



INFRASTRUCTURE INVESTING:
THE CLOSED-END FUND MARKET





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probity (prō'bi-tē)

n. [from Latin *probitas*: good, proper, honest.] adherence to the highest principles, ideals and character.

On an ongoing basis, Probitas Partners offers research and investment tools for the alternative investment market to aid its institutional investor and general partner clients. Probitas Partners compiles data from various trade and other sources and then vets and enhances that data via its team's broad knowledge of the market.

Overview

Infrastructure investing has become an area of increasing global focus among institutional investors and among various governmental agencies that are often sources of infrastructure deal flow. Though it has been an increasingly important part of many large investors' portfolios, infrastructure remains at a nascent stage for many institutional investors as they shift from treating it as an investment niche to an independent asset class. Although there is a wide array of research available that covers the infrastructure sector in general, this white paper focuses on how institutional investors are approaching the closed-end fund market, which is the largest sector.

This investment sector has yet to develop a full set of “best practices,” with benchmarking, for example, still in flux. Long-standing and new investors continue to evaluate offerings against both their existing portfolios and their direct and co-investment objectives. The differences in investor approaches and infrastructure experience create some interesting conflicts — even within the same investment vehicles — between investors with goals of near-term liquidity and those seeking long-term exposure through these longer-lived assets, as well as between very large investors with pricing leverage and co-investment capabilities and smaller investors without such capabilities.

This white paper focuses on how institutional investors are approaching the closed-end fund market

Defining Institutional Infrastructure Investing

Infrastructure investing covers a wide range of different project types with different risk/return profiles. These investment opportunities are capital intensive and are typically either in heavily regulated industries (as in the energy and transportation sectors) or are done under long-term concessions with public sector entities through Public-Private Partnerships (“PPPs”). The sector is focused on equity investing, although there are a few funds that target debt investments. Though most of the largest closed-end funds focused on infrastructure are typically diversified by project type and geography, it is useful to review the various sectors individually.

of governments turning to the private sector for help. As a result, Design, Build, Finance, and Operate (“DBFO”) PPPs have emerged as one of the most important models to close the infrastructure-funding gap, not only for new projects but also for existing assets with large deferred-maintenance or expansion needs. Many governments look to the private sector not simply for funding but also for the expertise necessary to improve productivity and create better service performance outcomes for infrastructure.

The major types of projects covered by PPPs include:

- **Transportation.** PPPs have played an increasingly significant role in addressing the pressing need for new and well-maintained roads, tunnels, bridges, airports, ports, railways, and other forms of transportation. Historically, transportation has represented more PPPs transactions than any other sector, in part because such projects are capital intensive. The ability to identify the DBFO elements of discrete transportation assets has facilitated the use of PPPs in transport projects. In addition, the prevalence of user fees for transportation assets allows for easy cash flow reconciliation. The scale and long-term nature of transportation projects are also well served by PPPs.

Public-Private Partnerships

Historically, governments around the world have shouldered the burden of infrastructure finance through a variety of public-financing structures, typically bond issuances, usually offset by pay-as-you-go user fees or by taxes. However, stretched public finance capacities, together with limitations on the public sector's effectiveness in managing projects pre- and post-completion, have created a growing trend

- **Water and Waste.** Water and waste management, traditionally the province of state and local governments, represents another fast-growing area for PPPs. Many countries are faced with increasing demands for clean water, while the process of dealing with waste products amid environmental concerns is becoming more complex.
- **Social Services.** Social services investing covers a wide range of potential projects, including:
 - **Education.** PPPs can provide substantial innovation for education infrastructure and service delivery. Under typical education PPPs, the private sector invests in the school infrastructure and can provide related non-core services (e.g., school transport, food services, cleaning, and maintenance) under contract, while the government continues to provide core services — namely teaching.
 - **Hospitals.** In recent years, a few countries have moved to diversify the sources of healthcare funding by using PPP arrangements to meet the growing demand for healthcare infrastructure. Typically, a private consortium designs, builds, and operates a hospital or healthcare facility and leases it back to the relevant government entity.
 - **Public Housing.** Several central governments have encouraged the use of concession models in pilot PPP public housing projects. Joint ventures allow the local governments to retain control over planning and development while utilizing the private partners' resources and expertise.
 - **Defense.** PPP projects in the defense sector include equipment maintenance and installation, supply-chain integration and operational support, depot maintenance, specialized military training, and real estate management. The projects typically are designed to overcome fiscal constraints, manage life-cycle costs, and reduce pressure on uniformed military personnel.
 - **Prisons.** PPP projects in this sector have led to noticeable reductions in construction times and costs for new projects as private sector expertise has been brought in, though the outsourcing of running prison facilities has sometimes been controversial.

PPPs were pioneered in Australia, Canada, and the United Kingdom, and have been increasingly adopted globally. The United States has been slower to adopt the model in part because PPP policies have, to date, not been set nationally, but on a state-by-state basis. In certain jurisdictions, specific projects have become points of conflict between political parties or factions over whether these assets should be

totally controlled and funded by the public sector. Even as governments look to expand PPPs to assist in economic stimulus during difficult times, to repair poorly maintained assets and to build new projects needed by their communities without further straining limited budgets, this debate is reshaping the terms of such activity between the public and private sector.

Private Infrastructure Investments

Though discussion of infrastructure investments often focuses on high profile PPPs, many infrastructure projects are purely private transactions without government support or contracts, though often operating in industry sectors that are heavily regulated. Sectors of focus include:

- **Renewable Energy.** Though renewable energy projects can be executed as part of diversified funds, there are also a number of funds focused on the sector that target investors who are interested in both the risk/return profile of projects in the sector as well as the potential environmental benefits. Wind power and solar power are of most interest, though geothermal, biomass and hydropower projects are also targets.
- **Energy and Power.** Infrastructure funds in this sub-sector usually focus on projects in electricity generation and transmission, natural gas storage, and distribution, and may cover renewables as well. These types of projects are usually a step away from commodity risk, and the risks that are undertaken can be minimized through long-term contracts or active hedging.
- **Telecommunications.** This sector covers both land-line and wireless telecommunications projects and has become increasingly important in the last decade. A few of these projects may be handled as PPPs.

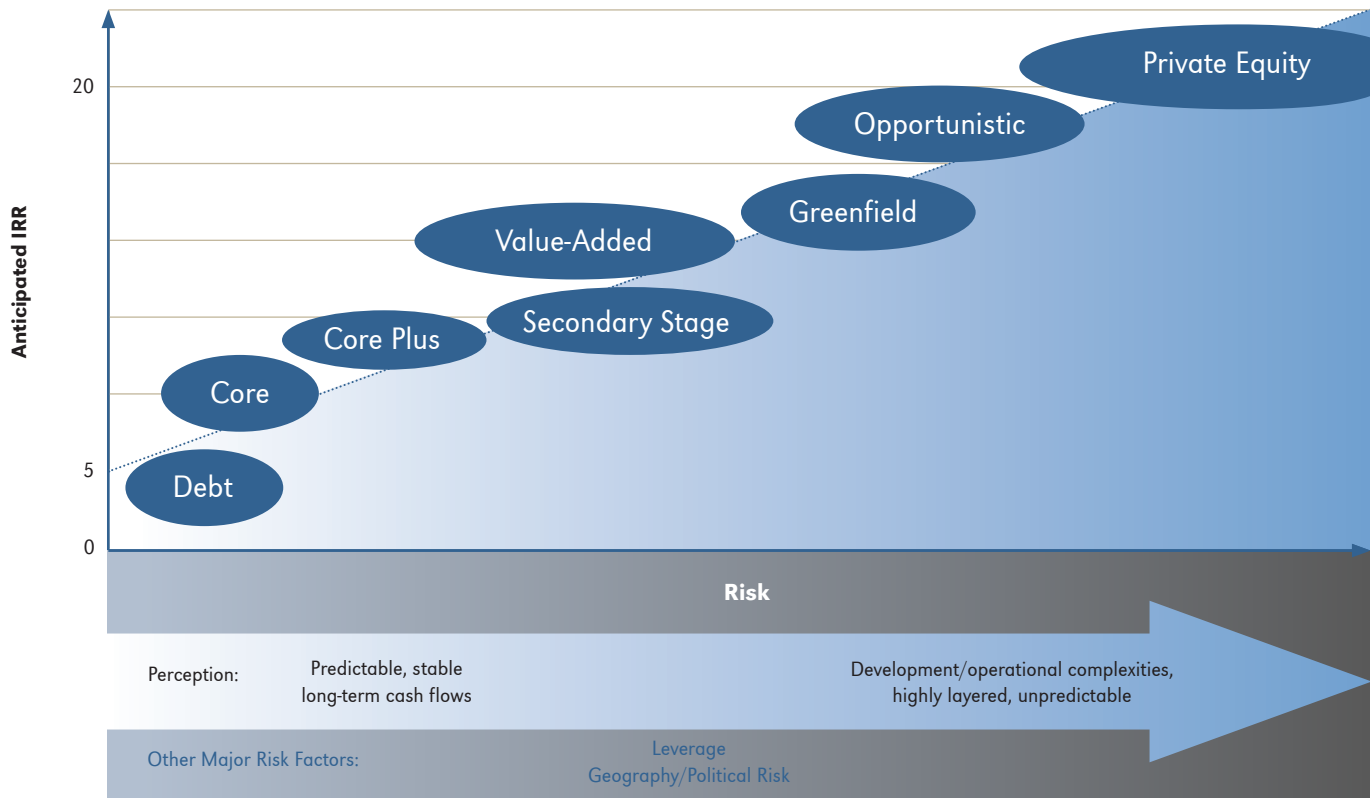
The returns in private investments are often driven by capital gains rather than current income. Some investors that focus on PPPs as core infrastructure assets consider investments made in private investments — typically via operating companies versus individual assets — to be purely private equity investments and not infrastructure at all. Others find the private investment approach interesting, given its higher-return profile, especially as part of a diversified portfolio of infrastructure assets. Many of the funds that focus on private investing seek to create or reposition assets or operating companies to be attractive stabilized investments in order to capture multiple arbitrage from core investors who acquire such assets for long-term holding.

Risk-Return Spectrum

Historically, risk return in the infrastructure space was characterized (or mischaracterized) in terms of the stage of development of an infrastructure project, with brownfield representing the lowest risk and lowest return on one end

of the spectrum, and greenfield on the other end of the spectrum with the highest risk and highest return. As the market has developed, this simplistic model has become more sophisticated as outlined in Chart I below.

Chart I Risk/Return



Source: Probitas Partners

As is obvious in Chart I, there is not a bright line between the stages, something especially true at the fund level where a manager may invest not only in a portfolio of projects in various stages, but could also adjust the risk/return profile of the investments through increased levels of leverage.

However, to better understand the sector, it is useful to look at the stages of development in isolation.

Debt Investments. The Great Financial Crisis (“GFC”) and resulting regulatory changes hit the commercial banking industry hard, including those banks that specialized in project finance. With debt needed to finance infrastructure projects becoming more difficult to access, a number of fund managers began to launch dedicated infrastructure

debt funds. Though not a project stage *per se*, these funds present a different investment choice along the risk/return spectrum, and within the sector they run the gamut from senior debt through mezzanine for both brownfield and greenfield projects.

