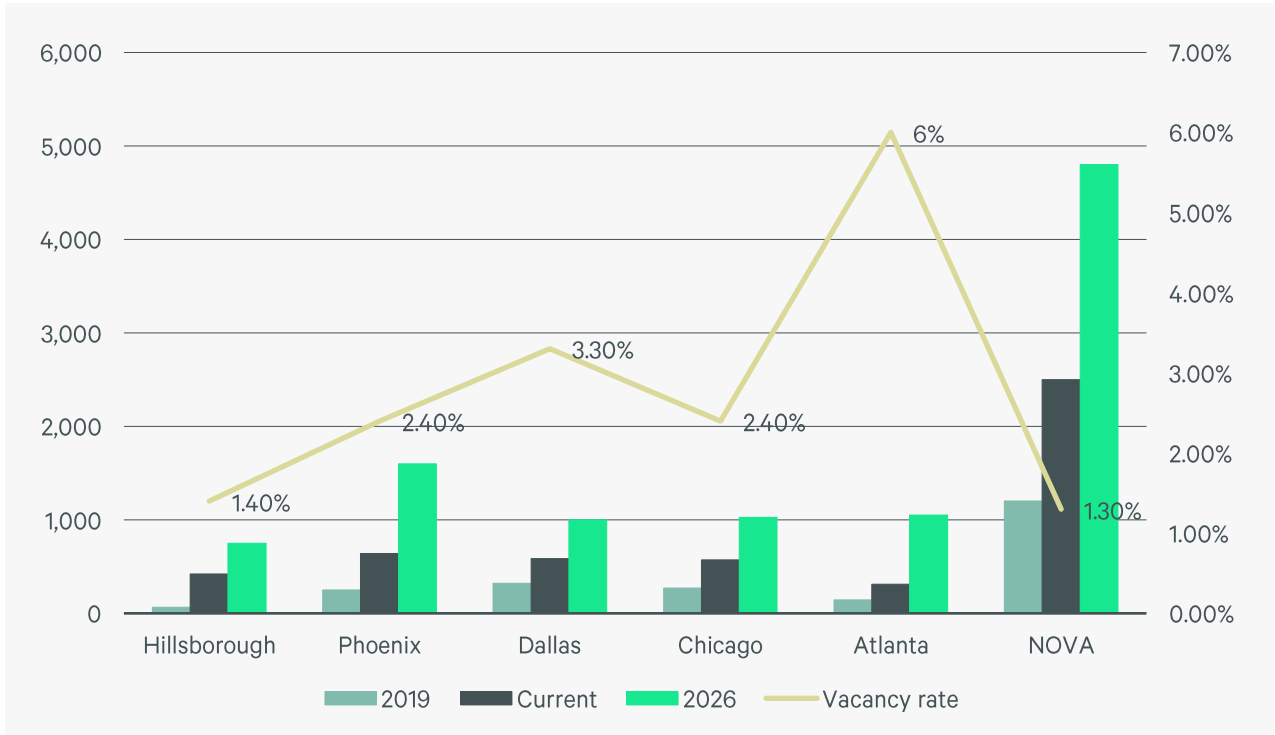
Digital infrastructure

Data centers remain thematically well positioned and command strong investor demand. According to CBRE, the six fastest-growing data center markets in North America have doubled in capacity since 2019 while the vacancy rates are sub-par to market with very low speculative build (**Figure 9**). Colocation capacity is driven by the hyperscale cloud, AI and enterprises using multi-cloud providers. GenAI requires larger facilities in size—50MW to 100MW—and more complex design in terms of hybrid cooling and reliability. At the same time, the latency (closeness to the client) is less important for training large language models (LLMs) and, therefore, secondary and emerging markets are becoming more appealing if they offer powered land and electricity at attractive prices.

