Morgan Stanley

INVESTMENT MANAGEMENT

The Case for a Strategic Allocation to Global Listed Infrastructure Securities

REAL ASSETS | GLOBAL LISTED REAL ASSETS TEAM | INVESTMENT INSIGHT | JANUARY 2016

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Introduction

In recent years, infrastructure has gained an increasingly prominent role in institutional investors' multi-asset class portfolios due to a number of advantageous investment attributes, including historically attractive risk-adjusted returns, diversification[1] benefits from low correlations with other asset classes, an ability to generate current income, and potential protection against inflation. Furthermore, institutional investors have predominantly preferred to access infrastructure investments through private equity-style, unlisted vehicles or by investing directly in the assets themselves, either as co-investors alongside a fund or via outright ownership. This preference is due to an ability to put large sums of capital to work at one time as well as having the benefits of greater control over the assets and less frequent mark-to-market valuations when compared to investments in listed infrastructure securities. While this avenue for infrastructure investment should continue to be attractive for investors, we believe an alternative route to investing in listed infrastructure securities can provide many of the same benefits as investing directly in the core infrastructure markets, with the added potential benefits of greater liquidity, lower fees, and greater geographic, regulatory, and industry diversification. Indeed, as the amount of capital earmarked for private infrastructure vehicles continues to grow and outpaces the assets available for purchase in the direct markets,[2] an argument might also be made that investing in listed infrastructure securities allows for a larger investable universe[3] while providing opportunities to take advantage of frequent pricing inefficiencies due to daily mark-to-market pricing and

[1] Diversification does not eliminate the risk of loss.

[2] Preqin, *Preqin Quarterly Update: Infrastructure*, Q3 2015. Current dry powder (committed capital yet to be invested) sits at $115B and is likely to grow as funds in the market are seeking to raise an aggregate $96B.

[3] We provide a complete analysis of the size the listed market later in the paper in a section titled "Public Markets Investable Universe—A Look at Indices".

liquidity. Therefore, we believe investing in listed infrastructure securities may offer better potential to achieve compelling returns, relative to private, unlisted infrastructure investments for similar type assets over a long-term time horizon.

What constitutes investing in infrastructure?

Infrastructure investing consists of allocating capital to tangible assets (i.e., land and structures) that provide essential services to society and help the economy to function and grow. It is the essential, "mission critical" nature of these assets which makes infrastructure such an attractive investment—as a result of their essentiality, as well as the capital intensity of the assets (infrastructure assets typically require large amounts of upfront capital to build and maintain), infrastructure project companies typically operate in an environment with little demand elasticity over a business cycle, as well as with little competition. As an example, utility services such as providing drinking water or electricity will always be needed regardless of underlying economic demand. Due to the potentially exorbitant cost of re-creating/duplicating a utility-scale network throughout a large urban area, not to mention the political and popular resistance to zoning and siting duplicative water pipes, transmission lines, transformer stations, etc., such infrastructure assets tend to operate in a monopoly market position in the jurisdictions in which they provide services. This combination of demand stability, multi-year capital planning periods, and monopoly market position tends to result in a cash flow profile that is both highly visible and more stable, which is the hallmark of a "core" infrastructure investment. More generally, a summary of the common attributes of infrastructure investments is outlined below.

- Essential to society or the economy
- Long, useful lives
- Monopoly/quasi-monopoly market position or high barriers to entry
- Operate in regulated environment and/or resistance to business cyclicality
- Can produce more stable, predictable cash flows, often linked to inflation
- Are difficult to replicate due to high construction costs and scarcity of resources

While these attributes provide a general characterization, a few nuances should also be mentioned. First, and perhaps intuitively, there is a difference in risk and cash flow predictability between a newly constructed infrastructure asset that has no operating history, called a "greenfield" asset, and one that has been around for decades with a long operating history, deemed a "brownfield" asset. Greenfield assets tend to have higher returns on invested capital commensurate with higher risk, and brownfield assets tend to have lower returns commensurate with lower risk. Consistent with this, the income component of a greenfield asset might initially be lower than that of a brownfield asset, given its higher reinvestment requirements and lower cash flow predictability. Also, return requirements may vary for similar type assets depending on where the assets are domiciled and what legal jurisdictions they operate in. Because many infrastructure assets are provided a regulated return on invested capital by a governmental entity (as a result of operating in a monopoly or quasi-monopoly market position and in order to prevent predatory pricing) or are governed by contract (in the case of a concessionaire or contracted assets), rule of law is a particularly important consideration when investing in infrastructure. Although a broad statement, most infrastructure investors looking for core infrastructure exposure seek brownfield investments in Organization for Economic Co-operation and Development (OECD) markets given the inherent greater level of stability. We believe an allocation through listed infrastructure securities can satisfy investors' desired exposure and targeted risk-return profile.

Types of Infrastructure

If capital intensity and providing an essential service to the economy and society are two key, common elements tying infrastructure assets together, in what industries and business areas are such assets found? Most assets (and companies, as owners of portfolios of assets) are found in the four industry areas of energy, utilities, communications, and transportation (i.e., "economic infrastructure"), as well as a fifth area referred to as "social infrastructure." These broad sector categories are summarized in *Display 1*.

- **UTILITIES:** Assets within this sector relate predominantly to networks providing electricity, natural gas, or water transportation and storage utility services, as well as select instances of power production. In most instances, the assets are regulated with little to no volume risk and no commodity or power price risk, with the exception of conventional power plants. For purely regulated assets, remuneration is typically provided on a "cost-of-service" basis through which the utility company gets a set return on capital invested, with the rates of return reviewed periodically. Power producers are provided a return based on the volume of power produced and the price of power, which is typically set as a function of the marginal underlying fuel used to produce that power (e.g., coal, natural gas, etc.) in a particular country or region. Although it varies by geographic location, some utility assets have explicit remuneration for inflation, providing an inflation hedge. Most assets operate as natural monopolies given their scale and cost, with power plants again being the exception.
- **ENERGY:** Within energy, infrastructure assets tend to be found in the "midstream" segment of the value chain. These assets can include long-haul transmission and short-haul distribution and gathering lines for crude oil, natural gas, and natural gas byproducts; storage facilities; natural gas gathering and processing plants; fractionation facilities

DISPLAY 1

Investment Universe

UTILITIES

- Electricity Transmission & Distribution
- Natural Gas Distribution
- Water
- Renewables

ENERGY

- Pipeline Companies
- Oil & Gas Midstream

(Natural Gas Gathering, Processing, Storage, Fractionation, Transportation & Marketing Services)

COMMUNICATIONS

- Wireless Towers
- Fixed Orbit Satellite Operators

TRANSPORTATION

- Airports
- Toll Roads
- Ports
- Railroads

SOCIAL

- Health Services Facilities
- Educational Facilities
- Correctional Facilities

This information reflects the views of the portfolio management team. These views may change without notice as circumstances or market conditions change. All information is provided for informational purposes only.

which split elements of the natural gas stream into their constituent parts; and other similar type assets. For the most part, these assets are focused on transporting, processing, or storing commodities developed by upstream exploration and production companies, for delivery to downstream customers (e.g., refiners or utilities). Assets tend to be either contracted or regulated, and exposure to commodity prices and volumes varies by asset.

