Perspectives

CBRE Investment Management

A Guide to Listed and Private Infrastructure Solutions

SEPTEMBER 2023

JON TREITEL, CFA, CAIA
Portfolio Strategist,
Listed Real Assets
jon.treitel@cbreim.com

AARON VALE, CFA, CAIA
Head of Infrastructure
Client Solutions
aaron.vale@cbreim.com

MATTHEW SCOLLON
Solutions Specialist
matthew.scollon@cbreim.com

In the context of a strategic allocation, investors are asking about combinations of infrastructure across listed and private solutions. At CBRE IM, we see benefits to a holistic approach. In this guide, we review:

- A compelling combination:
  - Comparing blended returns and volatility with traditional allocations.
- A balanced solution:
  - Accessibility and Liquidity
  - Asset Diversity
  - Strategy and Risk/Return
- The opportunity for excellence:
  - Listed benchmarks are incomplete; private benchmarks are un-investible.
  - Active managers have the potential to possess an information edge, exploit underfollowed mispricings and unlock value for investors.

A rising infrastructure asset class

As we explored in our recent *Strategic Allocation Guide,* private and listed infrastructure AUM has grown 17% annually from 2013 - 2022. Relative to targets, investors remain under-allocated and expect to increase or maintain allocations in the coming years.[i]

At CBRE IM, we see the benefits to a holistic approach to the infrastructure asset class. With both private and listed infrastructure, we see the potential to balance accessibility, liquidity, asset diversity and the ability to take advantage of mispricings. Together, a blended combination of private and listed has historically outperformed traditional assets, pension portfolios and other alternatives (as further described below). We thus see benefits to a holistic approach for what are largely the same underlying assets.

Infrastructure is infrastructure

Infrastructure assets, whether publicly traded or privately owned, offer exposure primarily to regulated, contracted and demand-based cash flows, boast long useful lives, provide essential services and offer the potential for inflation pass-through. Over long periods of time, cash flows and correlations reflect this; as we show in Exhibit 1, over the course of a rolling year, listed correlations to the private market increase, while correlations to broad equities diminish.

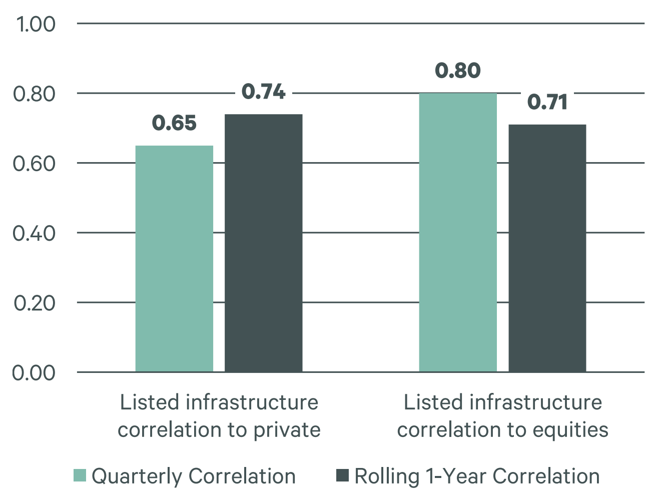
Exhibit 1: Listed and private infrastructure: Investment characteristics and correlations over time

Characteristics of infrastructure investment

Essential service | **Long life assets** | **Monopolistic position**

Inflation protection | **High barriers to entry** | **Predictable cash flows**

Listed infrastructure's correlation of returns to private infrastructure and equities



Source: CBRE Investment Management as of 12/31/22. Private infrastructure based upon a 50/50 blend of the Cambridge Associates Global Infrastructure Index and EDHEC Infra 300 EW Index. Listed infrastructure based upon UBS Global Infrastructure & Utilities 50/50 Index September 2001 through February 28, 2015, beginning March 1, 2015, is the FTSE Global Core Infrastructure 50/50 Index. Equities represented by the MSCI World Index. Considers data over the trailing ten year period. An index is not available for investment. Information is the opinion of CBRE Investment Management, which is subject to change and is not intended to be a forecast of future events, a guarantee of future results, or investment advice.

i CBRE Investment Management, A Strategic Allocation in Listed Infrastructure, March 2023.