With power hungry AI applications, the attention has turned to the quantity and type of power used by data centers. Google recently said that they are matching 64% of their data center power consumption against hourly carbon-free energy; this compares to their target of 90% matching by 2030. Machine learning can increase efficiency by optimizing the servers’ adaptability to different operating scenarios. GenAI workloads are variable with higher peaks than traditional loads. Intelligent systems and software can dynamically adjust the power supply to different racks or zones in a data center as well as shift power loads to times with lower carbon intensity.

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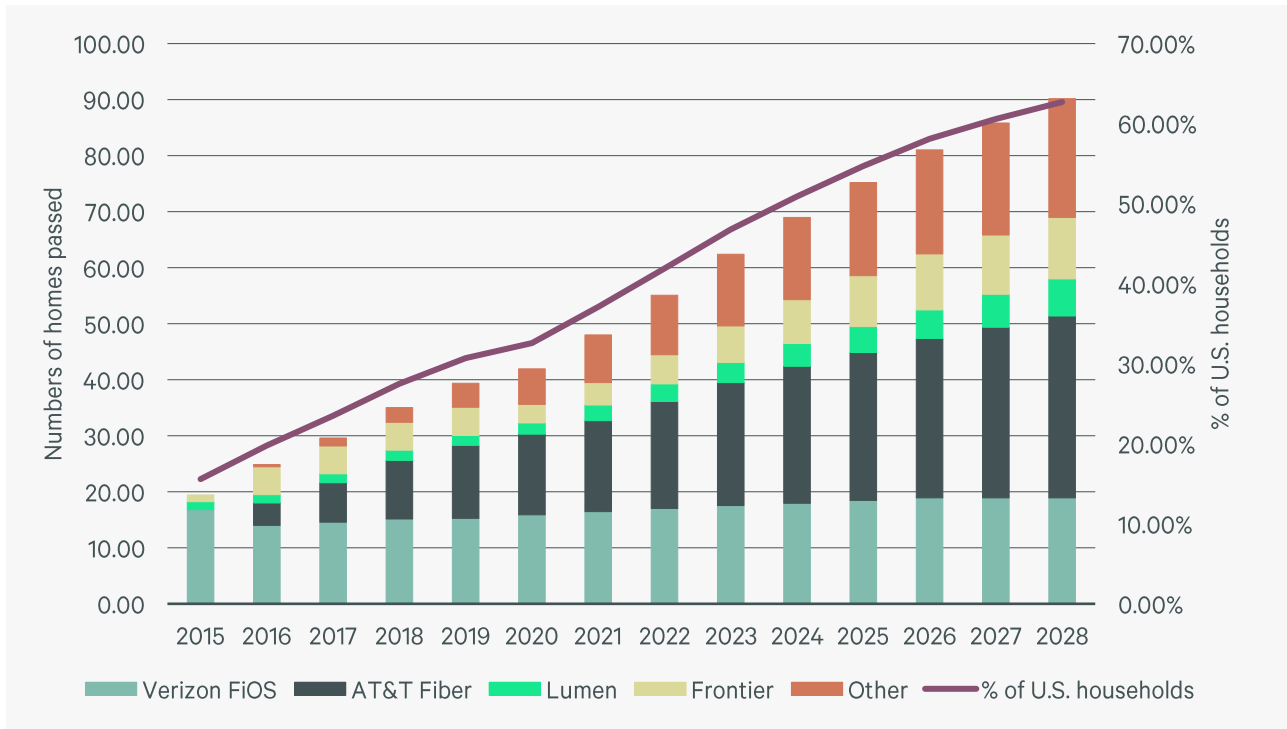
Figure 9: Six fastest data center markets in North America, capacity (MW)



