



ABSTRACT

This paper explains the concept of infrastructure investing. It reviews its history, why it is of current interest, and what forms it takes. It details the benefits and risks of infrastructure investing and elaborates on the issues involved in making an investment. It focuses on private investments in infrastructure assets, primarily in developed western economies. It concludes with a recommendation that most long-term institutional investment portfolios could benefit from an allocation to infrastructure.

BACKGROUND

What is Infrastructure?

Infrastructure has diverse meanings in different fields, but for the purpose of this paper it is defined as the underlying foundation of basic services, facilities, and institutions upon which a society depends. These various elements may collectively be termed economic, municipal, or social infrastructure, or simply public works.

Public assets, such as roads, bridges, airports, parks, and hospitals, communally belong to citizens. Similarly, public services are provided to citizens by the government and financed by on-going tax revenues or user fees. Examples include: utilities, education, the postal service, the judiciary, lotteries, police and fire protection, and the military.

Investable infrastructure is the intersection of public assets and services with the private sector. Such investment often takes the form of a sale or lease of an asset by the public sector to the private sector. "Core" infrastructure has traditionally included physical assets such as roads, tunnels and bridges; seaports and airports; railroads, subways, and mass transit facilities; drinking and wastewater treatment plants, pipelines, electrical transmission and generation; broadcast and cell phone towers; copper wire and fiber optic cable; schools and hospitals. As demand for expansion, upkeep, and efficiency of public infrastructure increases, we expect the definition of investable infrastructure to expand beyond physical assets, to include projects and companies that service, support, and enhance their operations.

History

The financing of infrastructure has followed a distinct course in the U.S. While the public and private sectors have cooperated for more than two centuries in the development of America's infrastructure, there has been a shift from a greater reliance on private resources to public spending by federal, state, and local governments.

Road construction was one of the first improvements in U.S. infrastructure, yet it was not until 1806 that Congress allotted funds for the National Road, the first federally funded route which stretched from Cumberland, Maryland to southern Illinois.

The expansion of America's rail system, which began in the 1820's, was financed through joint public/private enterprise, although the majority of funding came from private sources.¹ The railroads profoundly affected geographical, demographic, social, and economic growth in the U.S., and in so doing, became the dominant element of the national transportation system for a century. In the latter half of the twentieth century, highways and airports came to represent the new transportation infrastructure, but these projects were financed largely through public sources.

Electricity (energy infrastructure) owes its origins in the U.S. to the private sector, most specifically to Thomas Edison's work in the late 1870's. From experience with both water and gas utilities, which predated the Civil War, it was determined that municipal franchises and a degree of regulation would be necessary. State regulation, exercised through rate-setting, has remained the dominant form of public oversight since it was first instituted in Massachusetts in 1887, despite many new forms of power generation and distribution having since been developed.²

In recent decades, and in contrast to much of the developed world, the U.S. has relied on federal, state, and local governments, rather than the private sector, to finance and operate large-scale infrastructure projects. Fiscal autonomy has enabled state and local governments to finance general obligations and specific infrastructure projects through a combination of tax increases and the issuance of municipal bonds. Since municipal bonds are tax-exempt at the federal and often state level, they can provide a lower cost of capital for project financing. The tax-exempt status of municipal bonds, combined with their relatively low default rates, offers citizens an incentive to invest in local infrastructure projects and, in so doing, has provided governments with an economical, reliable, and deep pool of capital from which to borrow. Many state and local governments have taken advantage of their high degree of fiscal autonomy by investing in their capability to design, build, and operate infrastructure projects.

While the public finance model is not likely to disappear, it has faced increasing pressure in recent years. Widespread budget deficits on the state and municipal level have limited the ability of governments to issue bonds to finance new infrastructure and to invest in the management and upkeep of existing facilities. Adding to a government's debt burden may result in a rating downgrade, which would lead to a higher cost of debt. The downturn in the housing market exacerbated the budget conditions of local governments, since property and real estate taxes are critical sources of revenues.