The ability to balance: Accessibility, liquidity and asset exposures

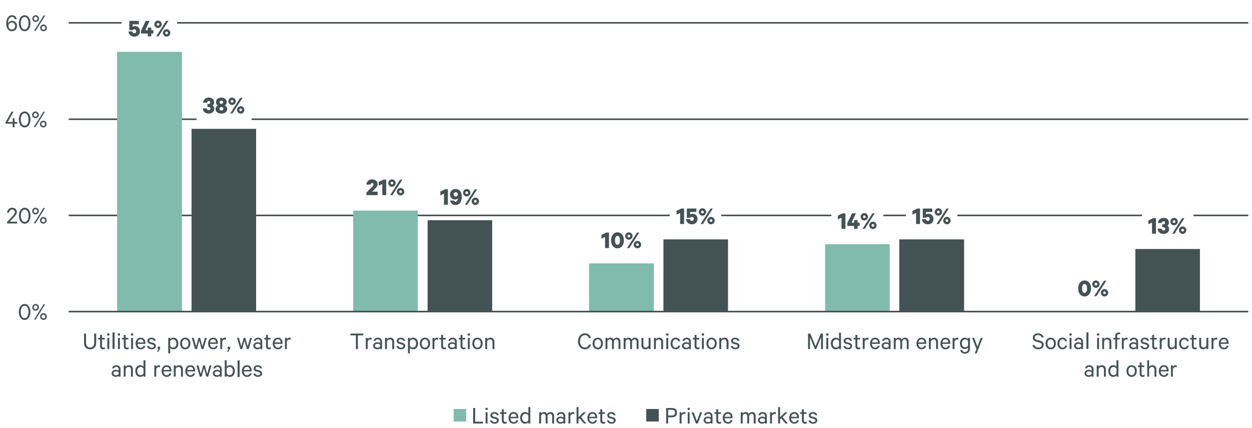
The accessibility and liquidity benefits of incorporating listed with private allocations are clear: the listed opportunity comprises approximately $4.5 trillion of addressable market cap that investors can access immediately, with the ability to deploy a sizable allocation into a diversified portfolio. In concert with private infrastructure, where J-curves, queues and re-investment can delay drawdowns, listed allows immediate access and the ability to quickly meet capital calls or manage to an allocation target.

More nuanced, between listed and private, are the blended exposure benefits. We see listed assets as including among the largest and most-scaled platforms in the world, particularly in certain developed markets and sectors that private investors may struggle to access expediently or efficiently. For example, private infrastructure investors can struggle to access large developed market utilities. A recent survey of 285 global asset managers confirms this, finding only a ~6% exposure to network utilities.[ii] Further access challenges can occur with flagship transport assets, inclusive of major airports and toll roads globally, which might be publicly traded.

Exhibit 2 details comparative exposures between listed and private. Based on deal flow, the private market has lower exposures to utilities, power and water vs. listed. Notably within this bucket, over half of private exposure has come from renewables. On the other hand, private has higher exposure to communications and social infrastructure assets.

From a geographic perspective, deal flow has been lower in the Americas for private (33% of deal values, compared to 59% exposure in listed) and lower in developed markets (78% exposure, compared to 88% exposure in listed).

Exhibit 2: Private market deal flow compared to listed infrastructure exposure, by sector



Source: Listed infrastructure represented by the CBRE Investment Management listed infrastructure universe as of 3/31/2023. Information is the opinion of CBRE Investment Management, which is subject to change and is not intended to be a forecast of future events, a guarantee of future results, or investment advice. Forecasts and any factors discussed are not a guarantee of future results. Private markets represented by the Infralogic database; deals closed between June 2013 and June 2023 by private funds, GPs, and institutional investors across greenfield, M&A, and take-private opportunities. Deal flow comprises approximately ~10,000 deals over this period.

ii EDHECinfra and BCG survey, infraMetrics 2022

Importantly, private ownership can also be influenced depending upon an investor's headquarters. For example, our Head of Infrastructure Research has separately highlighted that large pension funds have concentrated ownership in their own local geographies.[iii] The tendency of pensions to stay local suggests that a global approach to listed and private, through investment in global funds, could improve geographic diversification.