Core Brownfield Investments. These investments are based on well-established, well-maintained, cash-flow generating assets, such as fully operating and stabilized toll roads. They are *perceived* to be one of the lowest risk assets for infrastructure investing. The typical core brownfield investment profile is often compared to a long-term bond, with an immediate and sustainable current coupon and a term of 15 to 30 years or more, with much of the overall return driven by current income.

Core Plus Brownfield Investments. The term core plus is somewhat new in infrastructure investing and was borrowed from the real estate industry. As more money has targeted the core sector, especially through direct investments made by large institutional investors, fund managers have looked to move up the risk/return spectrum in order to generate higher returns necessary to maintain interest in their fund products and to support the fee and carry load of a fund. The risk of a fund pursuing this strategy is meant to be somewhere between core and value-added, and, for example, would include such things as nominally core projects that have heavy deferred maintenance needs, more volatile income streams or they are small in size and attract less competition.

Value-Added Brownfield Investments. Value-added investments typically involve projects that need significant capital for repairs and maintenance or for the expansion of a project while simultaneously generating some element of current income from current operations. An example of a value-added brownfield investment would be the purchase of concession rights for operating a toll bridge that, though currently generating cash flow, requires significant immediate capital improvements for major retrofitting or expansion. The risk profile is essentially a combination of core and greenfield risk.

Secondary Stage Investments. Secondary stage investing is focused on purchasing greenfield projects that have just been completed. The permitting and construction risk has been removed at that point, though usage forecasts remain just that – forecasts without actual operating results to support them. Secondary stage investors accept that forecast risk when purchasing the project.

Greenfield Investments. These investments are new projects that will not generate cash flow until completed. They include design and build risk, as well as operating risk, and are often sold to brownfield investors once the project is completed and stabilized. They are usually part of a long-term concession with the public sector that sets terms for the project's operation after it is completed. Greenfield investments typically require deal-generating skills that go far beyond bidding in auctions, requiring the ability to create, organize, and operate projects.

Opportunistic Investments. Opportunistic investments include capital committed to projects with significant operational or regulatory issues that need to be addressed before a project can be turned around or optimized, or greenfield investments (such as merchant power plants) whose operations are not covered by long-term pricing or usage contracts at the beginning of construction. This strategy typically requires a high degree of operating and complex negotiation skill, with returns driven by capital gains rather than operating income. In some instances,

opportunistic funds also invest in infrastructure-like or infrastructure-related investments, such as purchasing a construction company that has a heavy focus on infrastructure projects. This strategy is often more highly levered as well in order to achieve higher-return targets – of course with increased risk. Buying a core brownfield project using large amounts of debt actually results in an opportunistic project. Many investors who are focused on conservatively financed, long-term core, and core plus investments do not consider opportunistic funds to be infrastructure vehicles at all.

While the definitions of the stages of infrastructure development remain valid today, the notion that they categorically define risk has proven untrue in the wake of the GFC. A number of theoretically “safe” brownfield infrastructure investments acquired at the market peak in assets like toll roads have proved to be much riskier than value-added or greenfield investments when too aggressively underwritten or too highly leveraged.



Other Risk Factors

As discussed on the previous page, characterizing infrastructure investment risk simplistically via stages fails to properly define the risk/return profile of individual projects or a fund. A greenfield investment is not necessarily riskier than a core or value-added project; it depends significantly upon specific risks and how the transaction is structured, financed, and operated. Ultimately, the risk/return profile of each investment is a function of the structure of the investment and how that structure addresses a number of important risks, including:

Leverage. The risk in any project, beyond some nominal level, is inherently increased by the addition of financial leverage. Interestingly, since core projects are generally considered more stable, they are usually easier to leverage aggressively to generate higher returns on invested equity. However, any project that is highly leveraged inherently has less financial and operational flexibility, and for projects whose returns are generated through user fees or other contingent payments as described below, the combination of flawed revenue forecasts (or unanticipated economic downturns) and too much leverage can significantly increase risk and ultimately reduce or eliminate returns.

Geography/Political Risk. This is a broad area of risk, covering such issues as the potential for rejection of contracts, changing tax laws, currency risk (when the currency of the country where the project is located differs from the currency of the fund), political instability, sovereign credit risk, or potential civil strife. Thus, projects in emerging market countries are generally perceived to have a higher degree of risk than those in developed economies — though at times, political and economic problems can negatively impact projects in the developed world as well (e.g., Spanish rewrites of contracts on subsidized solar utilities after the GFC).

Permitting and Construction Issues. For greenfield (and to a lesser degree, value-added) projects, permitting and construction issues can significantly delay or upend a project, putting returns at risk or in the worst case, shutting down a project altogether. Fund managers pursuing investments in these stages need to have experience in managing these risks, through risk sharing agreements with contractors and government sponsors, as well as through active oversight of the entire project.

Elasticity of Demand. For those projects whose returns depend upon user fees, the demand for those services during the life of the contract drives the ultimate investment return. Even for a core brownfield toll road whose usage characteristics are presumed to be well-known, the availability of non-toll alternatives now or in the future, or

the impact of either soaring fuel prices or steeply rising tolls on traffic can reduce actual net revenue. As a result, a greenfield social infrastructure project with well-defined contractual structures and availability payments with a creditworthy governmental entity may be inherently less risky than a toll road whose revenue streams are driven partially or completely by user fees, and can be impacted in future by changing travel options or economic conditions.

Inflation. As with any long-lived asset, inflation can detrimentally impact profitability. This risk can be mitigated contractually in PPPs through inflation adjustment clauses that allow repricing, or in certain instances, through contracts hedging key operating costs. In certain PPP contracts that are poorly structured or in highly competitive offerings, however, these risks can be borne in part, or totally, by the investor. In addition, in instances where inflation is increasing precipitously, usage numbers may also decline significantly because of repricing, affecting revenues.

Additional risk factors that do not fit as neatly into a category are the mitigating impact of proprietary deal flow, operating expertise, and contractual risk assignment. In the greenfield arena, fund managers have more of an opportunity to assist public sector entities in developing projects at an early stage, providing advice on how a project might be structured and helping to define the risks in a design, build and operate environment. To be involved in these situations requires not only a background in these key disciplines, but also a marketing program targeting these more proprietary projects in the development stage. Though most of these opportunities will go to formal bid, investors involved early in the process will gain insight into and knowledge of the specific priorities for the project that will give them a material advantage in the process and an ability to better negotiate contracts and influence risk mitigation as part of their bid. In many brownfield investments, contracts are established as part of an auction process focused on generating the highest bid for a concession. Potential buyers bid on a basic structure, which is not as negotiable and is more likely to include a number of bidders with strong financial skills, but not necessarily strong operating backgrounds resident on their teams.

Any particular infrastructure project can contain all of the risks noted above. But in greenfield projects (and certain value-added projects) they are typically addressed in a specific structure designed by the sponsor to manage risks and enhance returns. The construction of the allocation of risks and the assignment of returns determines the actual risk/return profile of a transaction.

Bond-Like Is Not Risk-Free

A number of infrastructure investors learned painfully during the GFC that while stabilized high-quality assets can generate “bond-like” return performance, such assets are not guaranteed without risk. In periods of market turmoil, very low probability events can nonetheless occur (evaporation of debt capital, dramatic decline in user traffic, skyrocketing energy costs, etc.) which can cause stable assets to underperform, or even become distressed, if aggressively leveraged or poorly operated. Similarly, plummeting commodity prices can dramatically affect investments in both direct and allied sectors by affecting current operating revenue or by creating accelerated obsolescence.

Similarly, as assets mature, while their cash flow may become even more seasoned, they are increasingly at risk from disruptive technologies or changes in use that, while not envisioned at inception of the investment, may make the asset less valuable or valueless 25 years later.

Some investors still believe that stable, monopolistic investments matched to their long-term liabilities mean they can rest easy for the next 30 years. Instead, manager selection that focuses on requisite risk evaluation and mitigation skills, and ongoing active operating and management skills, remains the route to achieving hoped-for long-term performance, regardless of the apparent stable nature of the underlying project.



Drivers of Institutional Infrastructure Investment

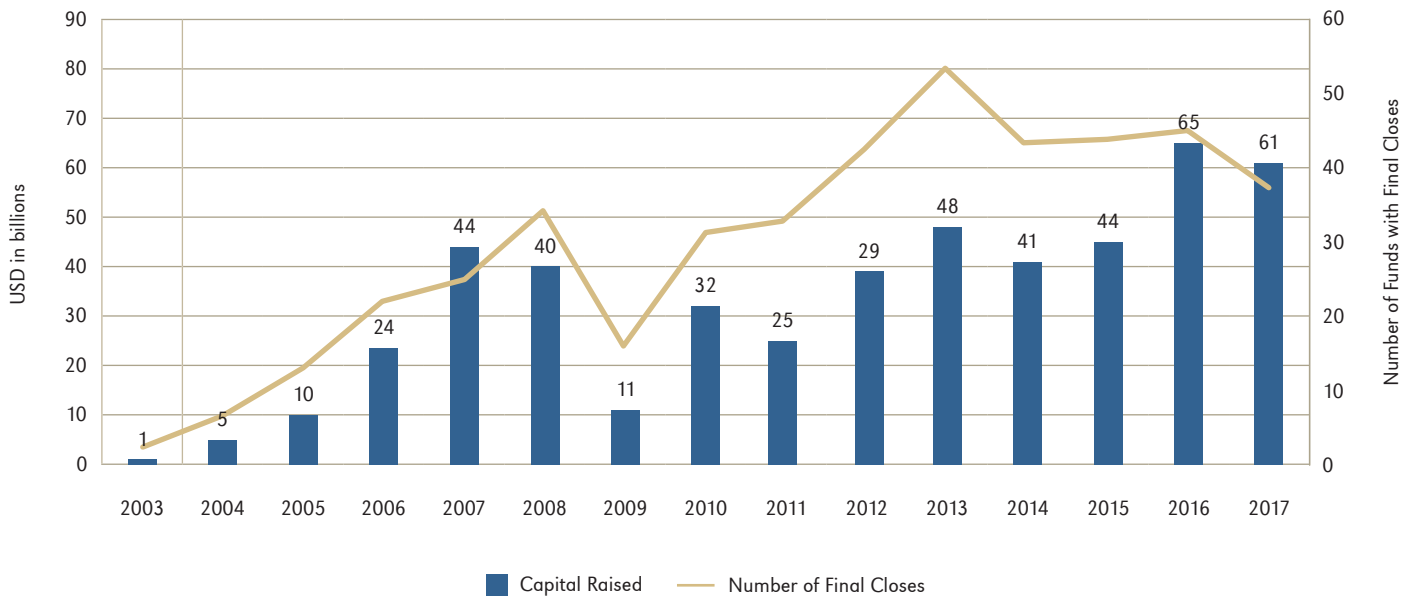
In 2003, the fundraising market for private closed-end infrastructure funds was only \$1 billion, an amount not unusual based upon history to that point (Chart II). It expanded dramatically through 2007 due to both increasing interest from institutional investors seeking alternatives for their asset/liability matching needs and a steady supply of projects needing funding. The combination of these forces, coupled with abundant and inexpensive debt available at the time, drove closed-end infrastructure fundraising to a new high.