- **COMMUNICATIONS:** Communications infrastructure assets consist of wireless and broadcast towers, as well as fixed-orbit satellites. Essentially, these assets serve as the backbone for wireless telephony and data, HDTV, and internet services in various geographies. Importantly, wireless and wireline carriers and cable companies, although included in many income-oriented funds, are typically not included in the infrastructure definition, as they provide the actual service and compete with their peers on price. By competing on price, economic returns can be eroded over time through competition, and as a result these assets are generally excluded from an infrastructure definition. Towers and satellites are generally remunerated on a contracted basis, with carrier customers "renting" space on the assets. Typically, towers and satellites achieve inflation-based or set percentage rent escalators on a per annum basis.

- **TRANSPORTATION:** These are the physical assets that allow for the transportation of goods and people, and consist of toll roads, airports, seaports, and railroads. Assets are typically regulated or are operated under a long-term concession, whereby an operator has the rights to receive the cash flows from the asset for a set period of time before returning the asset back to the government. Such assets tend to have higher exposure to the economic cycle relative to other infrastructure areas due to exposure to trade and commerce. Most transportation infrastructure assets achieve inflation-plus type pricing (either through regulation or due to market economics).

- **SOCIAL INFRASTRUCTURE:** Social infrastructure consists of contracts between private parties and the government to build and operate facilities which administer essential services for a set period of time in exchange for a fee. In contrast to economic infrastructure, the end customer/obligor in social infrastructure is the government, so counterparty risk tends to be extremely low. Examples of social infrastructure projects would be the administration of health care facilities (hospitals, clinics), schools, and prisons.

In most instances, assets in all the above categories can be accessed through both the listed and unlisted infrastructure markets. The one area that is less accessible in the listed infrastructure market relative to private is social infrastructure, although this universe is growing with a few recent IPO offerings. One distinct difference between public and private investment in these categories is that by investing in the public markets investors gain exposure to multiple assets at one time as most listed infrastructure companies own portfolios of assets, whereas with private investments the focus is on individual assets.

The Morgan Stanley Global Listed Real Assets Team Definition

Looking at a high level, if one were to include all companies and assets in the five broad industry categories described in *Display 1* in a definition of infrastructure, the amount of potential investment would be very large. In support of this argument, studies of infrastructure needs estimate spending requirements to surpass $70 trillion USD by 2030.[4] Others point to the size of the universe of listed infrastructure securities, where the largest index market capitalization measures the universe at $2.7 trillion.[5] While one might view as large an investable universe as possible as attractive, we believe a more narrowly defined universe is both more prudent and desirable for the following reasons. First, certain companies within the broad categories above may be asset-light or may compete on price, thus eroding the essential element of possessing a meaningful barrier to entry to the business such that economic returns on invested capital can be maintained over time. Second, certain assets and companies (as portfolios of assets) may meet the definition of infrastructure from a capital intensity and barrier-to-entry perspective, but may have contract or remuneration structures that introduce meaningful cash flow volatility into an investor's portfolio, which makes the assets inherently more difficult to value and less dependable from an asset/liability matching or income perspective. The Global Listed Real Assets Team at Morgan Stanley Investment Management believes that beyond the asset definition of infrastructure, most investors in the infrastructure markets are looking for a particular risk/return profile, with cash flow stability being of paramount importance. Given this view, we believe the following exposures should be eliminated from an investor's definition of infrastructure, even if they fit the industry groupings above.

1. SERVICES COMPANIES/ CONSTRUCTION COMPANIES/ COMPANIES WITH A LACK OF REAL ASSETS: As opposed to the owners and operators of infrastructure assets, users or builders of such assets that derive cash flows from the services they offer generally compete on price. While some services and construction contracts can last for a considerable time, the remuneration period and capital backlog is quite short relative to asset owners, introducing considerable re-contracting risk. Furthermore, there is little to prevent competitors from bidding on future contracts offered by a company's existing customers, making the future level of returns highly unpredictable. For pension funds or endowments looking to match inflation-linked liabilities over long periods of time, the unpredictability of the sustainability of the cash flow stream can make such companies inadequate investments. As a result, we believe that such companies are inadequate for long-term infrastructure investors.

2. POWER/COMMODITY PRICE RISK: Despite some energy infrastructure and electricity utility assets meeting an infrastructure definition from a capital intensity and barrier-to-entry perspective, cash flow volatility can be quite significant due to cash flow structures that depend on commodity prices (in addition to volumes, which is a risk inherent in many infrastructure assets). This is most readily observed in power generation assets for utilities, where the price of power is a function of the underlying fuel used to produce that power, and with gathering and processing companies within energy infrastructure, whereby some assets are remunerated on "percentage of proceeds," "percentage of liquids," or "keep whole" contract structures, all of which are a function of the price of natural gas and various natural gas liquids (NGLs). We believe most investors looking for core infrastructure exposure benefit from avoiding these types of exposures, instead focusing on the "transportation" areas within energy infrastructure and utilities (i.e., long and short-haul pipelines, transmission and distribution lines in electricity, storage, and other assets remunerated on a "fee-for-service" or "cost-of-service" basis). The one exception with regard to power generation in utilities is renewable power that is regulated or contracted through a purchase power agreement (PPA). With a PPA or regulated renewable asset, power is sold to the electricity grid at a set price, and with this functions much like a long-haul pipeline or other volume-based, fee-for-service asset where cash flows are solely a function of volumes (i.e., revenue = volume x fixed price).