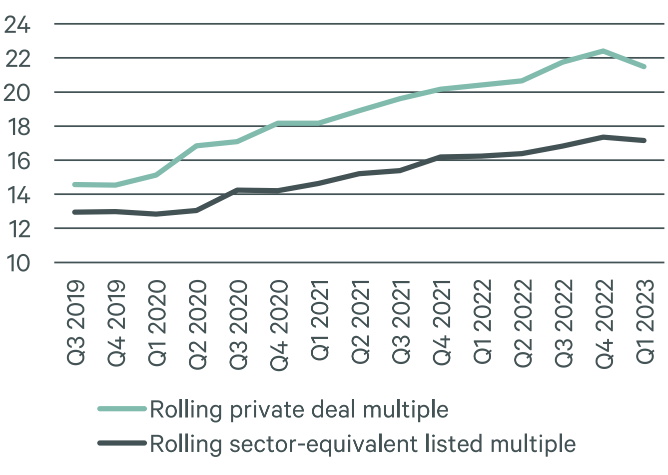
The ability to balance: Point of entry valuations

With the maturation of the private infrastructure asset class, its dry powder awaiting to be deployed has grown - Preqin quotes ~$320 billion as of June 2023. We've observed alongside this growth that premiums for listed assets have grown over time, whether for sizable stakes or for buyouts in whole. In Exhibit 3, we compare the valuations of these types of 'take-private' transactions to the broader listed market. (Note, as private deal flows may skew toward one sector or another over a given period, with different multiple values, we present an equivalent-weighted listed multiple for each time period to adjust our comparative listed multiples based on skews by deal type.)

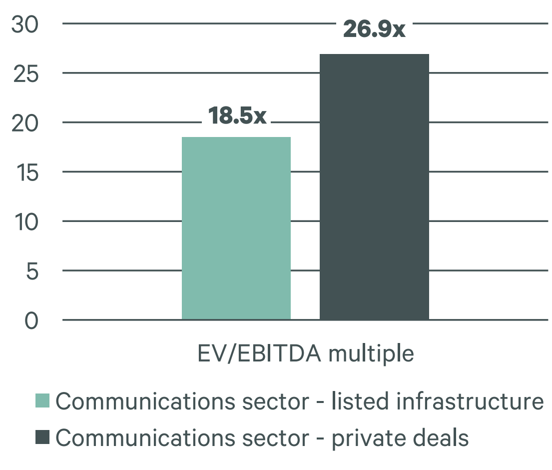
When considering these comparative multiples on a rolling year-basis, we find that deal premiums have risen over time. We've historically seen private equity pay a ~29% premium for large-scale listed assets.[iv] Investment premiums can differ based on investment trends; for example, we have seen privatization of cell towers and data centers, which are prized in the private markets, transact at an ~8x multiple spread to the listed market over the past year.

Exhibit 3: Comparative valuations between listed and private

Rising premiums for listed infrastructure over time[1]



Valuations in communications assets[2]



Source 1: CBRE Investment Management. Chart compare the rolling weighted private EV/EBITDA multiple across 148 deals representing $393 in consolidated enterprise value between 2016 and Q1 2023. Equivalent listed multiples are based upon the communications, midstream, transport, and utility sector multiples of the FTSE Global Infrastructure Core 50/50 Index, weighted according to private deal flow in a given period. Multiple are rolling three year multiples.

Source 2: CBRE Investment Management. Chart represents the communications sector EV/EBITDA multiple in the FTSE Global Infrastructure Core 50/50 Index as of March 2022 compared to communications privatization multiples in 2022.

iii CBRE Investment Management, Globally diversified infrastructure portfolios: The benefits of a multi-region approach, June 2023.

iv CBRE Investment Management as of 12/31/2022. Comparison of average EV/EBITDA multiples on private infrastructure market transactions from 01/01/2016 through 12/31/2022 vs. listed infrastructure market multiples over the same period.

The ability to blend: A combined listed and private solution

When we consider the available data, we believe a 70/30 blend of private and listed can serve investors. Below, in Exhibit 4, we compare the 70/30 infrastructure blend to traditional equities, bonds and a 60/40 equity/bond portfolio. As seen, a 70/30 private/listed blend outperforms traditional assets with superior risk-adjusted returns. Comparative drawdowns are attractive, as are returns when considering the ability to outperform inflation rates plus a hurdle. Correlations to the private/listed blend and traditional assets are low, indicating a diversification benefit for inclusion in a portfolio.