The credit crisis has also demonstrated how volatile and costly the sole reliance on municipal financing can be for a diverse range of public issuers. Wisconsin school districts, the Massachusetts Turnpike Authority, and the Metropolitan Transit Authority of New York City are just a few issuers that have been struck with unanticipated costs related

¹ Source: Amy Friedlander, *Emerging Infrastructure: The Growth of Railroads*, 1995.

² Source: Amy Friedlander, *Power and Light: Electricity in the U.S. Energy Infrastructure, 1870-1940*, 1996.

to the utilization of complex bond financing structures.³ Further, municipal bond financing comes with a range of restrictions, including the type of project that may be financed and the specific uses of bond proceeds.

Local governments no longer have the capacity to meet existing or anticipated obligations without either increasing taxes or user fees, or cutting services. In addition to the political risks of either option, there is concern that an imposition of either of these could impair economic activity or result in an exodus of tax-paying businesses and employees from their jurisdictions. These conditions have only put greater pressure on local governments to seek out funding and operational alternatives.

The Private Financing Alternative

Of the major English-speaking countries, the U.S. has been among the last to bring together private sources of capital and operation with public oversight of infrastructure facilities. Private financing, through various programs, became commonplace in the U.K. during the Thatcher administration of the 1980s and later spread to Australia and Canada. Outside the U.S., private financing was driven by the convergence of several conditions, including widening budget deficits, problems related to the accountability of public agencies, and the appeal of infrastructure as an asset class to institutional investors.

The private sector can play different roles in an infrastructure transaction. While “privatization” and “public-private partnership” (P3) are often used interchangeably, there are key differences between them.

- **Privatization** - The lease or sale of a government asset to a private sector company that bears the operating risk. As a party to the transaction, the government entity nevertheless retains oversight and certain rights over the operation of the asset. Some examples from the U.S. include the privatization of the Chicago Skyway, the Indiana Toll Road, and the proposed lease of Midway Airport. Privatization can also occur between two private entities, as is often the case with utility or waste treatment companies. Even fully privatized infrastructure facilities, such as those owned by utility companies, must conform to applicable regulatory standards.
- **Public-Private Partnership (P3)** - A government body engages the private sector in the financing and operation of a public infrastructure facility. While the degree and nature of private participation can vary, in a P3 the public sector retains some exposure to operating and financing risks, often in the form of debt obligations. To date, P3's have been a preferred method of operation in Canada, and are most common among new development, or “greenfield,” projects. Many states in the U.S. are in the process of approving or have already approved P3 legislation.

³ Source: “From Midwest to M.T.A., Pain from Global Gamble,” New York Times, 11/1/2008; “MassPike Swap Payment a Looming Threat,” The Bond Buyer, 1/14/2009.

Both privatization and P3's are typically structured using a long-term lease or concession.⁴ In the basic lease structure, the state or local government retains ownership of the asset (e.g., road) but a private company operates it and invests in improvements for a specified time period, often between 20 and 99 years. The government turns over daily operations to the concessionaire, yet since the asset is not sold outright, the public maintains some level of oversight (similar to a Board of Director's role in a public company). Once the lease term has expired, or if the operator does not meet the terms of the concession agreement, the asset is returned to the owner. It is worth noting that relatively few privatizations or P3's in the U.S. involve the outright sale of the asset. Approximately 80% of the transactions represent long-term leases or similar contractual agreements⁵.

Partnership with the private sector can bring numerous advantages to governments. Unlike federal or municipal debt financing, private financing enables governments to use limited public resources more effectively by outsourcing the costly maintenance of critical infrastructure, as well as the risks of operation and financing, yet without relinquishing ultimate control of the asset or service. While many countries have adopted standardized concession agreements, the specific obligations of the private sector participant can be structured in the contract to ensure that public interest is protected. Private capital may also afford governments greater financial flexibility. Much like corporations that use operating leases as a form of off-balance-sheet financing, lease agreements with private entities commonly provide governments with an up-front cash payment. These payments may be used to support other economic or social initiatives, fund reserves and other "rainy day" accounts, or to finance new infrastructure projects.