Fundraising fell dramatically in 2009 from the 2007 peak with the arrival of the GFC. But infrastructure fundraising rebounded over the next several years as markets stabilized and investors' interest in illiquid assets returned. The number of funds raised also increased, hitting a peak in 2013, as

new funds were launched to serve increasing demand. This rebound set the base for a surge of funds committed over the last two years — though the chart also shows that the number of funds that were raised shrank as the most successful fund managers — such as Brookfield and GIP — were able to raise huge follow-on funds on the back of their previous investment success.

It should also be noted that the chart below understates the closed-end capital going into the infrastructure market because it does not track co-investments and direct investments being made by institutional investors. This activity is much more difficult to track accurately and has also become a more important part of the market since the GFC.

Chart II Global Closed End Infrastructure Fundraising 2003–2017



Source: Probitas Partners; PREQIN, Infrastructure Investor, Private Equity Analyst
 Note: Does not include infrastructure funds-of-funds

It expanded dramatically... both increasing interest from institutional investors seeking alternatives for their asset/liability matching needs and a steady supply of projects needing funding

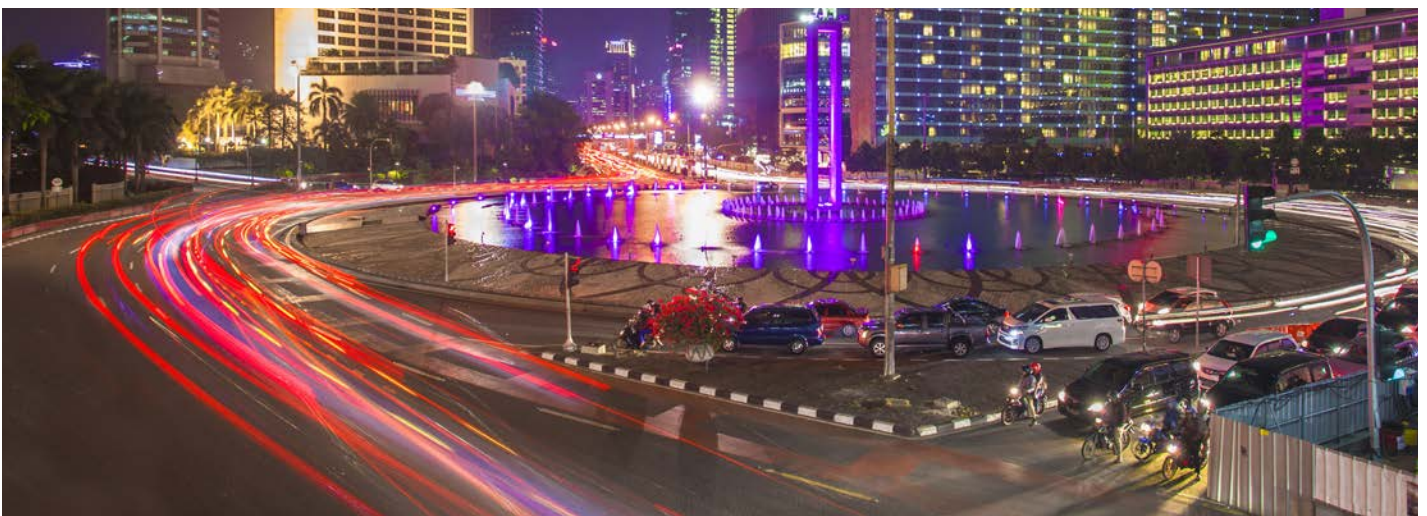


The Motivation to Invest

Institutional investors, especially pension and superannuation plans, sovereign wealth funds, and insurance companies, are attracted to infrastructure investing for a number of reasons:

- **Asset/Liability Matching.** For those investors who have significant long-term liabilities, it allows them to more closely match those long-tailed liabilities to long-lived, stable, high-quality assets. Few assets can be as long-lived as contractual maturities on infrastructure concessions and many fund maturities are lengthening to reflect this fact.
- **Current Income.** Though the total life of many infrastructure projects is quite long, brownfield assets can generate significant current income, both mitigating risk and attracting investors who seek an asset-backed alternative to fixed-income investing. However, investors need to appreciate that these long-term assets require ongoing maintenance, management and reinvestment, so not all cash generated in excess of operating expenses and debt servicing is available for distribution.
- **Inflation Protection.** Many infrastructure assets include inflation adjustment clauses in their pricing mechanisms, mitigating return dilution caused by inflation. For that reason, a number of investors place infrastructure in inflation-linked allocations along with such assets as timber, farmland and commodities. However, in an environment with steeply rising inflation, the ability to reset prices may be offset to a degree by the impact much higher prices have on demand.
- **Strategic Benefits.** There are other strategic motivations. For public sector pensions, investing in local infrastructure projects can boost local economies and help achieve public policy goals (e.g., increasing local employment and the local tax base) while at the same time investing pension dollars in assets that offer attractive risk/return profiles. Many Taft-Hartley plans in the United States, and their equivalents in other countries, look favorably on infrastructure investing as a way to boost job prospects for members in construction trades while achieving similar investment goals.

For those investors who have significant long-term liabilities, it allows them to more closely match those long-tailed liabilities to long-lived, stable, high-quality assets



Institutional Portfolio Allocations

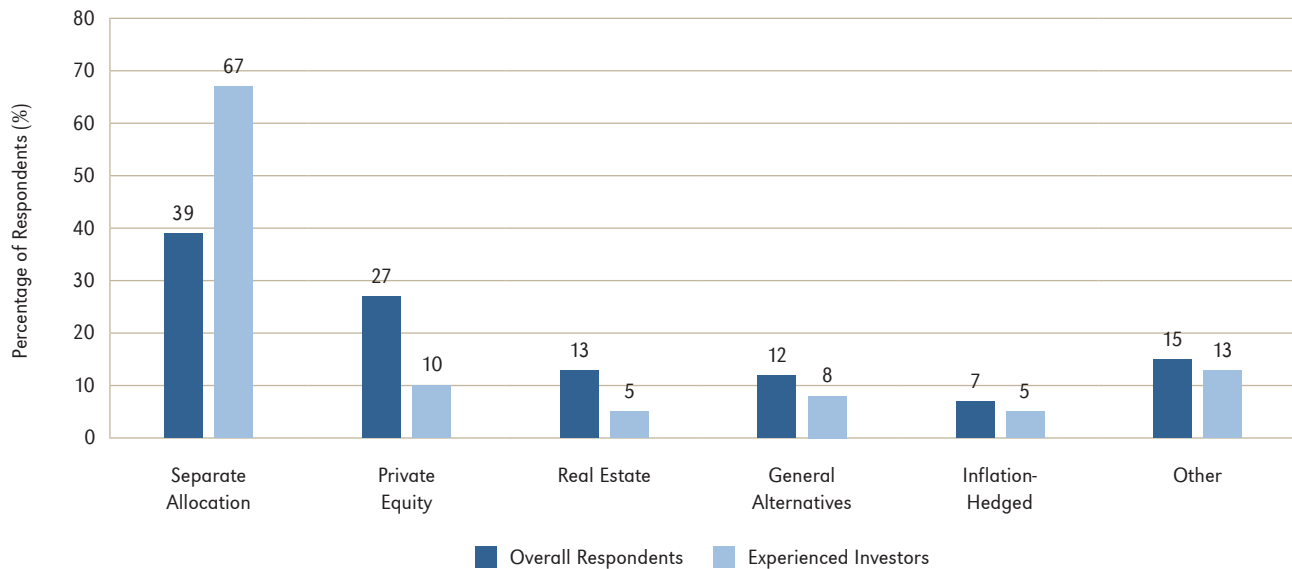
Most institutional investors divide their portfolios into separate allocations — for example, publicly traded equity, publicly traded bonds, private equity or real estate — in order to ensure proper diversification. Investments that do not clearly fit into an established allocation can have difficulty finding a home in an investor’s portfolio.

For most investors new to infrastructure investing, the hurdle issue is, “Where does it fit?” Even if an institution is leaning towards eventually setting up a separate infrastructure

allocation, “toehold” positions are often done as a means of market reconnaissance, and these early investments are placed, at least on a temporary basis, into existing portfolio sector allocations. As Chart III below shows, earlier in the life of the market many investors, especially ones newer to infrastructure, invested through their private equity or real estate allocations, though the risk/return profile of the spectrum of infrastructure investments does not perfectly overlap with the profiles of either of these sectors.

Chart III Categorizing Infrastructure — 2009

“Within our portfolio, infrastructure investments are or will be placed in (choose all that apply):”



Source: Probitas Partners’ Infrastructure Institutional Investor Trends for 2009 Survey

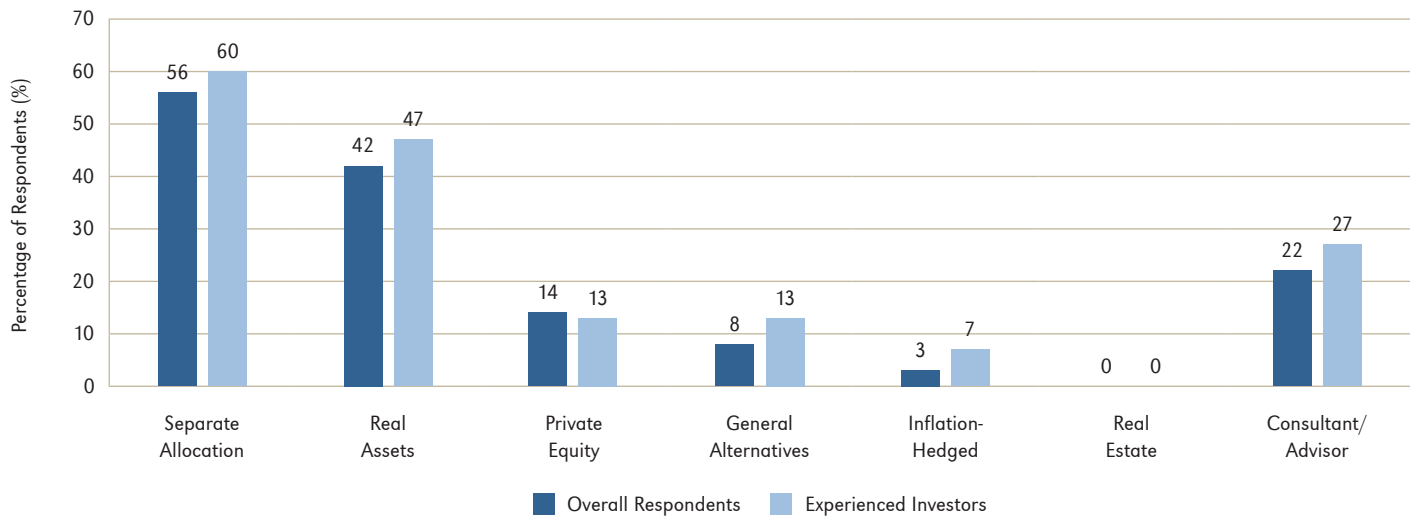
Note: “Experienced Investors” constitutes those investors who have been active in the sector for five years or more

As the market has matured there has been a marked shift towards investing through dedicated infrastructure allocations; investing via private equity or real estate allocations has faded. But perhaps the biggest difference detailed in Chart IV is the growth of real asset allocations. The wider search by institutional investors for alternatives and the commodity super-cycle began to attract attention to assets such as agriculture, metals & mining, oil & gas production, and timberland. Each of these sectors was independently narrow, but the focus on underlying real assets was reflected in somewhat similar return profiles. Many investors gathered exposure to these sectors into a single real assets category, in many cases with sub-categories.