Exhibit 4: The benefits of a combined listed and private solution

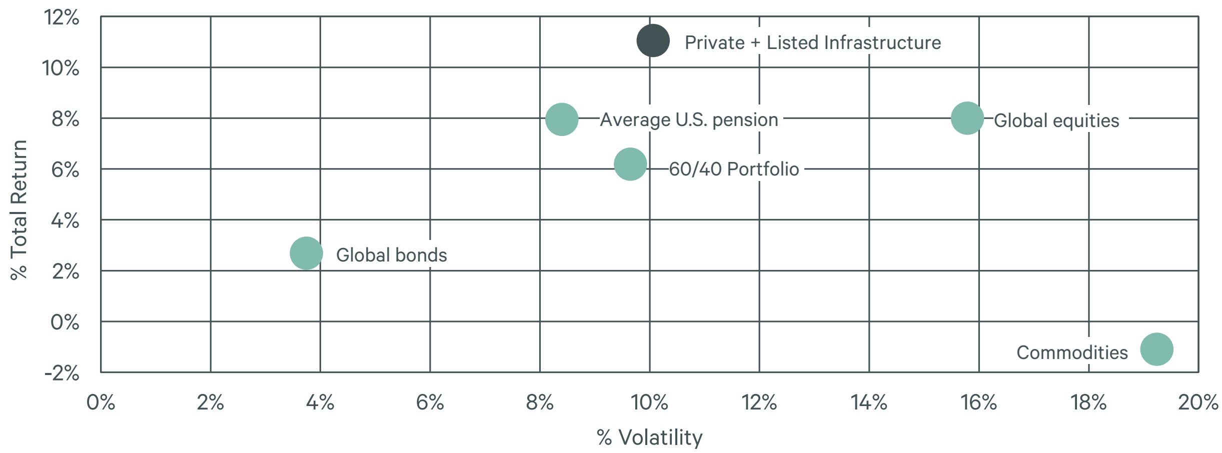
	Private/ listed blend	Global equities	Global bonds	60/40 portfolio
Return	11.0%	8.0%	2.7%	6.2%
Volatility	10.1%	15.8%	3.7%	9.7%
Sharpe ratio	0.97	0.43	0.38	0.51
Max drawdown	-18.4%	-46.1%	-13.9%	-27.9%
% of Qtrs O/P CPI+5%	62%	64%	13%	58%
Correlation to 60/40 portfolio	0.40	0.99	0.19	1.00

Source: CBRE Investment Management as of March 2023. Analysis considers available data from 6/30/05-12/31/2022. Private/Listed blend based upon the EDHEC infra300 Index and GLIO Global Listed Infrastructure Index. CBRE uses the EDHEC infra300 due to the availability of local currency returns, which is unavailable using the Cambridge Associates Global Infrastructure Index. Global Equities represented by the MSCI World Index. Global Bonds represented by the ICE BoFA Global Broad Market Index. Past performance is not indicative of future results. Indexes are unmanaged and have no fees. One cannot invest directly in the indexes. Please see our appendix for a discussion of private infrastructure benchmarks and data.

A 70/30 private/listed infrastructure blend offers the potential to balance access, liquidity, assets and valuations– while offering superior risk adjusted returns compared to traditional assets.

In Exhibit 5, we take the analysis further and show the 70/30 listed/private blend against not only traditional assets, but also against average US pension allocation and commodities. Blended infrastructure appears attractive in this context. It looks to justify its growing market share in institutional allocations, while commodities appear poor risk-adjusted contributors over the long-term.