Within listed infrastructure, it is difficult to entirely eliminate the exposures described above given the fact that listed companies own portfolios of assets; however, we believe an infrastructure definition that generally looks to minimize such exposure is prudent. An important point of distinction here is that we believe it is important for investors to focus on cash flow stability, but we recognize that cash flow stability may not translate to share price stability at all times. While cash flow stability may have some influence on share price volatility, equity market participants can produce share price volatility for certain stocks over the short term, which may in turn create valuation or arbitrage opportunities that an active manager can take advantage of.

As a final point, for core infrastructure investors (in contrast to opportunistic), and again with the goal of reducing cash flow volatility in an investor's portfolio, we also believe it prudent to have lower levels of exposure to the areas of emerging markets, greenfield infrastructure and more trade-leveraged, cyclical areas like ports. With greenfield emerging markets investments, predictability of volumes and returns on capital can be challenging given little to no operating history and unproven financial regulation. For more cyclical areas like ports, volume predictability can be similarly challenging, and pricing power during recessionary periods can be lost (as a port may have to compete on price to attract volumes).

Public Markets Investable Universe – A Look at Indices

As mentioned in our introductory remarks and elaborated on previously, the Global Listed Real Assets Team at Morgan Stanley Investment Management believes that listed

[4] OECD, *Fostering Investment in Infrastructure*, January 2015.

[5] Please refer to *Display 2.*

DISPLAY 2

Data as of December 31, 2015

INDEX	DOW JONES BROOKFIELD GLOBAL INFRASTRUCTURE INDEX	S&P GLOBAL INFRASTRUCTURE INDEX	MSCI ACWI INFRASTRUCTURE INDEX	MACQUARIE GLOBAL INFRASTRUCTURE 100 INDEX	FTSE GLOBAL CORE INFRASTRUCTURE 50/50 INDEX
Components	95	75	260	100	218
Market Cap (Free-Float Adjusted)	$712B	$880B	$2,747B	$1,273B	$1,502B
Selection Criteria	Pure-play approach that evaluates cash flows of companies (Infrastructure operations must account for greater than 70%).	Stocks are clustered across three sectors (combination of GICS sectors). 15 stocks come from Energy with their weight capped at 20%. 30 each come from Transportation and Utilities, with their total weights capped at 40% each.	Infrastructure companies that fall into one of five groups (combination of GICS sectors): Telecommunications, Utilities, Energy, Transportation, and Social.	Based on revenue analysis by Macquarie (over 50% must come from infrastructure operations).	Stocks are grouped across three sectors (combination of ICB subsectors): 50% from Utilities, 30% from Transportation, and 20% from Other.
Focus	Pure-play core infrastructure	Broad-based infrastructure exposure	Broad-based infrastructure exposure and related businesses	100 largest constituents and heavily weighted towards Utilities	Broad-based, Utilities-centric exposure
Regional Exposure	Americas: 59.4% EMEA: 26.4% Asia: 8.6% Australia: 5.6%	Americas: 43.9% EMEA: 34.6% Asia: 10.8% Australia: 10.6%	Americas: 46.6% EMEA: 30.0% Asia: 20.2% Australia: 3.1%	Americas: 58.5% EMEA: 27.6% Asia: 10.7% Australia: 3.3%	Americas: 57.1% EMEA: 18.8% Asia: 17.1% Australia: 7.0%
ANNUALIZED RETURNS					
1-Yr	-14.40%	-11.46%	-7.39%	-12.14%	-8.05%
3-Yr	4.89%	4.78%	5.48%	4.56%	6.88%
5-Yr	8.77%	5.09%	4.70%	3.84%	8.30%
7-Yr	12.62%	7.86%	6.53%	4.71%	7.70%
10-Yr	8.80%	5.94%	5.93%	4.73%	n/a

The index performance is provided for illustrative purposes only and is not meant to depict the performance of a specific investment. **Past performance is no guarantee of future results.** See disclosure page for index definitions.

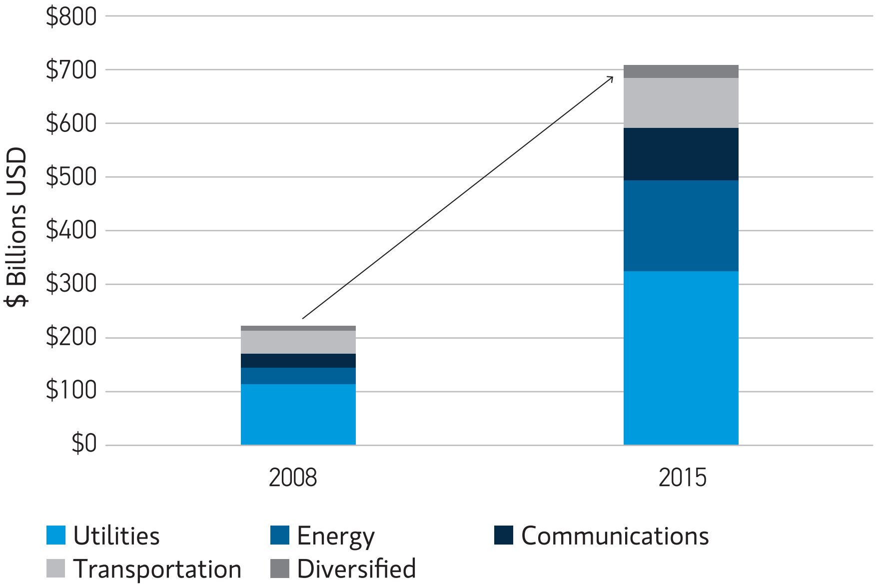
infrastructure securities can serve as an adequate proxy for core, private infrastructure exposure, assuming certain filters are applied to broader infrastructure industry categories and assuming a long-term investment approach consistent with the duration of the underlying asset lives of the companies is applied. For those investors looking to utilize a benchmark in order to gauge performance, while no benchmark is perfect, we believe the Dow Jones Brookfield Global Infrastructure Index (DJBGI Index)[6] currently acts as the best proxy for a number of reasons. The Team believes the most meaningful of these reasons is the evaluation of constituents on the basis of a cash flow test, looking at the underlying business segments of each individual company. Other indices generally take a more simplistic view, using broad industry GICS (Global Industry Classification Standards) categories or using more simple revenue tests, which can be misleading for infrastructure assets (as a number of expense items are passed through to the end customer per regulatory compact and are thus irrelevant). A second key argument for utilizing the DJBGI Index is that its utility focus is on transmission and distribution, consistent with the Morgan Stanley definition (the one exception being the exclusion of contracted/regulated renewable power from the Index). A summary of the various indices are included and compared in *Display 2*.