While there is only a limited track record for measuring the efficiency, or "value for money," of private financing in the U.S., data from the U.K. are generally favorable. A 2003 study found that just 8% of major Private Finance Initiative (PFI) projects in the U.K. were delayed by more than two months, and in every case the public sector paid what it had expected to pay.⁶ In comparison, use of the traditional public financing methods resulted in delays among 70% of projects, and budget overruns among 73% of projects.⁷ It is also reasonable to expect a stronger alignment of interests of various parties. For example, the private operator of a toll road is focused on maximizing revenues within the terms of the concession agreement, rather than re-election. Similarly, the private sector is more likely to have experienced and qualified managers who are both able and incentivized to create operating efficiencies. Since private operators are held to conditions and performance benchmarks outlined in the concession agreement, failure to adhere to the terms of an agreement can result in the transfer of the asset back to the public entity.

⁴ A concession is a business operated under a contract or license associated with a degree of exclusivity. In the case of a public service concession, a private company (the concessionaire) enters into an agreement to have the exclusive right to operate, maintain and carry out investment in a public asset for a pre-specified number of years.

⁵ Source: RREEF Research.

⁶ Private Finance Initiative is a form of public private partnership common in the U.K.

⁷ Sources: PFI: Construction Performance, National Audit Office (U.K.), 2003; Infrastructure procurement: delivering long-term value, HM Treasury (U.K.), March 2008.

The demand for alternative sources of financing has coincided with a growing appetite for infrastructure investment among institutions such as pension funds and insurance companies. Macquarie Bank in Australia is perhaps the pioneer of institutional investing in infrastructure, conducting their first deal in the early 1990's. While Macquarie and other sponsors offer listed funds suitable for retail investors, the primary sources of capital for infrastructure are pension plans. Around the world, these sizeable pools of institutional assets, such as Australia's superannuation system and several of the larger Canadian and European pension plans, have invested in infrastructure for more than a decade. These funds view infrastructure as a separate asset class, with distinct income, return, risk, and correlation characteristics. Plan sponsors are now key investors in toll roads in Australia, Portugal, the U.K., and Canada, and the Rome, Sydney, Budapest, and Taipei airports, just to name a few. Canada has been at the forefront of public-private partnerships in North America. In 1999, the 407 toll road outside Toronto was acquired by a consortium that included Macquarie and Cintra, a Spanish firm that specializes in toll road operation. The 407 remains one of the highest grossing toll roads in North America.⁸ In addition, the social and political benefits associated with infrastructure development make for a natural fit with many public and labor-union pension funds.

Despite the successful track record of P3's and privatization, it was not until 2005 that a major public infrastructure asset was privatized in the U.S., with the \$1.8 billion, 99-year concession agreement reached that year by the City of Chicago to privatize the 7.9-mile "Skyway." This transaction was followed by the privatization of the adjacent 157-mile Indiana Toll Road in 2006, for \$3.85 billion, in exchange for a 75-year operating lease. Macquarie and Cintra partnered on both of the concessions.

The institutional investment landscape in the U.S. has also begun to change. Facing growing funding obligations, public and private pension plans are showing greater interest in alternative investments, and are supplementing or substituting fixed-income allocations with investments that have similar attributes yet with higher returns. This has led many of them to infrastructure. Over the past few years, many of the larger public funds have increased allocations to infrastructure to 5% or more of their total portfolios.

WHY IS INFRASTRUCTURE INVESTING BECOMING POPULAR?

A confluence of factors has brought infrastructure investing to the forefront for governments, the general public, and investors. Primary among them are governments' need to maintain existing infrastructure and provide additional services while working under increasingly tight budgetary constraints, along with growing investor interest in diversifying away from traditional stocks and bonds while finding reliable sources of long-term returns.

⁸ According to 407ETR, toll road revenues increased by approximately 5% in 2008.

The Need for Infrastructure Investment

The bulk of existing infrastructure is concentrated in developed markets. According to RREEF, the global infrastructure market has a value of approximately \$20.5 trillion, of which 83% is concentrated in the developed world, and the remainder is in emerging markets (see the following table).⁹ The level of infrastructure in the U.S. is by far the largest in the world.