It is obvious from a quick review of the percentages in the chart, that add up to significantly more than 100%, that infrastructure investments are being made through multiple allocations by a number of investors, and in a number of cases what we see revealed in the chart is infrastructure as a sub-allocation underneath an overall real assets allocation. Note also that the most expansive definition of real assets includes real estate — though many investors with long-established real estate allocations have maintained those separately from real assets.

Chart IV Categorizing Infrastructure – 2017

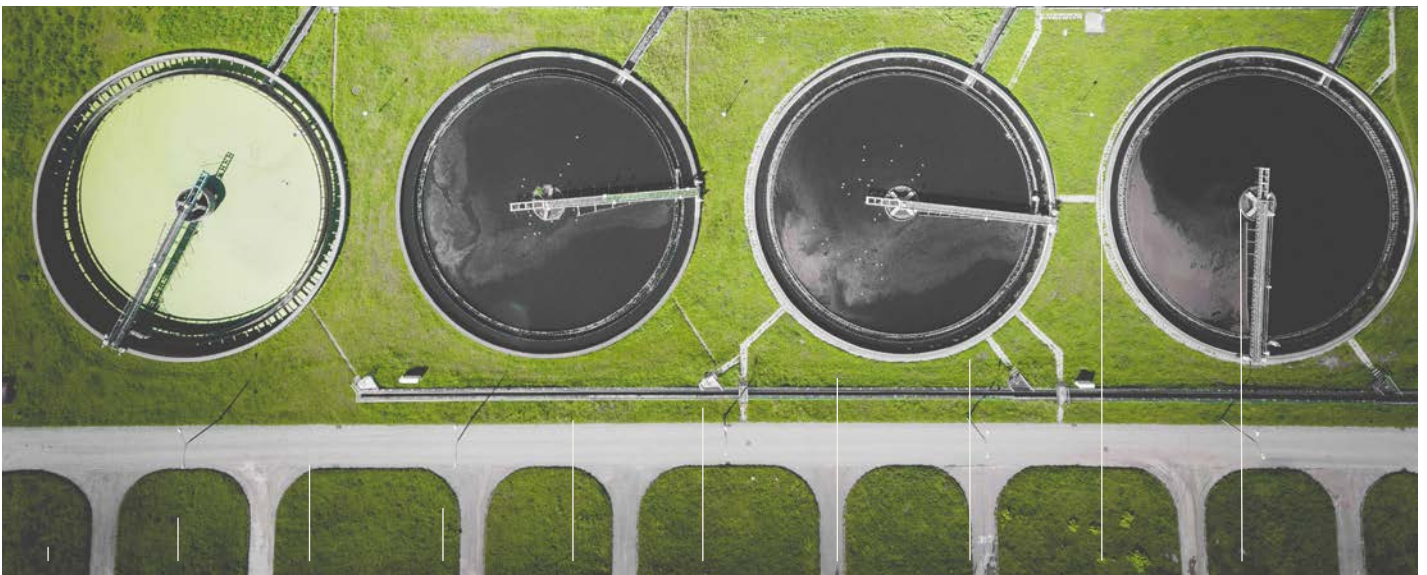
“Within our portfolio, infrastructure investments are or will be placed in (choose all that apply):”



Source: Probitas Partners' Infrastructure Institutional Investor Trends for 2017 Survey

Note: "Experienced Investors" constitutes those investors who have been active in the sector for five years or more

As the market has matured there has been a marked shift towards investing through dedicated infrastructure allocations



Benchmarking

The history of infrastructure funds is relatively short and shallow relative to private equity or real estate funds. As a result, there remains little vintage year comparison data on individual fund performance. The best source at this point for this type of data is PREQIN, an online data service that tracks fund performance through publicly available listings, Freedom of Information Act requests and fund manager data submissions. However, the performance data set remains relatively sparsely populated at this point, has robust vintage year comparisons covering only a few years and lacks enough data to breakout performance of different strategies within infrastructure.

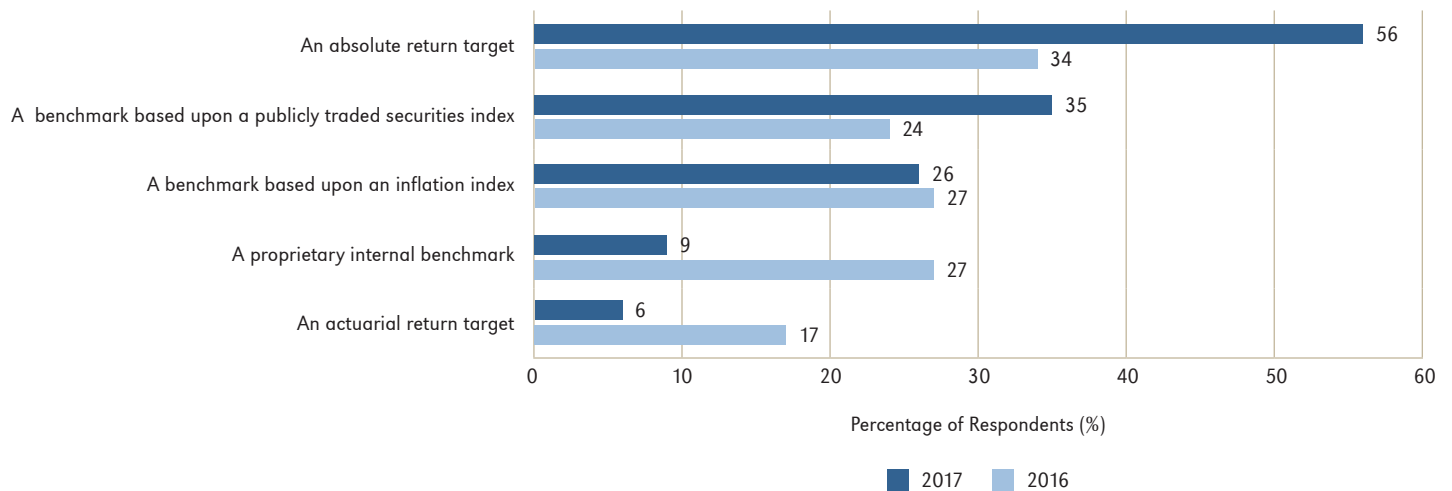
As far as infrastructure portfolio benchmarks, Chart V highlights the results of Probitas Partners’ latest Infrastructure Institutional Investor Survey on the topic.

By far the most popular benchmark at the moment is an absolute return target. A number of survey respondents use multiple benchmarks. Those that use publicly traded securities indices most often use broad based indices such as the S&P 500 or the FTSE 100 and not specific infrastructure indices.

In the public markets, there are a few indices designed to track infrastructure returns. For example, Macquarie Bank and FTSE have combined to create a number of jointly provided indices covering infrastructure globally and in various regions, which MSCI does as well. However, these indices are heavily weighted towards publicly traded electric, gas and water utility companies that are not representative of the private infrastructure sector as a whole. In addition, certain indices include “infrastructure linked” companies, such as publicly traded construction companies, that generate substantial revenue from infrastructure projects.

Chart V Portfolio Benchmarks

“Regarding portfolio benchmarks for infrastructure, my firm uses (choose all that apply):”



Source: Probitas Partners’ Infrastructure Institutional Investor Trends for 2017 Survey

The history of infrastructure funds is relatively short and shallow... As a result, there remains little vintage year comparison data on individual fund performance

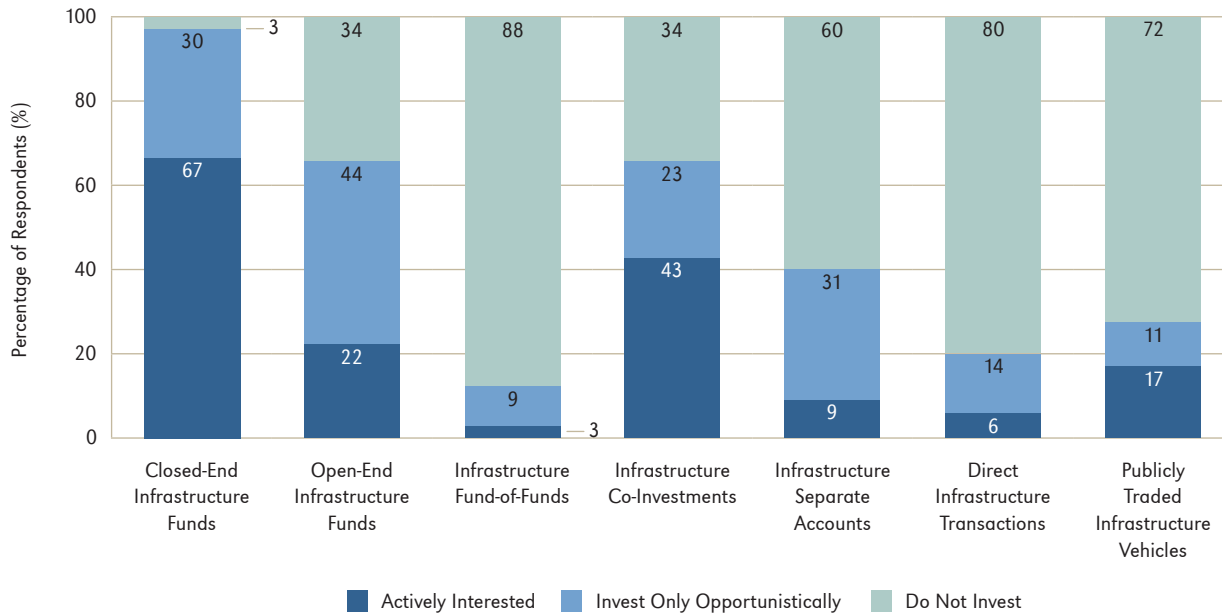
Investment Structures

As detailed in Chart VI, most institutional investors focus on infrastructure through closed-end funds and through co-investments made alongside fund managers with whom they invest. Only very large investors have the financial strength or staffing resources to pursue separate accounts or direct transactions — though the largest, most sophisticated

investors are deploying significant amounts of capital directly, usually into core brownfield projects. While this white paper focuses on closed-end funds, the rest of this section briefly touches on the other investment structures in the market.

Chart VI Interest in Investment Structures

“My firm’s interest in various investment structures is:”



Source: Probitas Partners’ Infrastructure Institutional Investor Trends for 2017 Survey



Open-End Funds

Open-ended or evergreen structures are favored by some investors as a natural vehicle for holding long-dated assets such as core brownfield projects, though the level of interest detailed in Chart VI has taken 15 years to develop as these structures have never been as popular as closed-end funds. Open-end funds can provide immediate current income for new investors who often buy into an established portfolio with a pre-specified existing base of investments that allows immediate visibility to assets being purchased and mitigates the J-curve. Most of the open-ended structures carry a lower fee and carry structure that contemplates a very long-term hold by investors and usually provide a redemption feature. This has become a more attractive structure for investors who intend to match liabilities long-term, but who still seek a liquidity option for unforeseen circumstances.