[6] For the purposes of this paper, we are using the Dow Jones Brookfield Global Infrastructure Index to represent the listed infrastructure securities market. We would point out that Dow Jones offers two versions of this index: the one we are using, which excludes MLPs, and a composite index, which includes MLPs.

DISPLAY 3

Market Capitalization Growth of the Dow Jones Brookfield Global Infrastructure Index

Data as of December 31, 2015

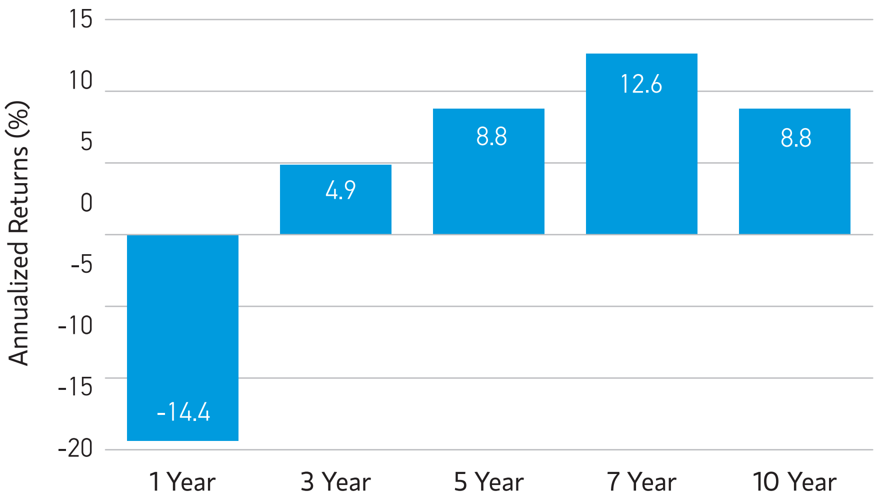


Source: Morgan Stanley Investment Management, FactSet, S&P Dow Jones. The Dow Jones Brookfield Global Infrastructure Index does not Include Railroads or Renewables. All information is provided for informational purposes only.

DISPLAY 4

Dow Jones Brookfield Global Infrastructure Index Annualized Performance

Data as of December 31, 2015



The index performance is provided for illustrative purposes only and is not meant to depict the performance of a specific investment. **Past performance is no guarantee of future results.** See disclosure page for index definitions.

As of December 31, 2015, the DJBGI index consisted of 95 securities with a market cap of $712 billion, meaningfully narrowing the scope of the universe when compared with the other indices by focusing on real assets while eliminating services-related businesses and power generation within utilities. *Display 3* provides an illustration of the index.

We would note that the DJBGI Index does not entirely meet our definition of infrastructure, as a handful of universe adjustments should be made to more completely capture the available opportunity set (e.g., inclusion of select railroad companies and PPA-contracted renewable power companies, additional emerging markets companies, elimination of certain midstream companies, etc.). Accounting for these adjustments, the Morgan Stanley listed infrastructure universe totaled approximately $1.15 trillion in market capitalization across 175 securities as of December 31, 2015. Note that while we monitor the larger universe as described in the Morgan Stanley definition, a number of these companies, particularly within the emerging markets, are given a lower emphasis in our core portfolios. As these emerging markets companies mature and gain operating and regulatory history, we believe they will eventually become more stable, qualifying brownfield infrastructure investments.

Investment Performance of Global Infrastructure – Listed Securities as a Proxy

As mentioned above, infrastructure is favored due to a number of advantageous investment characteristics, including attractive risk-adjusted returns, diversification benefits from its low correlation with other investment classes, an ability to generate current income, and potential protection against inflation. We examine these areas in detail and compare global listed infrastructure securities vs. private infrastructure performance, in order to gauge the suitability of listed infrastructure securities as a proxy for private infrastructure.

DISPLAY 5

VINTAGE YEAR	PRIVATE INFRASTRUCTURE (PREQIN MEDIAN IRR)	LISTED INFRASTRUCTURE (DJBGI INDEX)
2006	7.9%	10.7%
2007	5.0%	8.0%
2008	9.0%	6.9%
2009	11.0%	15.8%
2010	9.2%	12.7%
2011	18.6%	12.7%
2012	11.0%	12.5%

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ATTRACTIVE RISK-ADJUSTED RETURNS

To frame the return profile of infrastructure, given the fact most infrastructure companies operate in demand-inelastic environments with high levels of regulation/contracting, it is perhaps intuitive that the return profile of infrastructure should be lower than investments in more market-based, unregulated industries but at lower risk (defined as a permanent loss of capital). This notion of lower risk is supported by historical evidence in the credit markets, where the default rates of infrastructure companies have been considerably lower than those of the broader corporate market.[7] In terms of realized returns, despite a lower risk profile, historical evidence also supports a favorable result, with realized private market equity internal rates of return (IRRs) as shown in *Display 5* ranging between 5 and 19%, depending on geography, industry type, leverage within the capital structure, and the level of asset maturity (brownfield at the lower end and greenfield at the higher end). Looked at prospectively, distributions of equity return expectations for infrastructure indicate most institutional investors target a range of 4 to 11% (nominal, annualized), with the vast majority in the 8-9% (nominal, annualized) range.[8]

From a return perspective, global listed infrastructure, as represented by the DJBGI Index, has historically met the return requirements quite well, siting within the 5-19% IRR range and meeting the current 8-9% target on a long-term basis. In a similar comparison, other infrastructure indices, due to their higher levels of equity-risk associated with them given their less pure definitions of infrastructure, have demonstrated mixed results in meeting the 8-9% target.[9]

Looked at on a "vintage year" basis (i.e., same starting period for investment), the return profile for listed largely matches that of private infrastructure, further supporting the argument for listed from a return perspective.[10]

Switching to risk, the ability to compare listed to private is more difficult. While private infrastructure investments are generally accepted to be less risky than other asset classes, listed infrastructure can be shown empirically. From the perspective of a permanent impairment of capital, it is true that listed infrastructure securities have exhibited little risk, consistent with the private markets. However, for many listed market investors, risk is equated to volatility. We would argue that volatility does not necessarily reflect risk, particularly over the short-term. In fact, we believe short-term volatility, while perceived as a negative comes with tradeoffs, namely greater liquidity and potentially the ability to purchase assets at attractive valuations relative to private markets when share prices decline. That said, while we do not agree with the perception of volatility as a risk, a comparison of infrastructure securities versus the broader equity universe still reflects a lower volatility profile (while still maintaining a similar level of return). *Display 6* provides a risk-return comparison across a number of common indices.