Cumulative Investment in Infrastructure

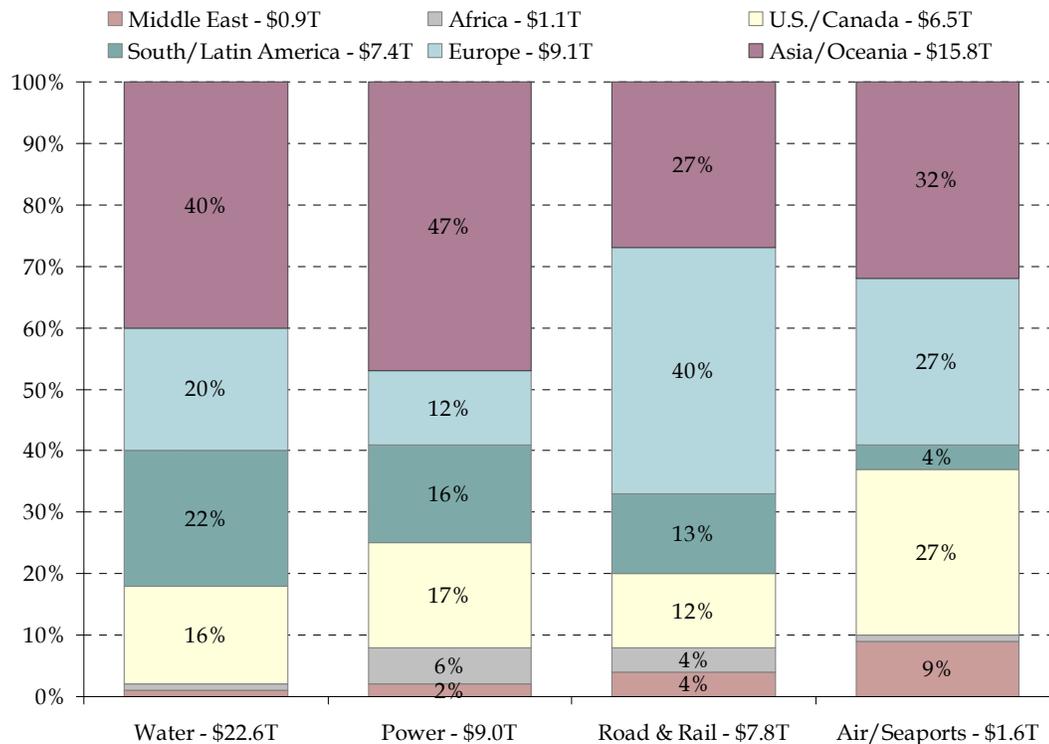
Country	\$ in T	Country	\$ in T	Country	\$ in T
U.S.	6.1	France	1.1	Canada	0.6
Japan	2.0	U.K.	1.0	Italy	0.5
Germany	1.5	China	0.8	Spain	0.5

Source: RREEF Research, "Estimating the Size of the Global Infrastructure Market" (2008)

While staggering in size, the value of existing infrastructure is dwarfed by demand for new investment. One recent study estimated the global demand for infrastructure at \$41 trillion.

Total Projected Cumulative Infrastructure Spending 2005-2030: \$41 Trillion

(Shown in dollars and as a percentage both by region and industry)