Exhibit 5: Blended infrastructure profiles compared to pension allocations, traditional assets and commodities



Source: CBRE Investment Management as of March 2023. Private/Listed blend based upon the EDHEC infra300 Index and GLIO Global Listed Infrastructure Index. CBRE uses the EDHEC infra300 due to the availability of local currency returns, which is unavailable using the Cambridge Associates Global Infrastructure Index. Global Equities represented by the MSCI World Index. Global Bonds represented by the ICE BoFA Global Broad Market Index. 60/40 portfolio is based on a blend of 60% global equities and 40% global bonds. Average US Pension allocation is based on CBRE IM study of the asset class allocations of 28 of the largest US pension funds, representing nearly $2.5 trillion in assets, based on the most recently available reports as of March 2023, with a return/risk profile replicated using the following indices: Domestic Equities: Russell 3000; International Equities: MSCI World ex USA; CMBS: Bloomberg US CMBS; Bonds: Bloomberg US Aggregate; Real Estate: NCREIF Property Index; Natural Resources: S&P Global Natural Resources; Infrastructure: EDHEC infra300; Private Equity: Cambridge US Buyout & Growth; Hedge Funds: Credit Suisse Hedge Fund. Commodities: Bloomberg Commodity Index. Past performance is not indicative of future results. Indexes are unmanaged and have no fees. One cannot invest directly in the indexes.

The benefits of active management in listed infrastructure

Across both listed and private, CBRE IM sees the benefits to an active allocation in infrastructure.

In listed, we note that infrastructure benchmarks aren't uniform: they tend to each capture only a portion of the whole universe. Some benchmarks may make sizable bets to cyclical sectors such as midstream and transportation, while under-representing assets such as communications. Other benchmarks may show geographic concentrations unsuited to attractive long-term risk-adjusted returns. At CBRE IM, we manage listed infrastructure in the context of a proprietary universe that we believe offers the opportunity for enhanced diversification and growth.

We see listed managers with a private-public research platform and specialized knowledge of niche sectors (relative to global equities coverage) with an opportunity to outperform. In infrastructure, private market data is not widely available while, globally, infrastructure assets are governed by disparate and unique regulatory agencies that require specialized underwriting. At CBRE Investment Management, our flagship listed infrastructure strategy has outperformed major industry benchmarks and peers with in line to lower volatility since inception.

The benefits of active management in private infrastructure

In private infrastructure, there is no index to access the "beta" of the access class, so an investor's challenge is to find strategies and exposures which unearth outperformance in privates. We believe specialized knowledge and active asset management offer opportunities for outperformance in private portfolios.

One important component of that is what type of asset exposure is sought. CBRE IM sees opportunities for outperformance via active and specialized investment management in the mid-market space. We define mid-market as deals between $500-$2 billion in target enterprise value and expand on this in Exhibit 6:

Exhibit 6: The benefits of mid market exposure for private investors

Mid-market companies outperforms general and core infrastructure (8/16/2018-8/16/2023)

Why Mid-Market?

15.2% vs. 9.2%
Mid-market returns Have outperformed global infrastructure(1)

~11x
More transactions completed in the mid-market space

73%+
Of 48 megaprojects suffered from poor execution(2)

9 OUT OF 10
Large infrastructure projects go over budget

$500M-$2B
Target enterprise value of assets considered for CBRE CGIF

- Relationship-based investment sourcing
- Competitive sale process is often less efficient and costly for mid-market companies
- Greater opportunity for structuring to enhance returns and downside protection
- Enhanced ability to de-risk and enhance returns through consolidation and growth strategies

1. Source: Inframation. Period is last 5 years (8/16/2018-8/16/2023). Mid-market is categorized as transactions between $100 million and $2 billion, while large-cap transactions are those with transaction values of greater than $2 billion. Includes greenfield, M&A, and take-private closed transactions; excludes additional financings, refinancings, nationalizations, privatizations, and public offerings. EDHECInfra as of 6/30/2023. Total mid-market returns are based on Infra100 mid-market index covering the largest 100 unlisted mid-market infrastructure companies with market capitalization of $24.75 billion. Total infrastructure returns are based on Infra300 which tracks the quarterly performance of 300 unlisted infrastructure companies with market capitalization of $321.17 billion. Gross of fees, equally weighted and in local currency. Period is last five years (Q3 2018–Q2 2023), returns are annualized.