Another way to look at the level of risk is to observe the "upside/downside" capture of listed infrastructure companies relative to the broader global equity markets. As can be observed during the same five-year period in *Display 6*, infrastructure securities captured only 72.1% of down markets relative to global equities, while still managing to capture 77.7% of up markets in the process of outperforming by over 200 basis points annualized during that time.[11]

[7] According to Moody's recent report "Default and Recovery Rates for Project Finance Bank Loans, 1983-2013 Addendum", the 10-year cumulative default rate for availability based infrastructure projects is 1.3%, lower than the 10-year cumulative default rate of 3.0% for corporate issuers rated single-A by Moody's.

[8] Preqin, *Preqin Investor Outlook: Alternative Assets*, H2 2015.

[9] As demonstrated in the full index return comparison in *Display 2*. For a graphical depiction of the Dow Jones Brookfield Global Infrastructure Index, please refer to *Display 4*.

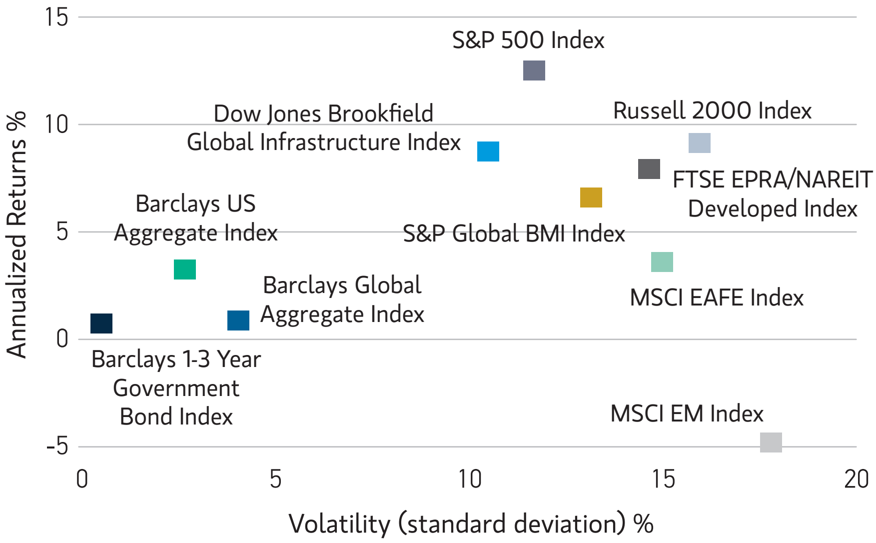
[10] Private Infrastructure returns are taken from *Preqin Quarterly Update: Infrastructure*, Q3 2015 and display the median IRR across each vintage year available (i.e., IRRs are taken from all reported funds that began in a given year and are calculated through the most recent date available, which is typically March 31, 2015 to June 30, 2015). Listed Infrastructure "vintages" are generated assuming an investment began at the start of a given year and are calculated through June 30, 2015 in order to provide a fair comparison.

[11] During the five years ending December 31, 2015, the Dow Jones Brookfield Global Infrastructure Index was up 8.8%, while the S&P Global BMI was up 6.6%.

DISPLAY 6

Five-Year Risk-Return Comparison

Data as of December 31, 2015



Sources: Morgan Stanley Investment Management, S&P Dow Jones, Russell, MSCI, FTSE, Barclays. All information is provided for informational purposes only.

Investing involves risks including the possible loss of principal. In general, fixed income investments are subject to credit and interest rate risks. Foreign securities are subject to currency, political, economic and market risks. The risks of investing in emerging market countries are greater than investments in foreign developed countries. Investors should carefully review the risks of each asset class prior to investing.

Should investors look to directly compare the volatility of listed versus private infrastructure, we would argue that the most prudent approach would be to look at each on a similar, medium to long-term time horizon. We acknowledge that listed securities are likely to demonstrate more volatility in the short-term, but again we would emphasize that the liquidity advantage allows listed investors to take advantage of short-term mispricings. We believe that looked at on a medium to long-term basis (i.e., five to ten years or beyond), listed infrastructure securities should show no more volatility than what might be observed in the private markets if valuation frequency were normalized (i.e., listed securities only looked at on a quarterly or annual basis). Given that most institutional investors are long-term in nature, this seems to be the most appropriate comparison. It is also most consistent with the asset life duration of infrastructure.

DIVERSIFICATION BENEFITS FROM LOW CORRELATIONS WITH OTHER ASSET CLASSES

Private market investors typically look to improve the optimal risk-return tradeoff in an investment portfolio while achieving moderate returns with infrastructure investments. To help achieve this objective, private market investors have generally targeted an allocation in the range of 1-10% of their overall portfolio.[12] While private market investors have generally accepted that an investment to private infrastructure can enhance their overall allocation, we contend that an allocation to listed infrastructure securities can provide similar benefits.

As shown in *Display 7*, we compared the efficient frontiers for an allocation containing global equities and global fixed income with one that adds global listed infrastructure to the mix. Based on historical data, our analysis indicates that the inclusion of global listed infrastructure may potentially enhance the efficient frontier, as evidenced by the fact that the portfolio which includes infrastructure generally produced higher returns relative to the portfolio that exclusively holds global equities and global fixed income at normalized levels of risk.[13]

In terms of correlations, similar to our comments earlier, we would caution against assuming listed and private investments are comparable over the short-term. It is true that listed infrastructure has exhibited greater correlation to the global equity markets than unlisted investments; however, these correlations spiked during the period of the "credit crisis" of 2008-2009 and have been coming down ever since.[14] Moreover, while the direction of returns may have been similar between the broader equity markets and listed infrastructure, the magnitude of the return was measurably different (underscored by the upside/downside capture above). Also, with listed infrastructure securities, investors are focused on a small set of the broader equity universe, with the DJBGI Index only representing 1.7% of the overall global equity market.[15] Thus, we believe listed infrastructure securities represent an adequate diversifier to an investor's multi-asset class portfolio.