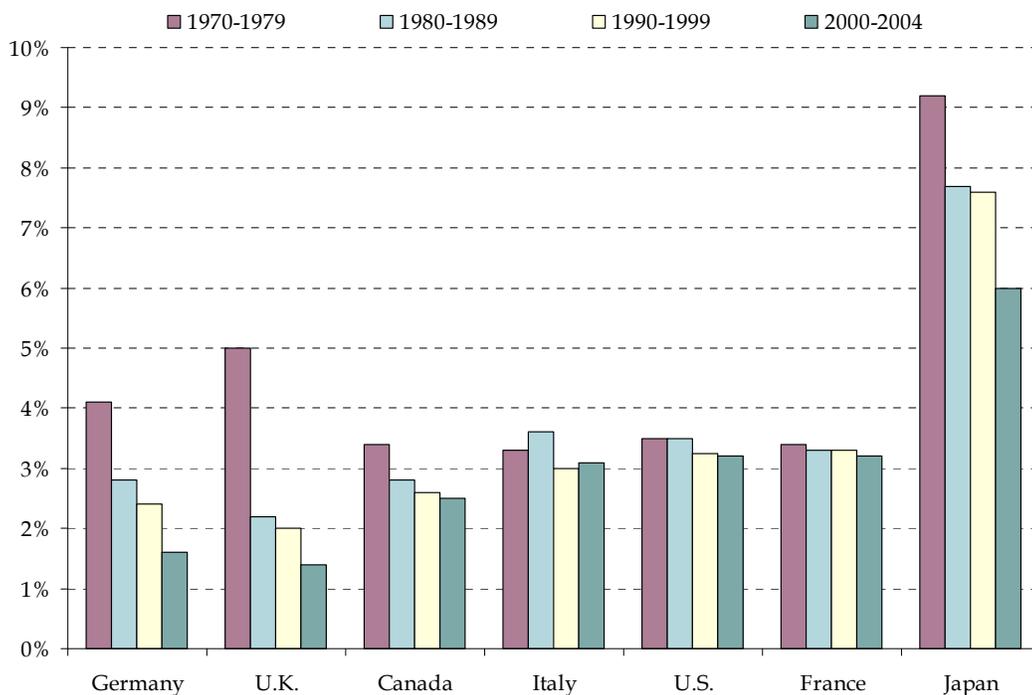
Source: Booz Allen Hamilton

⁹ RREEF uses two different methodologies to arrive at this estimate: an estimation of the total capital stock of infrastructure projects and infrastructure stock as a percentage of GDP.

According to Organization for Economic Co-operation and Development (OECD) estimates, 2.5% of global annual GDP will need to be spent on roads, rail, power transmission and distribution, water, and telecommunications between 2007 and 2030. Over the same period, an additional 1% of annual GDP is required just for increasing power generation capacity. It is worth noting that key sectors such as ports and airports were excluded from the study.¹⁰

Unlike emerging and middle market countries, where demand for infrastructure is driven by rapid economic expansion, swelling populations, and ever rising expectations of indigenous middle classes, much of the developed world has suffered from declining investment in its existing infrastructure base. The following chart, which covers a 35-year period, depicts how governments in many western economies have been spending a decreasing amount of their budget on infrastructure since 1970.

General Government Gross Fixed Income Investment in Transportation Infrastructure
(Period averages shown as a percentage of GDP)



Source: OECD, *Public Services and Infrastructure: Tracking the Improvements* (2005)

In the U.S., the widening infrastructure gap made headline news following a number of failures of major public facilities, such as the fatal collapses of a tunnel ceiling in Boston in 2006 and the I-35 bridge in Minneapolis in 2007. The most recent “report card” prepared by the American Society of Civil Engineers gave the overall condition of U.S. infrastructure a “D” and estimated the five-year need for investment in infrastructure within the U.S. at \$2.2 trillion.¹¹

¹⁰ Source: OECD, *Infrastructure to 2030* (2007).

¹¹ Source: ASCE 2009 Report Card for America’s Infrastructure (2009).

The Congressional Budget Office (CBO) has reached a similar conclusion. Although annual spending on transportation infrastructure, by far the largest line item, is already more than \$100 billion, the CBO estimates that an additional \$20 billion would be needed just to maintain the current level of transportation service, and that substantially more spending would be justified before the value would exceed spending. Spending on aviation, rail, and drinking and wastewater treatment would likewise require significant increases in investment just to maintain current levels of service.¹² As the quality of infrastructure in the U.S. has declined, so too has spending on infrastructure as a percentage of GDP.

Policy Agendas

The increased attention to infrastructure can also be attributed to the intersection of public works projects with a range of other agendas. The authorization of the Interstate Highway System under President Eisenhower, still the largest highway system in the world, was conceived as a national security project to enable the movement of troops and military equipment across the country. Yet the highway system has served many other agendas, including the evacuation of entire regions during natural disasters and catalyzing local economic development.

Improvements to the nation's transportation network not only help to relieve costly congestion, but provide greater access, flexibility, and opportunity to job seekers. Infrastructure investments allow institutions to address important public policy issues in key areas such as energy, social policy, and transportation. New spending on more efficient energy and transportation systems can reduce energy costs as well as carbon dioxide and other harmful emissions. Private capital can be used to renovate or build hospitals, schools, courthouses and other public facilities. The potential for major investment in local infrastructure is a welcomed prospect for communities around the U.S.