However, these vehicles have issues that limit their popularity:

- **Policy and Portfolio Management Concerns.** Certain investors alternative programs prohibit them from investing in illiquid or limited liquidity partnerships without a fixed and set duration, while others without such a policy still dislike the structure. Especially with illiquid structures, many investors (especially those with backgrounds in private equity or private real estate fund investing) favor a structure which requires them to re-underwrite a fund manager in detail before committing more capital to that manager. Over extended periods of time, most fund managers go through significant changes in key investment and management staff, as well as ownership. Many portfolio managers prefer the discipline of a periodic and set re-underwriting of a fund manager's current capabilities in a changing market.
- **Liquidity and Exit Mechanisms.** Open-end funds usually include liquidity potential via a redemption mechanism that allow investors some amount of liquidity after a set period, much as hedge funds do. Unlike hedge funds, however, liquidity is usually not generated by selling underlying assets – which are illiquid and are not easily sold in any short-time frame – but by attracting new investors whose capital can be used to replace that of exiting investors instead of providing capital for new transactions, with the price usually set at the Net Asset Value (“NAV”) calculated by the manager. This process can be very difficult, however, if the manager is experiencing difficulties, if the calculated NAV is under question or if a general market shock is forcing investors towards liquid assets.
- **Carried Interest.** A major issue for open-ended structures that charge carried interest is how that carry is calculated. Since they are not publicly traded, and they are geared towards holding assets for a very long period, any carry paid to the management on an interim basis has to be done on the basis of a NAV calculation usually with some sort of high-water mark provision. The mechanics of such a calculation and the mechanics of a distribution waterfall can vary significantly from fund to fund, with some being much more investor-friendly than others. On the other hand, funds without an effective incentive compensation mechanism will likely have difficulty attracting and retaining experienced staff – and even with a strategy of investing in core brownfield assets, as many open-end funds do, aging assets, potential needs for expansion and new forms of competition must be taken into account in long-held assets.

This process can be very difficult, however, if the manager is experiencing difficulties, if the calculated NAV is under question or if a general market shock is forcing investors towards liquid assets.

Direct Investments and Co-Investments

Only a handful of the largest and most mature investment programs have dedicated direct teams that can execute infrastructure investments. These large investors are typically well-staffed, with well-compensated teams, in order to compete directly with the largest infrastructure fund managers — either alone or in consortia — for the largest infrastructure investments that come to market globally, usually targeting core brownfield investments.

Investors in both direct investments and co-investments are usually interested in them for two basic reasons:

- **Decreased Costs Compared to Fund Investing.** Many investors feel that the typical fund structure is too expensive for infrastructure investments, especially for core brownfield investments, with management fees too high — especially when calculated on a committed basis. Investors also argue carried interest is too high relative to the risk/return profile of such investments. By investing directly or through “no-fee, no-carry” co-investments made alongside funds that they have backed, they look to increase net returns by decreasing costs. However, successful investment programs are not free:

- **Costs of hiring and retaining dedicated staff.** The biggest cost — and the biggest risk — of building these programs is both hiring and then retaining experienced, dedicated investment professionals, especially for direct investments. The skill set for this staff is different from fund investment staff, requiring a proven history of success in past infrastructure investing. The compensation packages provided must be competitive with market compensation packages, including those offered by infrastructure fund managers that are seeking the same talent.

Co-investments are different from direct investments, but they are not necessarily simple to execute. The most successful co-investment programs are staffed with professionals with the experience to know what opportunities to accept and which to reject, and who have experience making direct investment decisions. Also, a number of institutional investors look at internal co-investment programs as a stepping stone towards direct investing, with internal staff gaining experience and insight while working alongside fund managers.

- **Operating and dead deal costs.** In addition to staffing costs, any program has operating costs for

office space, travel, communications, accounting, and auditing. These programs also have “dead deal” costs expended on due diligence for transactions that at the end of the day are never executed.

- **Portfolio Control.** Both co-investments and direct investments provide an investor with more control in building its portfolio, allowing it to overweight or underweight industry sectors or geographies based upon its strategic view of the market or to support initiatives important to its stakeholders.

A separate point needs to be made for co-investments. For smaller and medium-sized funds, or larger funds new to the sector, providing co-investment opportunities to larger limited partners in a fund can be beneficial. By having a ready and willing source of capital in the form of existing fund limited partners, the fund sponsor effectively has a larger checkbook than represented by the fund alone, and can more effectively negotiate and win larger transactions without having to seek co-investment from non-affiliated investors or from competitive infrastructure funds. This can create benefits for all limited partners of the fund — though it also can raise issues of potential conflicts of interest between smaller investors and larger investors with active co-investment programs.

Importantly, over the past decade following the GFC, co-investment has become an important tool to offer large limited partners to get significant cornerstone commitments for a new fund. Many fund managers offer such scale investors economic inducements in the form of reduced fee and/or carry as well as contractual preferred access to co-investments, with the overall arrangement sometimes structured through a separate account investing alongside the fund. Often, the first co-investment comes as part of an arrangement that seeds the first investment or two of the fund, reducing the “blind pool” risk for investors who follow.

These arrangements can also have negative implications for other investors motivated by co-investment — that either have less scale or come later to the fundraising process, should they feel that much of the co-investment opportunity has been allocated away. Similarly, it has the potential to incent the manager to pursue much larger transactions out of the “sweet spot” of its strategy to fulfill the co-investment commitments or desires of its most strategic investors, generating potential conflicts of interest with other investors not driven by co-investments.

Publicly Traded Infrastructure Vehicles

These of course are entirely different than private funds, and investments here raise several issues:

- **Allocation Definition. In Which Bucket Does It Belong?** Investment mandates for internal or external managers of an investor's publicly traded portfolio can be very broad; there is a likelihood that some of the most heavily traded infrastructure positions may already be in an investor's public portfolio. That is especially true if public utilities are deemed to be infrastructure investments, as they are in many of the existing indices or mutual funds in the sector. If the definition is expanded to cover "infrastructure linked" investments such as construction companies, it can exacerbate the overlap. For this reason, most investors do not have separate publicly traded infrastructure programs.
- **Thin Trading.** Utility stocks are often included in infrastructure indices or mutual funds as they are typically very liquid, and their pricing is robust. Though there are public infrastructure vehicles that are heavily traded, there are many listed though lightly-traded vehicles, often appearing on minor exchanges. This creates two problems:
 - **Market Volatility.** Stocks that are thinly traded are often volatile and subject to increased pressure in difficult markets. Though there is a public price for the stock, it can be subject to price pressure driven by overall market activity as well as by technical trading issues quite separate from underlying valuation parameters.
 - **Lack of Liquidity.** Investors with large positions in a thinly traded stock may have difficulty exiting a position, and pent up demand for exits can exert downward pressure on price.
- **Sponsored Vehicles.** There are a number of publicly traded funds that are part of a fund family consisting of both public and private vehicles. Two major issues arise with these vehicles:
 - **Potential Conflicts of Interest.** Historically, several publicly traded funds have purchased significant assets from privately held sister funds controlled by the same sponsor. This raises issues of potential conflict of interest between management and investors not only in the pricing of assets but also regarding fees; many infrastructure vehicles have fee

structures which allow management (and thus their sponsors) to collect asset acquisition and disposition fees, and with inter-fund transactions these fees can be charged on both sides of a transaction.

- **Sponsor Difficulties Affecting Vehicle Valuation.** During the GFC, a couple of infrastructure firms that had sponsored a number of publicly traded infrastructure vehicles failed to service their debt and went into administration. These difficulties dramatically impacted the trading value of the public funds they sponsored, regardless of the performance of their underlying assets, and resulted in a scramble among those vehicles to separate themselves from their sponsors.

Investors interested in publicly traded infrastructure fund investing need to be aware of these factors when pursuing such a strategy, deciding how to treat an allocation and how to properly balance exposures across their entire portfolio.

Funds-of-Funds and Separate Accounts

Funds-of-funds are the least popular structure for infrastructure investing. Though they have the same benefits of private equity funds-of-funds — professional investment management and a diversified portfolio of underlying fund managers and opportunities — overall returns in infrastructure investing are lower than they are for classic private equity strategies, making it difficult to support the added level of fees that funds-of-funds entail.

Separate accounts are slightly different. They are often characterized as a fund-of-fund designed for a single investor, but in exchange for a very large capital commitment that investor negotiates a much-reduced fee structure and an investment strategy tailored to its specific needs and desires. In some cases, it retains final investment approval. In many instances, the separate account manager also provides strategic insight into the infrastructure market on a regular basis as part of its service. However, the amount of capital commitment required by an investor before a manager would agree to set up a separate account means that it is an investment solution out of reach for most investors.

Closed-End Fund Investment Considerations

Closed-end funds are the largest and deepest sector of institutional investor interest, and are covered in more detail in this section.

Infrastructure Fund Landscape

As detailed in Chart II previously, \$61 billion in commitments were raised for infrastructure funds in 2017, just slightly behind 2016's total. The bulk of the capital raised was for funds targeting North America and Western Europe, as well as global funds that are heavily focused on those two geographies as well as other OECD countries.

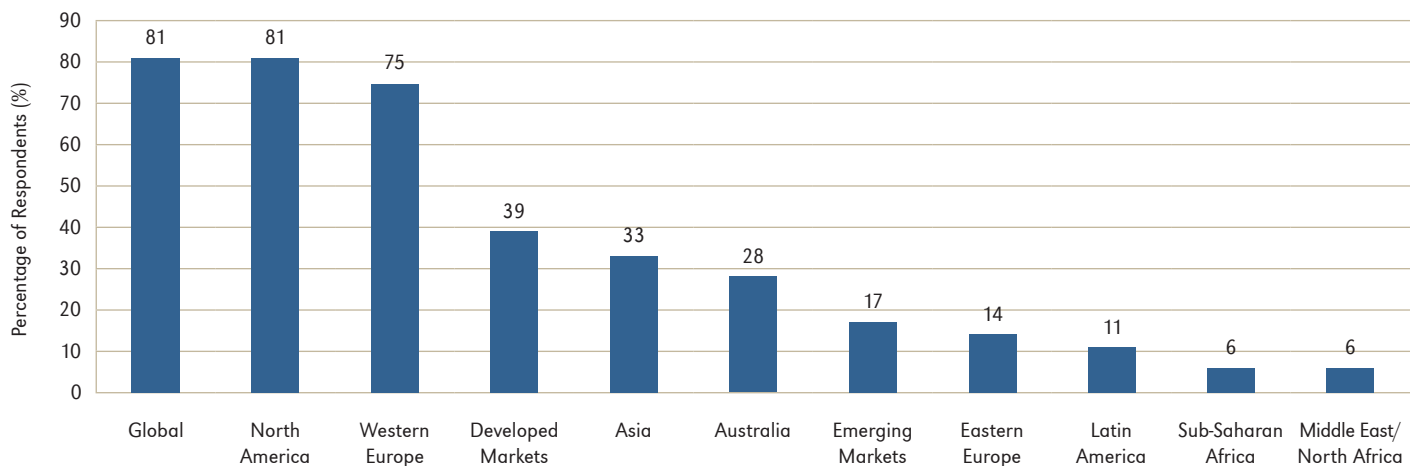
These preferences are also reflected in our 2017 survey regarding what geographies investors are targeting (Chart VII). Among the emerging markets, only Asia registered interest from as much as one third of the respondents. Many investors are uncomfortable with currency and political risk in emerging markets, especially for investments that are long-lived and illiquid.