[12] Preqin, *Preqin Quarterly Update: Infrastructure*, Q3 2015. For institutional investors with an allocation to private infrastructure, target allocations are as follows: Less than 1%: 9%, 1-4.9%: 42%, 5-9.9%: 32%, Greater than 10%: 17%.

[13] Efficient frontier analysis in *Display 7* provided by FactSet for the 10-year period ended December 31, 2015 using monthly returns. Indices were used as a proxy for global equities (S&P Global BMI), global fixed income (Barclays Global Aggregate), and global listed infrastructure securities (Dow Jones Brookfield Global Infrastructure). The efficient frontier that excludes infrastructure set ranges for global equities and global fixed income at 25-75%. The efficient frontier that includes infrastructure set ranges for global equities and global fixed income at 25-75%, while global listed infrastructure securities was added with a range of 0-50%. **Past performance is no guarantee of future results.**

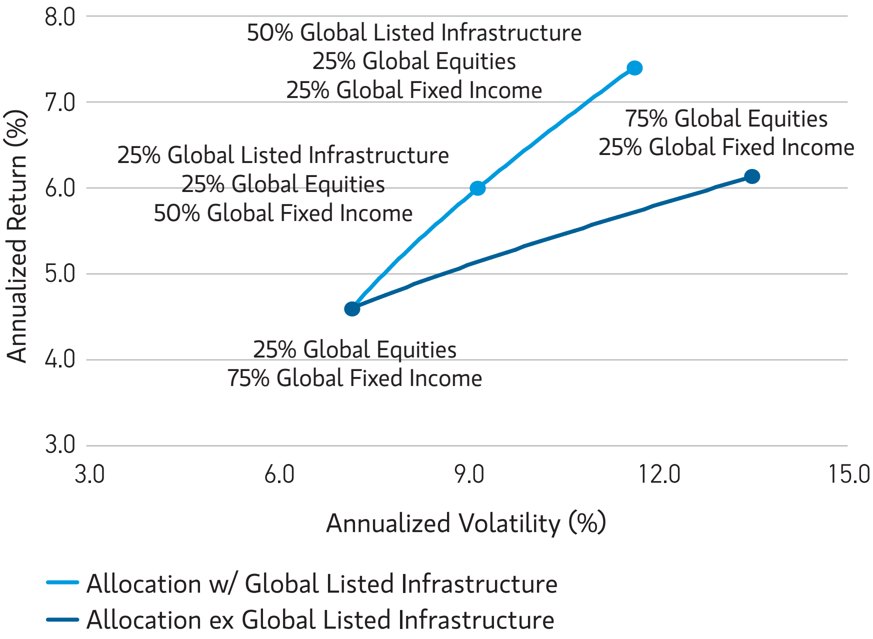
[14] As demonstrated in *Display 8*, the three year correlation of the Dow Jones Brookfield Global Infrastructure Index relative to the S&P Global BMI spiked as high as 0.95 during the credit crisis, but has since come down to 0.80 as of December 31, 2015.

[15] Data as of December 31, 2015 using the S&P Global BMI as a proxy for global equities.

DISPLAY 7

Historical Efficient Frontier

Data as of December 31, 2015



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AN ABILITY TO GENERATE CURRENT INCOME

Infrastructure has long been sought for its ability to help generate long-term, stable cash flows. As a result of this ability, many institutional investors have turned to the asset class seeking a more reliable income stream,[16] a consideration that has increasingly taken on greater importance given the prospective outlook and low return environment in traditional fixed income markets. Core private infrastructure funds typically distribute a healthy level of current income, something they are able to do early in the life of the funds given their focus on brownfield assets that do not need time to ramp up cash flows. Listed infrastructure strategies may also offer an attractive income component due to their advantaged cash flow profiles. However, these strategies may not be perceived to provide the same level of income reliability due to the fact that they are equities.

A simple comparison demonstrates that infrastructure securities can provide a higher level of income compared with global equities. As of December 31, 2015, the DJBGI Index offered a dividend yield of 4.2%, comparing favorably to global equities, with the S&P Global BMI having a dividend yield of 2.6%. We would acknowledge that listed infrastructure strategies vary in their approaches, with some strategies seeking to distribute income and others being more focused on long-term total returns. Still, an investor can benefit from the underlying infrastructure assets' ability to generate stable cash flows regardless of the strategic approach to distributions.

POTENTIAL PROTECTION AGAINST INFLATION

Infrastructure assets, whether in the public or private markets, achieve inflation protection by virtue of their remuneration structures. For regulated and contracted infrastructure, companies are allowed a "real" return on invested capital plus explicit compensation for inflation in the countries in which the assets are domiciled. For more market-based assets, while the protection is not explicit, pricing power generally moves alongside inflation (as the operator must cover inflationary costs), and a "floor" on the valuation exists in terms of replacement cost (which is in nominal, inflated monetary terms). Private market participants value this aspect of infrastructure given that the investment cash flow stream should rise alongside growing liabilities, creating a natural hedge.

While it is difficult to track private market inflation protection from a disposal perspective given the different purchase dates and holding periods of various assets, the argument for inflation protection is generally accepted given the types of assets owned. We would note that given listed infrastructure companies own similar assets, observing the behavior of listed infrastructure securities should also reinforce this point for private infrastructure. If we consider listed infrastructure performance versus the broader global equity markets, it is clear that valuations at least historically have held up better in high inflationary periods, supporting the argument that listed infrastructure securities provides some level of protection against a rise in inflation.[17]

In conclusion, while difficult to make exact comparisons between listed and private market infrastructure, we believe an analysis of both over the medium to long-term demonstrates that listed infrastructure securities can provide much of the same financial benefits investors are looking for when seeking infrastructure investments.