Jobs and Labor

While politicians may seek to justify infrastructure spending as a means to accomplish a variety of policy initiatives, not all investments yield the same results. This is especially the case in the complex areas of job creation and labor conditions. Investment in projects that utilize new technology, materials, and are driven by innovation can spur job creation by providing opportunities to businesses that support these projects. Similarly, greenfield projects generate jobs during the construction period but also provide employment opportunities that remain after a project is completed. In contrast, projects that are comprised solely of construction, and not innovation or new development, require increasing the workforce for short periods of time but rarely translate into a source of sustainable employment. Some job-seekers may appreciate even temporary employment, but job insecurity will limit their ability to participate in the growth of the economy through consumption and investment. In general, private capital, rather than government subsidies, has had a better track record of promoting innovation and adding sustainable jobs to the workforce.

¹² Source: Congressional Budget Office, "Current and Future Investment in Infrastructure" (2008).

Still, there is a common perception by some public employees and private unions that privatization or P3's will lead to a loss of jobs. It is not unreasonable to expect that new, private management of a public facility will look for ways to reduce costs, including labor costs. However, partnering with the private sector does not necessarily have to result in an adversarial transaction, and labor concerns can and should be mitigated in a properly structured concession agreement. For example, a new operator can offer employment on the same terms to all existing employees. If, however, the operator is inclined to reduce labor costs, it would likely seek to reduce the workforce through natural attrition.

As the construction industry stands to benefit from additional infrastructure investment, most building trade unions have thus far expressed support for investing private capital in infrastructure projects. Several of the largest unions have reached out on a national level to many of the infrastructure funds coming to market and encouraged them to adopt a Responsible Contractors Policy,¹³ and this outreach program has been successful. Further most of these same unions have invested their (mostly pension) capital in infrastructure funds that have adopted RCP language.

An Influx of Managers and Operators

Finally, demand for infrastructure investment has catalyzed fundraising among a range of managers, including both established infrastructure fund groups and new entrants to the market. The number of unlisted funds in the market grew from just six in January 2006 to more than eighty in January 2009. Approximately \$93 billion was raised by infrastructure funds between 2005 and 2008. This figure is poised to grow rapidly, as the funds in the market in early 2009 were seeking to raise an additional \$90 billion, of which roughly one-third was targeted for the U.S. market.¹⁴

The burgeoning U.S. infrastructure market has also gained significant attention both from foreign investors and project operators. As mature markets outside the U.S. have reached saturation, the opening of the U.S. market is viewed as an opportunity to diversify sovereign exposure in a market with relatively little political risk and enormous growth potential. A number of new infrastructure funds based outside the U.S. have stated their intent to allocate portions of their capital to U.S. investments. Similarly, project operators with decades of experience constructing and operating large infrastructure assets globally are actively bidding on transportation, energy, and social infrastructure projects across the U.S.

¹³ A Responsible Contractors Policy (RCP) is designed to guide the selection of independent contractors and subcontractors who provide construction, repairs, maintenance, and infrastructure operating services. Among the guiding factors outlined in the Policy are usually compliance with applicable statutes and payment of "fair" compensation and benefits to employees.

¹⁴ Source: Prequin (2009).

TYPES OF INFRASTRUCTURE INVESTMENT

The infrastructure asset class includes a range of sub-sectors, stages of investment, and geographic regions. While the combination of individual factors can offer distinct risk/return characteristics, infrastructure investments share several basic features that make them attractive to institutional investors. Infrastructure investing typically involves investing in assets where the ability for competitors to enter the market is highly constrained by either capital costs or governmental control, resulting in natural barriers to entry. Further, most infrastructure assets involve very long-term contracts to provide necessary services for extended periods (e.g., twenty years or more).

Infrastructure Sub-Sectors

A more comprehensive list of infrastructure sub-sectors can be found in Appendix 1; here we provide an overview of some typical investments that fit the definition of core infrastructure: roads, airports, and utilities.