Though many of the larger funds in the market are widely diversified by industry sector, there are a number of funds that are narrowly focused on a sector or two: energy and power, transportation, and renewable energy are the dominant focused sectors currently (Chart VIII). Social services have limited appeal globally; this sector is of more interest to European investors while being of little interest outside of Europe.

As can be seen in Chart VIII comparing 2016 to 2017, these interests are not set in stone as is obvious in water and waste management. Investor interest shifts overtime due to both underlying market changes or, especially in the case of niche strategies, investors filling the "bucket" in their portfolio sub-allocations (at least temporarily) and moving on to other strategies.

Chart VII Geographic Focus

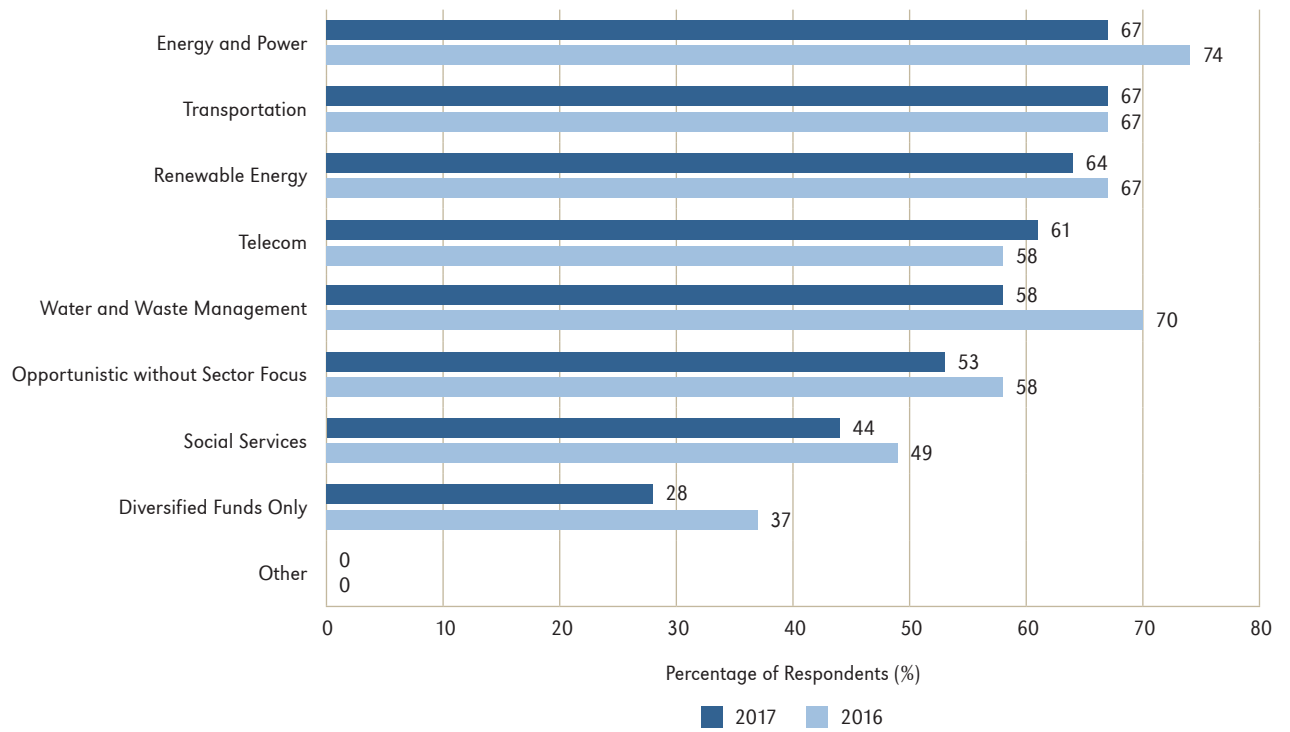
"My firm invests in infrastructure funds with investment mandates focused on (choose all that apply):"



Source: Probitas Partners' Infrastructure Institutional Investor Trends for 2017 Survey

Chart VIII Infrastructure Industry Sectors of Interest

"My firm seeks to invest in the following sectors (choose all that apply):"



Source: Probitas Partners' Infrastructure Institutional Investor Trends for 2017 Survey



Ten Largest Funds to Date

The ten largest infrastructure funds raised to date offer an illustration of the most popular fund vehicles historically.

There are various similarities among these large funds:

- **All Are Focused on Developed Countries.** Most of the capital raised by these funds is directed at the European and North American markets or other OECD countries, even within those funds that have global investment mandates. However, there are a number of smaller funds focused on investing in Asia, Latin America, and Sub-Saharan Africa.
- **Core, Core Plus and Value-Added Strategies Dominate.** Though a few of these funds have mandates that allow a small percentage of greenfield or secondary stage investing, the bulk of the capital being deployed is targeting brownfield investing of various types. Most of the funds raised since 2013 pursue core plus or value-added strategies.
- **Most Funds on the List Are Diversified by Industry Sector.** Of the eleven funds on the list (two were tied for tenth place), nine are diversified while ArcLight and Energy Capital target the energy and power sector. Especially for the largest funds, it is difficult to effectively deploy their capital without some degree of diversification by sector.
- **Manager Concentration.** The four largest funds on this list were raised by Global Infrastructure Partners (“GIP”) and Brookfield, with GIP’s first fund also holding seventh place. The strong performance of these two managers has led them to dominate the list, and Macquarie, an Australian manager with one of the longest histories in infrastructure investing has also placed two of its funds on the list.

Table I Ten Largest Infrastructure Funds, December 2017

Rank	Fund Name	Firm Name	Strategy	Headquarters	Year	Amount (MM)
1	Global Infrastructure Partners III	Global Infrastructure Partners	Value-Added	New York	2016	USD 15,800
2	Brookfield Infrastructure Fund III	Brookfield Asset Management	Core Plus	Toronto	2016	USD 14,000
3	Global Infrastructure Partners II	Global Infrastructure Partners	Value-Added	New York	2013	USD 8,250
4	Brookfield Infrastructure Fund II	Brookfield Asset Management	Core Plus	Toronto	2013	USD 7,000
5	GS Infrastructure Partners I	GS Infrastructure Investment Group	Core	New York	2007	USD 6,500
6	Macquarie European Infrastructure Fund II	Macquarie Infrastructure and Real Assets	Core	Sydney; London	2006	EUR 4,635
7	Global Infrastructure Partners I	Global Infrastructure Partners	Value-Added	New York	2008	USD 5,640
8	ArcLight Energy Partners Fund VI	ArcLight Capital Partners	Core Plus	Boston	2015	USD 5,575
9	Energy Capital Partners III	Energy Capital Partners	Core Plus	Short Hills, NJ	2014	USD 5,095
10	Macquarie European Infrastructure Fund V	Macquarie Infrastructure and Real Assets	Core	Sydney; London	2016	EUR 4,000
10	EQT Infrastructure Fund III	EQT Funds Management	Core Plus	Stockholm	2017	EUR 4,000

Source: Probitas Partners

There are two other major trends in the market that are not revealed in this table:

- **Middle-Market Focused Funds.** Besides niche funds focused on small geographic markets or specific smaller industry sectors, there are a growing number of funds focused on diversified industry sector opportunities in Europe or North America that target middle-market projects that they believe are too small for large funds to pursue. They believe that competition for these projects is muted, allowing for a more attractive purchase price and thus higher returns. Naturally, these middle-market funds raise smaller funds more in-line with their strategy, and one would not expect them to show up on a “ten largest” list.
- **Sponsored Funds.** In the period leading up to the GFC, when the closed-end fund market was young and expanding rapidly, many funds were sponsored by commercial or investment banks, such as the Goldman Sachs and Macquarie funds listed in the table. These institutions often had professionals with experience

in project finance or investment banking targeting infrastructure that were relevant to infrastructure investing in a market where such experience was at a premium. As the banking industry became stressed during the GFC and banking regulations changed, these sponsored vehicles became less popular among their sponsors and more groups spun out to become independent, and new groups were formed by staff who had gained an investment track record with the first wave of funds. Many investors also favored these independent funds as they removed the issue of potential conflicts of interests with sponsors.

However, over the last few years there has been a revival of interest in sponsored structures as groups such as Goldman Sachs and Morgan Stanley have launched new vehicles, while the merchant banks of the 21st century – the private equity fund platforms such as Blackstone, Carlyle, and KKR (and EQT, which is on the “top-ten” list) that have rapidly become active across many sectors of alternative investing – have added infrastructure to their suite of products.

..the bulk of the capital being deployed is targeting brownfield investing of various types



Fund Duration

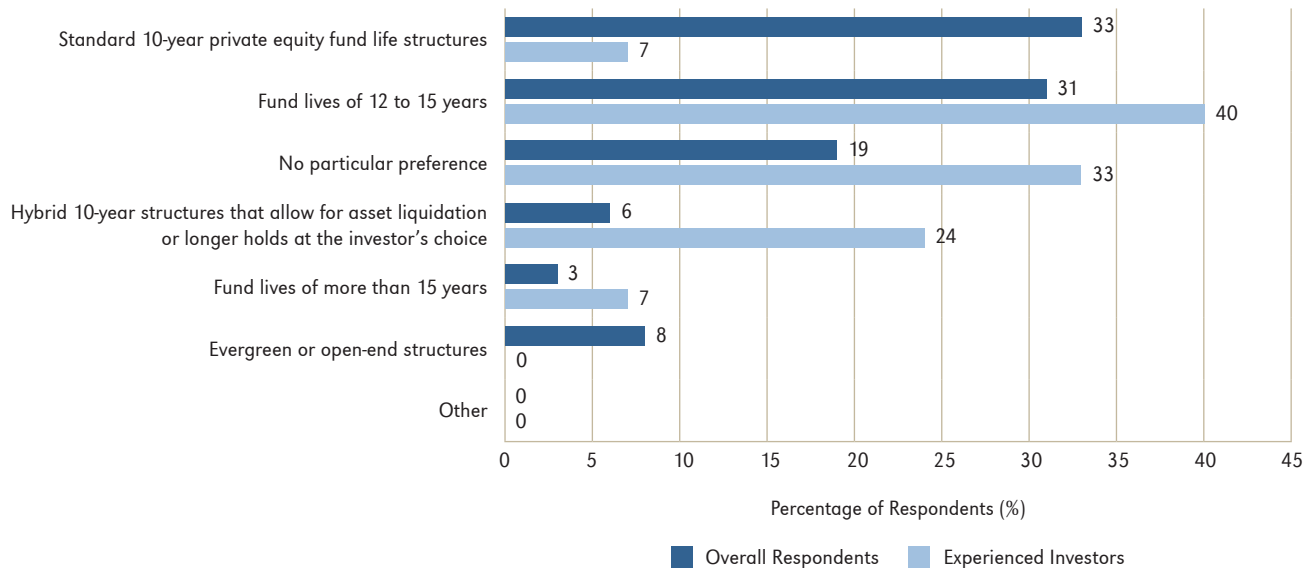
There is no clearly established standard for fund duration today, as there is in private equity with its usual contractual 10-year maturity. Instead, different vehicles handle duration in very different ways. Chart IX compares the amount of interest in various closed-end maturity structures as well as open-end or evergreen structures.