Other Considerations – Listed Versus Private Infrastructure

While we believe this argument makes a compelling case for listed infrastructure securities to serve as a proxy for private infrastructure from a financial perspective, we acknowledge there are

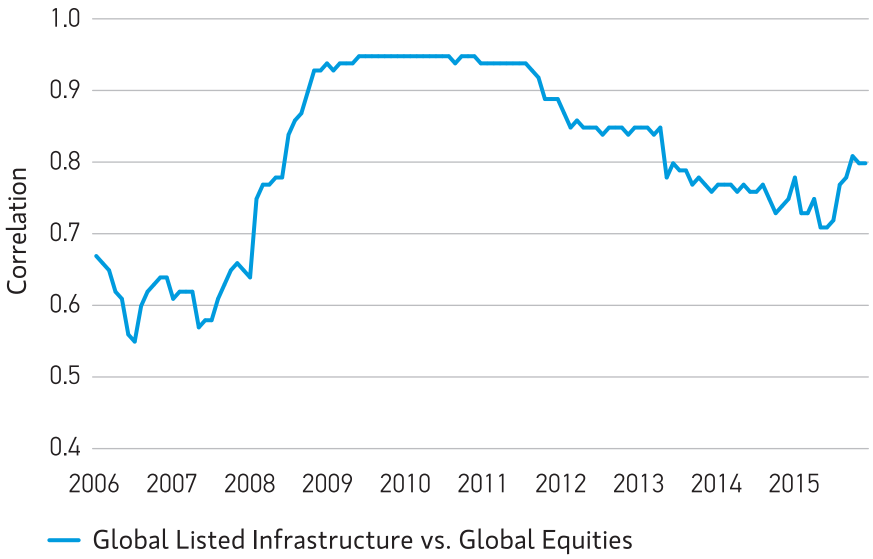
[16] Preqin, *Preqin Investor Outlook: Alternative Assets*, H2 2015.

[17] Data in *Display 9* provided by S&P Dow Jones from January 2003 through March 2015.

DISPLAY 8

36-Month Rolling Correlation

Data as of December 31, 2015

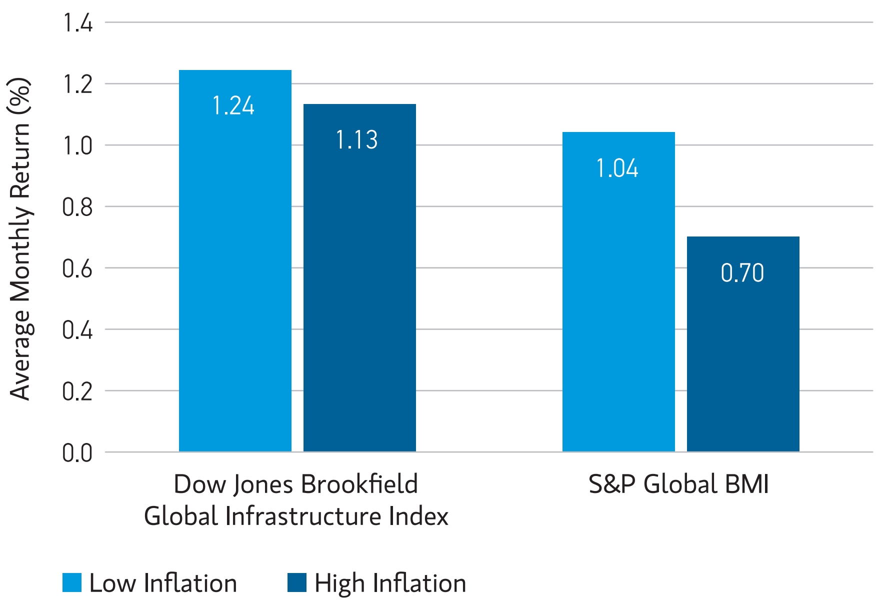


Sources: Global Listed Infrastructure—Dow Jones Brookfield Global Infrastructure Index; Global Equity—S&P Global BMI Index. Based on 36-month rolling correlation and provided in USD terms. **Past performance is no guarantee of future results.**

DISPLAY 9

Average Monthly Performance

Low Inflation vs. High Inflation



The index performance is provided for illustrative purposes only and is not meant to depict the performance of a specific investment. **Past performance is no guarantee of future results.** See disclosure page for index definitions.

other considerations when selecting between the two forms of exposure as well. We address a number of the other considerations in this section.

- **ACCESSIBILITY AT AN ACCEPTABLE RETURN – (ADVANTAGE: LISTED):** One of the primary concerns facing private infrastructure strategies has been rising valuations as investors have flooded these funds with capital. Dry powder (committed capital yet to be invested) among these funds recently reached a record $115B, which is likely to grow further with 155 funds in the market currently seeking to raise $96B in aggregate.[18] While there seems to be no shortage of funds willing to raise capital, the need to deploy increasing levels of capital is leading to greater competition over deals, which have steadily risen in size. Faced with the prospect of overpaying for deals or waiting for dry powder levels to come down, investors can use listed infrastructure to more immediately gain exposure to the asset class through a large investable universe rather than having to compete in an overcrowded marketplace. Moreover, this relatively small segment of the broader equity market still lacks robust numbers of investors who are focused on the benefits long-term exposure to infrastructure can provide. As a consequence, listed strategies utilizing an appropriate investment approach can be patient in waiting to take advantage of market dislocations to access infrastructure assets at discounts to their underlying value, potentially providing returns in excess of that available in the private market for the same types of assets. Given the level of sophistication of investors in the private markets, in combination with the level of dry powder that needs to be put to work, the likelihood of significant market mispricings/dislocations in the private market is anticipated to be low.

[18] Preqin, *Preqin Quarterly Update: Infrastructure*, Q3 2015.

- **ASSET DIVERSIFICATION – (ADVANTAGE: LISTED):** Beyond the accepted diversification benefits of including real assets in a multi-asset class portfolio, listed infrastructure allows investors to diversify by geography and asset type. This diversification eliminates single-asset risk that exists in private strategies while also ensuring investors are exposed to the full spectrum of infrastructure assets and not overly concentrated in any one area.

- **ASSET DUE DILIGENCE – (ADVANTAGE: PRIVATE):** An advantage of private infrastructure strategies is that they often invest in individual assets, rather than companies that operate a suite of assets. In combination with this and similar to most private strategies, due diligence can be extensive as investors are provided full access to a project company's books and records following the signing of a confidentiality agreement. This allows the investor to better understand the asset-level economics through proper due diligence. This greater disclosure is partly mitigated by the concentration of the investments, in contrast to a more diversified portfolio, as mentioned above.

- **LIQUIDITY – (ADVANTAGE: LISTED):** A drawback to private strategies is that they typically include lock-ups of several years that restrict an investor's exit opportunities. Listed strategies offer daily liquidity, which not only allows for the withdrawal of capital on an investor's timeframe (rather than what's dictated by the fund) but also provides investors with the ability to fully invest today rather than being dependent on the ability of private strategies to deploy capital. Once invested, this liquidity provides investors the opportunity to tactically increase or decrease their allocations based on market conditions.