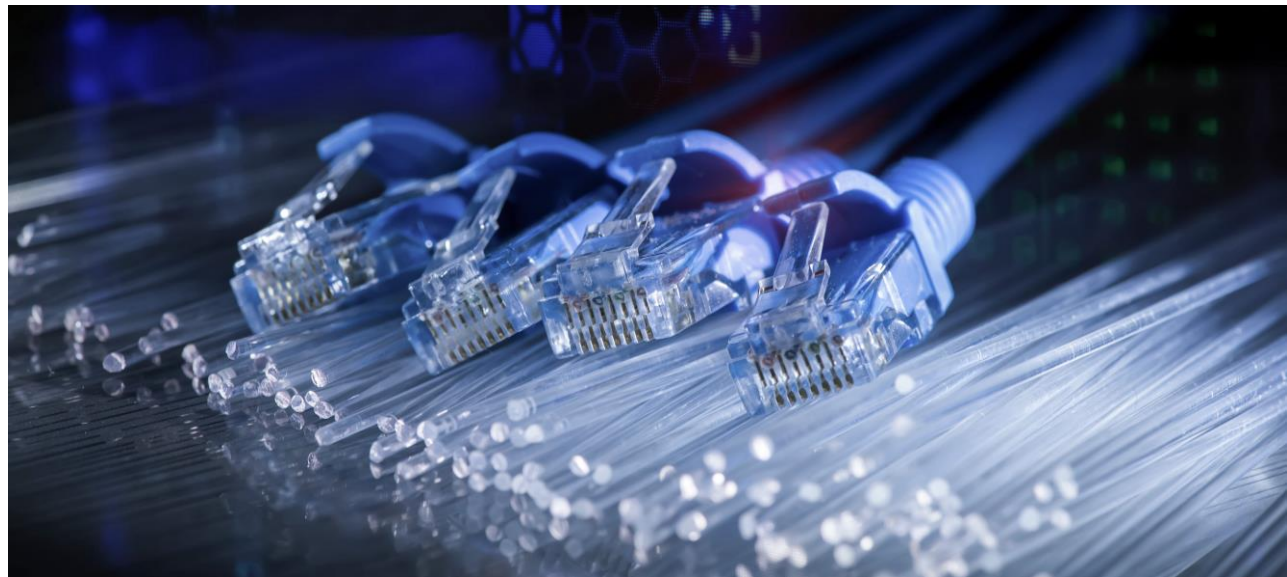
Source: CBRE Hosts Discussion on How Nvidia is Changing the Data Center Industry, May 22, 2024. NOVA: North Virginia.

Fiber-to-the-home (FTTH) has entered a late stage with slowing penetration and increased competition in urban areas. The fragmentation in many markets, the challenging business environment and inadequate project economics might usher in sector consolidation. The rate of FTTH growth will moderate as it becomes more costly to build in less densely populated markets, especially when considering labor shortages and the elevated cost of equipment. FTTH penetration in the U.S. has reached almost 50% (Figure 10) and is expected to plateau at about 60% by 2028. The traditional broadband operators (cable, teleco and satellite) face elevated competition from fixed wireless access (FWA) which has gained strong traction in the U.S. over the past two years. FWA offers speeds that are typically faster than copper wireline and a marginal cost advantage.

Figure 10: FTTH (fiber-to-the-home) penetration in the U.S. (million homes, lhs) and % of U.S. households (% , rhs)