The typical 10-year life private equity structure continues to be common in the market and still has broad acceptance from newer investors that are more familiar

with the structure of private equity and real estate funds. However, there has been a distinct movement towards closed-end funds with longer maturities, especially with experienced investors who are interested in holding long-lived assets longer but who are not necessarily interested in open-ended structures. These experienced investors are also more likely to be flexible as far as maturity structures, looking to match structure to the strategy of fund managers they find interesting.

Chart IX Preferred Terms Structures

"My firm prefers to invest in vehicles with the following duration:"



Source: Probitas Partners' Infrastructure Institutional Investor Trends for 2017 Survey

Note: "Experienced Investors" constitutes those investors who have been active in the sector for five years or more

There is no clearly established standard for fund duration today

Hybrid structures were designed to bridge the gap between the common 10-year maturity fund and the desire of certain investors to hold core or core plus investments for a longer period. They were designed to contractually determine how liquidity would be achieved at the end of a fund's life when there were strong disagreements among investors as to whether to sell or retain assets. However, the hybrid structure still has a difficult conflict issue – the pricing of positions upon transfer. In the past, certain managers who managed both closed-end funds and open-end funds or publicly listed vehicles arranged in their documentation

the plan for the closed-end fund to sell assets to their longer-term vehicles, with investors wanting to retain their rights to the underlying assets participating in some sort of transfer mechanism. Other structures include opt-outs at the end of the fund life for shorter-term investors, offering shorter-term investors a contractual right of realization while reserving longer-term investors the opportunity to stay with assets in a revised fund structure for a longer horizon. Many of these structures are just coming to the point where these provisions will be triggered and are not deeply battle tested.



Liquidity

For all of the closed-ended structures listed in Chart IX, the issue of how they will deal with the ultimate liquidity of their fund investments if, at the end of a partnership's stated life, a significant number of positions remain in portfolio. Most private equity funds allow for extensions of a partnership's life for one to three years in one fashion or another. But these extensions are meant to deal with small, tag-end positions that may not be ready for exit, rather than a larger portfolio of naturally long-lived assets. The hybrid and open-ended structures described above are meant to address this issue directly, but have failed to gain wide acceptance, especially with newer investors, because the structures are inconsistent with many institutional investors' current preferences or delegations of authority.

Other liquidity alternatives are described below:

- **Sales to Other Sponsors or Acquirers.** General partners can always elect to sell positions in their portfolios. Potential purchasers of these positions include:
 - **Strategic Acquirers.** Depending upon the sector, there may be strategic acquirers looking to build their base of assets or contracts in order to gain scale for which certain positions may represent attractive acquisitions.
 - **Sophisticated Primary Investors.** Many of the primary investors active in the market are large, sophisticated investors — such as public pension plans — with strong appetites for cash-generating contractually-defined investments that are likely to be the kind held in a fund at the end of its life. A number of these investors already have active co-investment and direct investment programs that make excellent targets for such sales.
 - **Specialist Vehicles.** A number of specialist vehicles exist (such as publicly traded vehicles or specialist secondary funds) that actively look to purchase positions in the current market that fit their portfolio needs. More recently, fund managers pursuing structured secondaries in the private equity market have begun to approach mature infrastructure funds about restructuring their funds that are approaching their contractual maturity, as they are doing with mature private equity funds where certain investors want liquidity while others are content to stay the course. The secondary fund manager in this case provides a third-party view on pricing the assets.

- **Secondary Sales by Individual Investors.** The sale of partnership positions, as distinct from the sale of underlying transactions in a portfolio, is always an option for investors in a fund. However, since infrastructure is a relatively new asset class, secondary sales of partnerships have so far been limited.

Fees and Returns

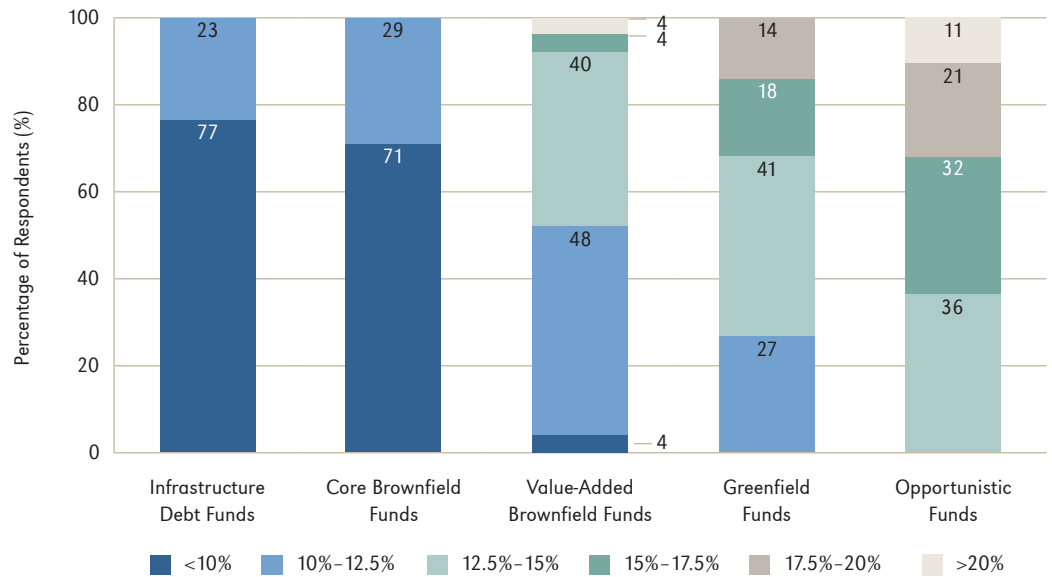
When the infrastructure fund market first began to rapidly expand in 2004 and 2005, most of the private infrastructure funds offered in the market were priced roughly in line with the “2 and 20” private equity pricing model (2% management fee and 20% carry). As noted previously, many of these funds were focused on core brownfield investments in the developed markets. At that time, without large amounts of leverage that would also raise their risk profile, these funds would typically generate net returns in the range of 10% to 12% over their lives. Increasingly since the GFC, return expectations have been compressed (see Chart X for current expectations) and institutional investors have taken the position that the return profile and operating and management intensity required of this style of infrastructure investing does not justify that level of fees and carry.

As the market has matured, investor's understanding of the base return profiles of different project types (ex-leverage and geographic issues) has also matured. Chart X also shows that investors have very different return expectations for some of the major project types as one moves up the risk spectrum.

Investors' perception of anticipated return also colors their view on how much they are willing to pay for those returns. Chart XI shows a pattern very much like Chart X, with management fees that investors are willing to pay increasing with higher expected returns. Carried interest expectations are less gradated and lumpier, but our 2017 survey showed that 70% of investors thought that carry on infrastructure debt funds should be 10% or less, while 56% of respondents felt the same for core brownfield funds.

Chart X Target Net IRRs

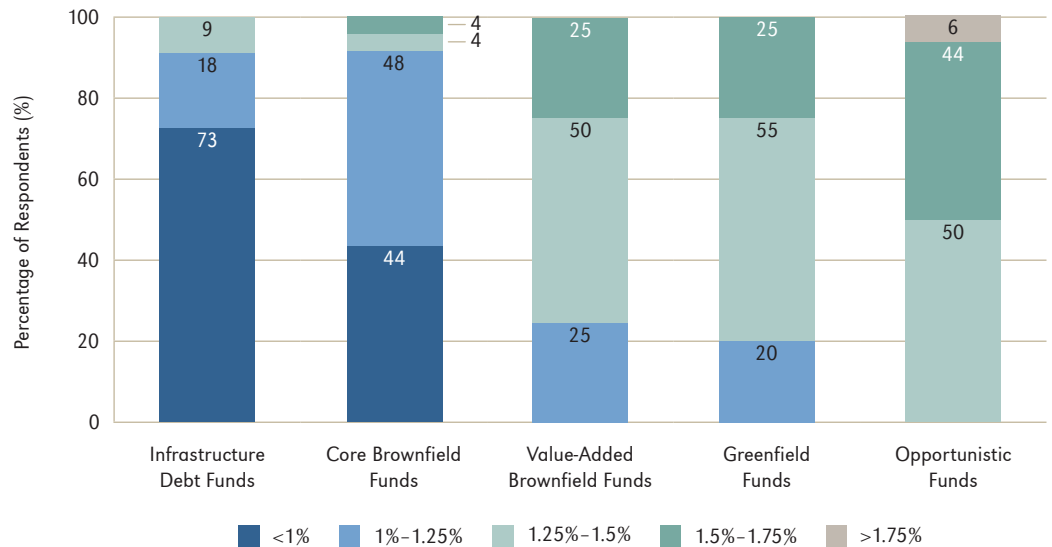
"For the major sectors of closed-end infrastructure funds operating in developed markets, my firm's target Net IRRs are as follows:"



Source: Probitas Partners' Infrastructure Institutional Investor Trends for 2017 Survey

Chart XI Targeted Annual Management Fees

"For the major sectors of closed-end infrastructure funds operating in developed markets, my firm's targeted management fees are as follows:"



Source: Probitas Partners' Infrastructure Institutional Investor Trends for 2017 Survey