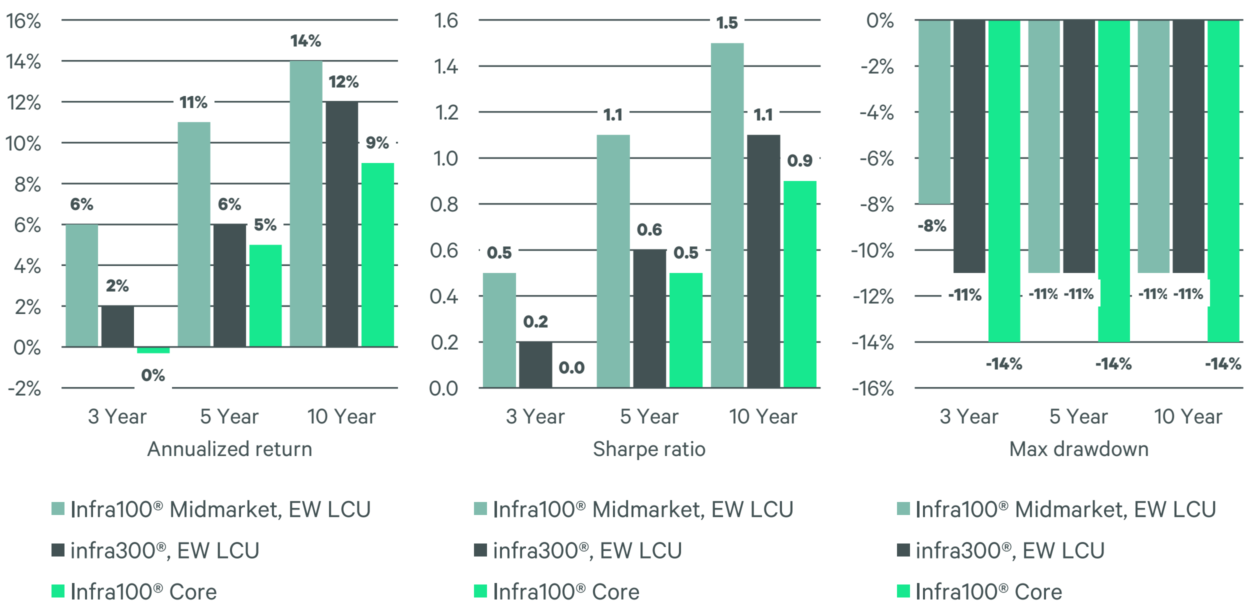
2. Bent Flyvbjerg, "What you should know about megaprojects and why: An overview," Project Management Journal, 2014, "Megaprojects, the good, the bad, and the better," McKinsey Global Institute, January 2013

We believe the benefits of mid-market investing include access to more attractive private exposures and enhanced ability to drive value via active asset management. Smaller asset sizes lend to more relationship-based investing, limiting competition. This often enables CBRE IM Private Infrastructure to forgo involvement in auction processes, engaging instead in bilateral deals.

Asset management is further critical to private infrastructure investing to generate, enhance and preserve value. Actively engaging in operational and value-add initiatives such as platform build-out, governance enhancements, strategic investments and financial management are instrumental in accelerating growth. Working closely with portfolio companies and engaging with key stakeholders ensures that the right expertise is brought to the table to develop comprehensive business plans that support value creation. In the mid-market space, there is greater flexibility in executing operational and strategic initiatives than in a large business with more layers of bureaucracy within a legacy corporate structure.

Comparative return, Sharpe ratios and drawdown statistics further underscore the potential for superior returns in midmarket private infrastructure, as we show in Exhibit 7.

Exhibit 7: Advantages to mid market exposure in private infrastructure



Source: EDHECinfra as of December 6, 2022. EDHEC infra100 mid-market, infra300 and infra100 core indices, equally weighted and in local currency. Past performance is not indicative of future results. Indexes are unmanaged and have no fees. One cannot invest directly in the indexes.

A holistic approach to the infrastructure asset class

When we review the market, we see listed and private infrastructure as two ways to access an asset class that continues to garner institutional support. A blend of private and listed can offer benefits including balanced accessibility, liquidity, diversity, quality and enhanced risk / return compared to traditional allocations; furthermore, specialized active investment teams offer the potential to unlock value for investors. As we look ahead, we see actively managed, holistic infrastructure as a compelling solution for investor allocations.

Appendix: A consideration of private infrastructure benchmarks

Our teams are often asked for our views of private infrastructure benchmarks. In private infrastructure, data tends to be opaque and of recent vintage compared to other real assets such as real estate. We believe private infrastructure benchmarks are a work-in-progress. They exhibit differences in geography, sector and risk profile. Major indices include the EDHEC Infra300 Index, the Cambridge Associates Infrastructure Fund Index and the MSCI Global Private Infrastructure Index. We briefly examine notable factors below.