- **LOWER FEES – (ADVANTAGE: LISTED):** Listed strategies typically charge management fees that are less than 1%.[19] Private infrastructure, on the other hand, has generally followed the private equity model, charging a higher management fee along with a performance fee that can meaningfully reduce expected net returns.

A Final Comment on Investing Style

Given the similarities in return profile to private infrastructure, in addition to the other potential advantages of listed infrastructure discussed previously, we believe listed infrastructure securities represents a credible proxy for private infrastructure. However, in order to maximize the potential benefits of investing in the listed infrastructure markets, Morgan Stanley believes investors should carefully consider investing style as well. That is, to effectively serve as a proxy for private infrastructure, listed infrastructure strategies must go beyond qualifying an appropriate universe of securities. We believe these strategies should utilize an investment approach that embraces three key principles: (1) focus on a lower risk profile within the overall universe, (2) implement a bottom-up based process, and (3) maintain a long-term time horizon. We discuss each principle in greater detail in this section.

1. FOCUS ON A LOWER RISK PROFILE. The first component of a proper public markets approach requires considering not just the types of assets infrastructure investors are seeking, but also why they even seek those assets in the first place. Taking a step back, we should remember that interest in private infrastructure began in earnest as institutional investors needed to find new ways to match liabilities—this occurred as interest rates came down, prohibiting them from producing a sufficient return entirely through fixed income. If we consider what the liabilities of most institutional investors look like, they are very long-dated and typically growing at an inflationary rate. From that perspective, it is easy to understand how infrastructure has risen in popularity, as we know infrastructure assets can produce a more steady, stable return over time, long enough to match the types of liabilities formerly matched by fixed income investments. With that in mind, a listed infrastructure strategy should seek to provide the same type of return profile. We previously demonstrated that listed and private infrastructure have achieved similar rates of returns, with listed infrastructure volatility also being meaningfully lower than what investors typically have seen from equities over long-term time periods. Narrowing the investable universe can get a strategy part of the way there, but within the universe of infrastructure securities, we believe these strategies should seek companies that have an even lower risk profile, with a focus on cash flow stability.

2. IMPLEMENT A BOTTOM-UP BASED PROCESS. The second principle suggests a bottom-up approach is more appropriate than one that relies on top-down macro bets. Investors looking to de-risk their returns over a long period of time may be able do so by seeking investment opportunities that have the potential to work in both weak and strong economic environments, rather than attempting to "call" the bottom or top of economic cycles or broad macro trends. While we would not diminish the importance of macro considerations—traffic trends will have an impact on transportation companies, commodity prices are important to consider in the context of energy infrastructure—we believe that a bottom-up analysis of infrastructure securities is the best method for investors to recognize value in these companies. Just as private infrastructure strategies are advantaged in that they can conduct single-asset due diligence, listed strategies should seek as great a level of understanding of these same assets the companies they invest in own and operate. Taken a step further, this can present listed strategies with opportunities as equity securities may frequently misprice infrastructure assets over the short-term, often due to investor sentiment related to macro considerations, allowing investors the potential to access these assets at discounts to their intrinsic value.

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[19] According to Morningstar, approximately 90% of US 40 Act Mutual Funds charged management fees of 1% or less. Data as of December 31, 2015.

3. MAINTAIN A LONG-TERM TIME HORIZON. The third and final aspect of this investment approach matches investment strategy with the useful lives of the underlying assets. Infrastructure assets are typically long-lived, with generally more stable cash flows and stable pricing power. Given this, the underlying asset value should not change materially over short periods of time, absent some significant structural change (e.g., change in regulatory structure or "stranding" of assets). For listed infrastructure investors, this means portfolio positioning should not change meaningfully absent some large move in the share price as near-term information flows and macro data points have no meaningful impact on underlying asset value. A more tactical trading strategy for listed infrastructure securities only introduces unnecessary "equity risk," and given that underlying asset value does not change, such a trading strategy removes the connection between the potential benefits of infrastructure and the actual asset exposure. Said another way, if short-term share price movements of infrastructure companies are frequently used for tactical trading, the investor is looking to capitalize on near-term information flow, not underlying infrastructure asset value (with all of its benefits). Trading on near-term information flow can be done in any equity sector, and thus the value of owning infrastructure assets is lost. A more appropriate approach is to take a long-term, asset-based view, which should allow the investor to benefit from the structural characteristics of infrastructure assets over the medium to long-term.

Conclusion: Listed is the New Alternative

In summary, the Global Listed Real Assets Team at Morgan Stanley Investment Management believes investors can achieve core infrastructure exposure through listed securities. Private markets strategies attracted the majority of flows into the asset class initially, but we anticipate listed strategies will gain acceptance as a complement and/or alternative over time as they become better understood by investors. Within real assets, there is precedent for this lag in private to public markets acceptance. Private real estate strategies grew in popularity prior to the development of listed real estate strategies in the mid-nineties, but our experience saw early skepticism gradually turn to widespread acceptance of the fact that listed securities can be used as an effective proxy. Today, listed securities continue to be used as a common complement to or proxy for core, direct real estate exposure.

Infrastructure will likely continue to be an area of focus for investors should recent trends hold. Many investors continue to increase their target allocations to the asset class, yet even with ample amounts of capital being raised, some investors remain underweight their allocations.[20] With concern over core options in the private markets and the length of time it may take for capital to be deployed, we anticipate more investors will seek out listed strategies. We believe those investors that do turn to listed securities will benefit from gaining immediate exposure through strategies that can effectively serve as a proxy for private infrastructure. These strategies may continue to provide investors with attractive risk-adjusted returns that offer enhanced diversification benefits, current income, and a potential inflation hedge. We encourage investors to better understand the landscape of infrastructure alternatives available to them, as listed strategies may be able to achieve the core infrastructure exposure investors desire.

Investors can generate core exposure to infrastructure in a cost-effective manner by investing in equity securities of publicly listed companies. Based on the premise that long-term performance of infrastructure securities will be most highly correlated with the underlying value of their assets, investors utilizing a bottom-up driven investment approach should be able to access these securities at valuations comparable or superior to direct investments. In doing so, listed infrastructure has the ability to provide the benefits mentioned earlier, but with the added advantages of daily liquidity and meaningfully lower fees. We believe a listed, public markets strategy bears the consideration of those with infrastructure allocations to fill.

[20] Preqin, *Preqin Quarterly Update: Infrastructure*, Q3 2015.

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