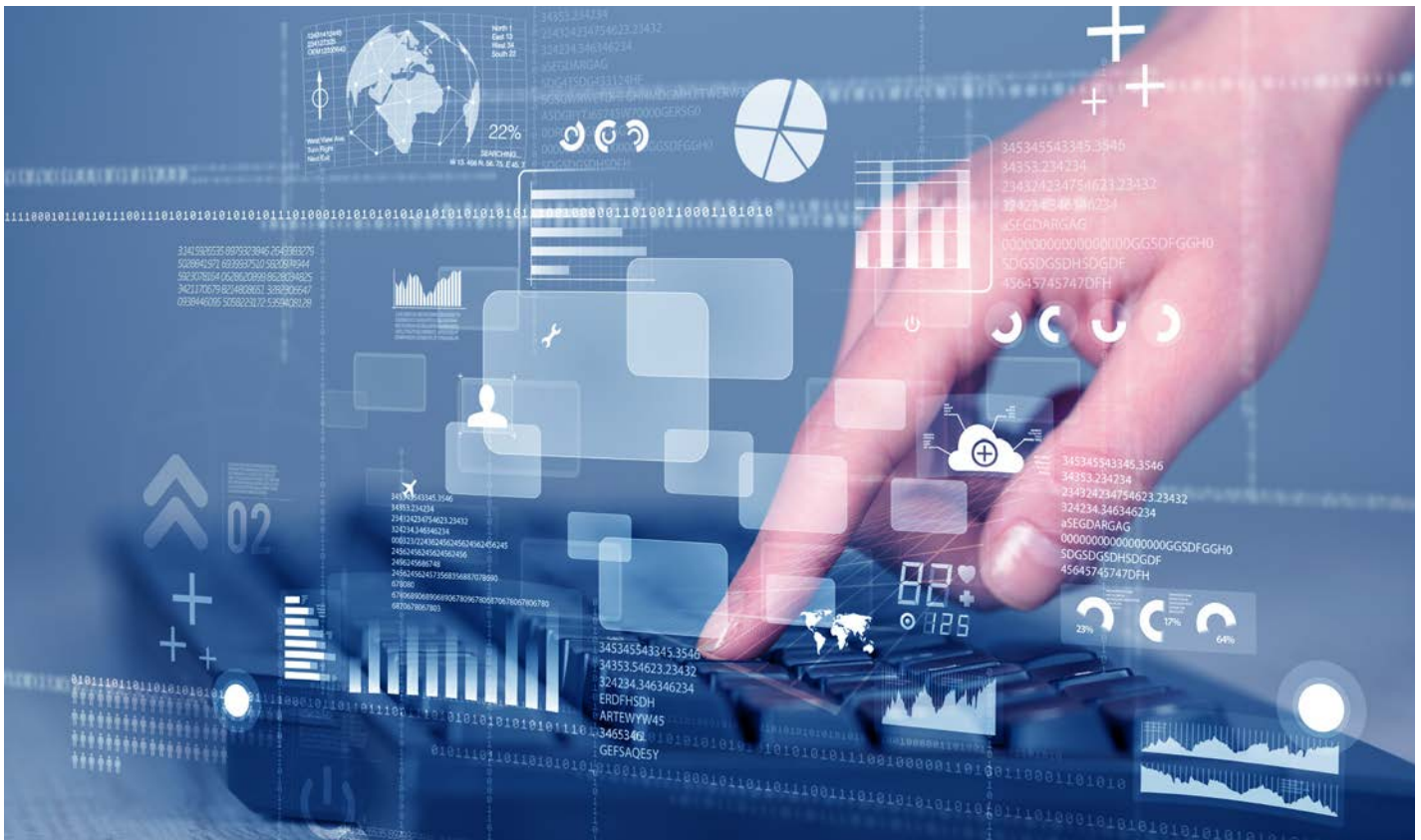
In addition to the headline numbers, the implementation details of these fund economic structures are important to understanding the true net economic impacts for a fund investor. The important nuances of infrastructure fee structures include:

- **Calculation Basis for Management Fees.** Certain structures (mainly open-ended structures) charge fees based upon fund NAV as opposed to the usual private equity model where fees are charged on the commitment amount during the investment period and on the cost basis of outstanding investments thereafter. Though such a structure can result in lower management fees early in a fund’s life and as the NAV of the fund grows so does the amount fees being paid on a percentage basis compared to the original commitment. Most debt funds are currently being structured with fees payable on capital outstanding instead of on capital committed – which also provides an incentive to the fund manager to invest quickly, though hopefully not hastily.
- **Preferred Rates of Return or Hurdle Rates.** Certain funds provide preferred rates of return for investors that are more attractive than others, while others provide for a hurdle rate that investors must achieve before the fund manager receives any carry beyond that preference.

- **Carry Calculation and Distribution Methods.** Certain vehicles that are longer lived calculate and pay carry on a valuation basis instead of a distributed cash basis and investors need to be comfortable both with carry calculations and “high water mark” or claw back provisions on these structures. Funds that charge management fees on NAV are *de facto* charging a carry through that structure.

In any negotiations concerning a limited partnership agreement, investors should seek a package of terms that accomplish an alignment and motivation to achieve the announced strategy, not just simplistically “2 and 20” or “1 and 10.” That is especially so in infrastructure fund investing and investors need to holistically review the package of terms and governance provisions that will comprise the investment relationship.

There is no single “right” or “market” fee and carry structure today for infrastructure funds; a single, uniform structure simply does not reflect the varied risk/return profiles found in various vehicles employing various strategies. Investors need to gain comfort with the investment manager and strategy of a fund on which they are performing due diligence, and they must also be comfortable with the package of terms and conditions being presented to ensure both alignment of interest between the parties and an ability to appropriately staff and execute the manager’s strategy.



The Political Environment

Because PPPs have been an important part of infrastructure investing, the governmental perception in large jurisdictions of infrastructure investment in general and PPPs in particular is also important. At the moment, there are two significant events playing out in the political sphere and a specific structural issue:

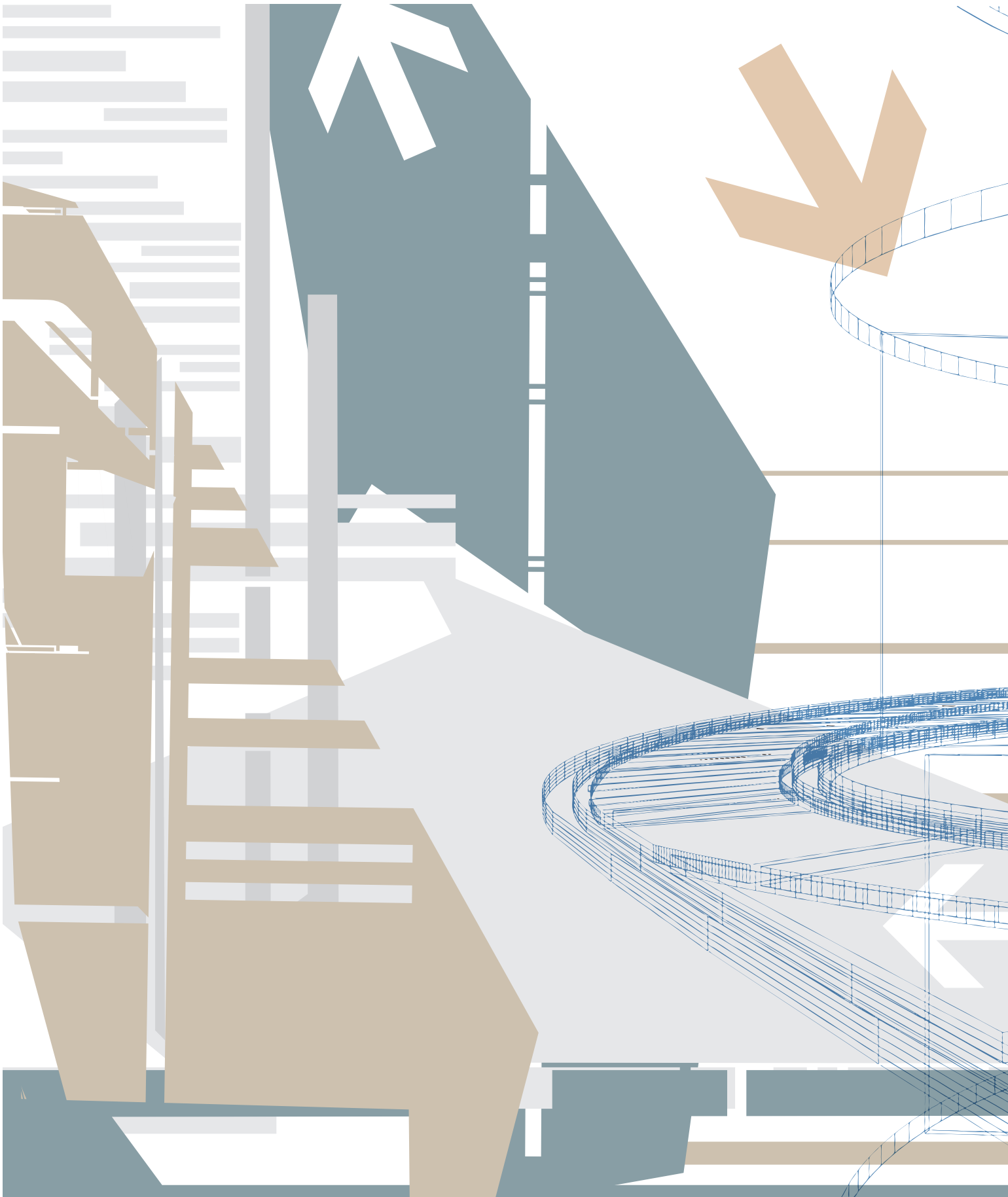
- **The UK Labour Party's Current Position on PPPs.** The UK was an early adopter of the PPP model. In 1992, the Tory led government of John Major launched the Private Finance Initiative ("PFI"), a type of PPP, to help address financing the UK's infrastructure needs. This program was expanded in 1997 under the Labour government of Tony Blair, especially targeting the concept of "value for money," bringing efficiency both to construction and ongoing operations. Though at first hailed by both major parties as successful, a number of projects have been found over the longer term to be extremely expensive, in large part because of governmental lapses in the initial project negotiation process where, in effect, too much project risk was laid-off to the government. The general British perception of PFIs because of these troubled projects has become negative. Recent statements from the head of the Labour Party lean not towards fixing the flawed negotiating process but towards eliminating PFIs entirely, which given the weakness of the Tory government, could presage real trouble for this sector.
- **The Trump Administration's Infrastructure Initiatives.** During the 2016 election campaign, Donald Trump was vociferous in his support of fixing deteriorating infrastructure in the United States, often bandying about

a figure of \$1 trillion or more to be devoted to the cause. After a year in office, an outline of a plan has been released, though the bulk of the proposal is meant to be funded by states and municipalities, many of whose budgets are still under stress. And though previously the idea has often been floated that much of the financing for an infrastructure initiative would come from the private sector, recent statements from the administration have downplayed the potential for PPPs in executing the plan.

Given this background, it is not surprising that in our 2017 survey only 17% of respondents strongly agreed with the statement "The U.S. administration's infrastructure plans will have a major positive impact on the U.S. market," while 50% felt there would be minimal impact and 33% were uncertain of how things would play out. Since the outline was released early in 2018, expectations by infrastructure fund managers has been muted.

- **The Structure of the PPP Process in the United States is Fragmented.** Most PPP programs are the purview of individual states and municipalities, not the federal government. The actual PPP process differs by jurisdiction and these local entities drive priorities and execution of most projects. The awarding of these local PPP contracts has often been fractious, with contentious debates on projects driven by local politics instead of national politics. In a few high profile cases, proposed projects were cancelled over political disputes after bids were received — and after a number of fund managers had spent time, effort and money responding to detailed requests for bids.

Most PPP programs are the purview of individual states and municipalities, not the federal government



CONCLUSION

Over the last fifteen years, closed-end infrastructure funds have moved from a niche in the alternative investment sector to an asset class of its own with an increasing number of sub-strategies to cater to investors' needs. As the years progressed, issues of standard fund structures, maturities, allocations and benchmarks have begun to clarify but remain unsettled.

The two biggest changes over the last decade have been the increasing options for investors in project stage and industry exposure and the increasing direct investment by large institutional investors, especially in core brownfield assets. Both these trends have fundamentally changed the market and will likely to continue to do so over the next decade.



INFRASTRUCTURE INVESTING: THE CLOSED-END FUND MARKET

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