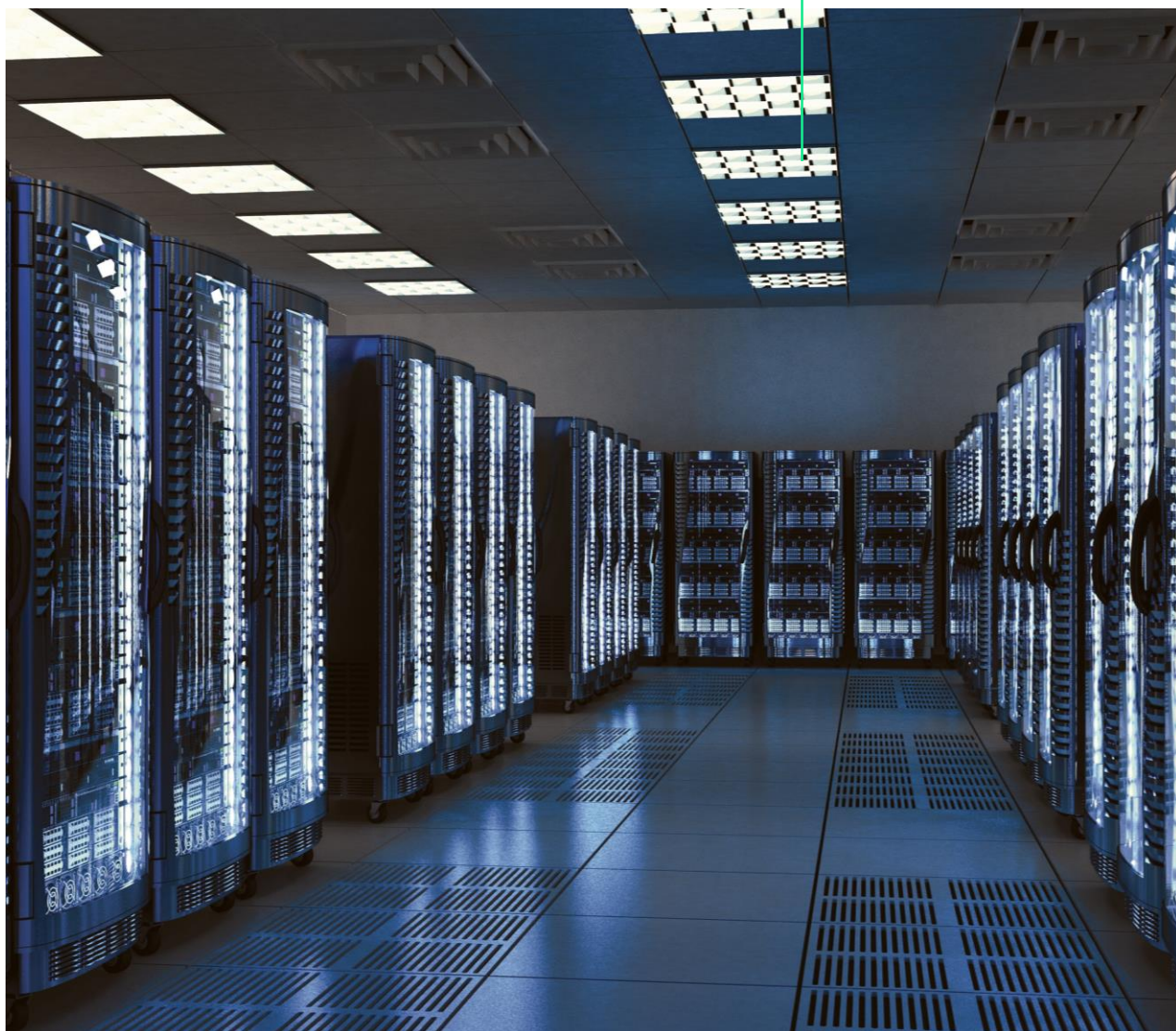
Source: S&P Global Ratings; a—actual, e—estimated. Data compiled March 27, 2024. For illustrative purposes only. Current market conditions differ from prior market conditions; including during prior periods of stress and dislocation. There can be no assurance any prior trends will continue. There can be no assurance any forecasts will be realized.



Conclusion

In the first quarter of 2024, policy rate uncertainty was still a drag on risk sentiment and dealmaking in private markets, including infrastructure. We are on the cusp of central banks making their next moves on interest rates which we believe will unlock capital and support the closing of a strong pipeline of infrastructure investments. Despite the atypically low investment volumes in Q1 2024, infrastructure sectors such as energy transition and data centers continued to attract high levels of funding from diverse investors. The strong currents of digitalization are spilling over into the power infrastructure sector and driving the need for grid capacity and emissions-free power sources.

We are on the cusp of central banks making their next moves on interest rates which we believe will unlock capital and support the closing of a strong pipeline of infrastructure investments.



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