EDHEC Infra300 Index. Beginning in 2000, EDHEC represents over $300 billion in assets. Assets are heavily oriented toward Europe, at 70% of the index total. EDHEC provides detailed sector data and is available in both USD and local currencies.

Cambridge Associates Infrastructure Fund Index. Beginning in 1993, CA has a long history compared to other indices. Returns are in USD only and comprise closed-end funds, with limited observations before 2010. Cambridge is comprised of over 140 funds and backfills its database.

MSCI Global Private Infrastructure Index. Beginning in 2008, MSCI has $100 billion in value reported by ~11 respondents. The index offers diversification by sector and geography with returns broken into capital appreciation and total return. Returns are converted to USD only, which has the potential to inflate long term returns.

In the below exhibit, we show major index data including geographical/sector breakouts and returns. Sector and geographic comparisons are limited for Cambridge Associates, which classifies a large percentage of assets in a "diversified" and "global."

Please follow up with our teams for more information.

Private equity infrastructure data

	EDHEC infra300	CA	MSCI
Market Cap	$304bn	$368bln	$101bn
Constituents	300	141	123
Geographic Breakout			
Americas	7.7%	43.3%	25.0%
Asia	7.7%	1.6%	
Europe	70.3%	19.0%	47.3%
Oceania	14.3%		26.4%
Other		36.1%	
Sector Breakout			
Renewable Power	20.7%		18.0%
Environmental Services	4.7%		
Network Utilities	16.3%		23.2%
Data	4.0%		2.8%
Social	7.7%		2.0%
Transport	27.0%		35.9%
Power Generation x-Renewables	10.0%		3.7%
Energy and Water Resources	9.7%		12.4%

	EDHEC infra300 (USD, gross of fees, levered)	Cambridge Associates (USD, de-smoothed, net of fees)	MSCI (USD, gross of fees, levered)
Returns			
2004 Q4 - 2022 Q4	12.4%	9.9%	NA
2009 Q1 - 2022 Q4	10.3%	6.7%	11.7%
Standard Deviation			
2004 Q4 - 2022 Q4	15.3%	12.8%	11.7%
2009 Q1 - 2022 Q4	15.4%	10.6%	4.5%

Source: CBRE Investment Management, EDHEC Infra, Cambridge Associates, and MSCI as of 12/31/2022.

About CBRE Investment Management

CBRE Investment Management is a leading global real assets investment management firm with $147.6 billion in assets under management* as of June 30, 2023, operating in more than 30 offices and 20 countries around the world. Through its investor-operator culture, the firm seeks to deliver sustainable investment solutions across real assets categories, geographies, risk profiles and execution formats so that its clients, people and communities thrive.

CBRE Investment Management is an independently operated affiliate of CBRE Group, Inc. (NYSE:CBRE), the world's largest commercial real estate services and investment firm (based on 2022 revenue). CBRE has approximately 115,000 employees (excluding Turner & Townsend employees) serving clients in more than 100 countries. CBRE Investment Management harnesses CBRE's data and market insights, investment sourcing and other resources for the benefit of its clients. For more information, please visit www.cbreim.com.

If you would like to discuss the contents of this paper with our team, or would like more information about investing in infrastructure, please contact:

Jon Treitel, CFA, CAIA
Portfolio Strategist, Listed Real Assets
T: +1 610 995 8280
E: jon.treitel@cbreim.com

Aaron Vale, CFA, CAIA
Head of Infrastructure Client Solutions
T: +1 416 861 5816
E: aaron.vale@cbreim.com

* Assets under management (AUM) refers to the fair market value of real assets-related investments with respect to which CBRE Investment Management provides, on a global basis, oversight, investment management services and other advice and which generally consist of investments in real assets; equity in funds and joint ventures; securities portfolios; operating companies and real assets-related loans. This AUM is intended principally to reflect the extent of CBRE Investment Management's presence in the global real assets market, and its calculation of AUM may differ from the calculations of other asset managers and from its calculation of regulatory assets under management for purposes of certain regulatory filings.