Roads

Investment in surface transportation typically involves the lease or sale of a concession to a private company or consortium to operate a road, bridge, or tunnel, in exchange for the revenues generated by toll collection. Concessions may also be awarded for development or expansion projects. After the end of the concession period, which can range from 20 to 99 years, the lease can be extended or the asset may be returned to the public sector.

Toll roads can make attractive long-term investments because the cash flows tend to be stable and reliable, due to the predictability of traffic volumes. Further, concession agreements often preclude construction of alternate routes, which limits direct competition. There are also opportunities to increase revenues. Increasing traffic flow by introducing “zipper” lanes, high occupancy toll lanes, electronic tolling, or raising speed limits, tends to generate higher toll revenues. In addition, concession agreements typically allow operators to raise tolls in line with the greater of GDP or CPI. Such options are available to public authorities as well, but most often they do not find the necessary support, perhaps because politicians have an incentive to focus on the short-term cost of implementing these changes rather than the long-term benefit from doing so, or they are unwilling to support politically unpopular toll increases.

Of note, only a small percentage of U.S. toll roads are currently in private operation or were funded through private capital. For example, between 1992 and 2008, just 14.1% of all improvements to U.S. toll roads used some form of P3. These improvements include greenfield extensions, widening of existing routes, and addition of High-Occupancy Toll (HOT) lanes.¹⁵ However, fiscal pressures and greater involvement from investors, road developers and operators are expected to increase P3 activity in the U.S.

¹⁵ Source: Current Toll Road Activity in the U.S.: A Survey and Analysis, U.S. Department of Transportation (2009).

Airports

Airports represent another attractive investment as they offer stable and predictable demand with resilience to shocks. Over the past 20 years, international passenger growth has, on average, exceeded GDP growth.¹⁶ Like toll roads, most airports face limited direct competition in the same market. Despite the fact that privately operated airports are commonplace outside the U.S., since Congress authorized the Airport Privatization Pilot Program in 1996, only Stewart Airport in New York was privatized, but it has since left the program. Midway Airport in Chicago has received approval for privatization, but the deal still requires approval from the Federal Aviation Administration.

Traffic growth is a key driver of airport revenues. Traffic growth drives revenues in two ways. The first is through fees related to the basic operation of an airport, including terminals and runways. Second, commercial concessions, such as retail shops and parking garages, are a growing component of airport revenues. New airport concessions often include rights to develop real estate surrounding the airport, which can be used for ground transportation links, office space, hotels, and shopping centers. Forecasts indicate that traffic growth will continue to increase slightly ahead of economic growth. Worldwide passenger traffic grew in 2007 by approximately 7%, and between 2008 and 2025, the number of domestic passengers is expected to grow by 4.7% annually, and international passengers by 4.9% annually.¹⁷

Regulated Utilities

A substantial portion of the infrastructure opportunity set involves regulated utilities, such as gas, electricity, and water. For example, just five percent of the roughly 54,000 publicly-owned water and wastewater systems in the U.S. contract their operations with private firms.¹⁸ Regulated assets are monopolistic by definition. Hence, there will be no direct competition eroding a utility company's customer base. Utilities also possess what economists call *low demand elasticity* (i.e., consumers will be highly reluctant to have their water or power turned off).

When a regulator determines the rate a utility can charge customers, the established standard is to provide the utility a "fair" return on its capital, which includes a full recovery of its costs, such as capital expenditures. This provides for relatively stable and predictable cash flows and rates of return to investors. Further, the regulating bodies generally include inflation as one of the factors in the formulas they use to evaluate how much a utility can increase their rate (i.e., a rate case), thus providing a built-in inflation hedge. Though private utilities face challenges as a result of regulation and unequal tax treatment versus publicly-owned systems, these challenges can be surmounted and returns enhanced by increases in efficiency and reorganization of a utility or its units.

¹⁶ Source: International Air Transport Association.

¹⁷ Source: Airports Council International; Federal Aviation Administration.

¹⁸ Source: Leonard C. Gilroy and Adam B. Summers, "Detailing Foreign Management of U.S. Infrastructure," Reason Foundation (2006).

Stage of Investment

The stage at which an investment is made is a key determinant of the risk as well as potential return for investors. Infrastructure projects are commonly separated into one of two stages, though some projects will possess elements of both.

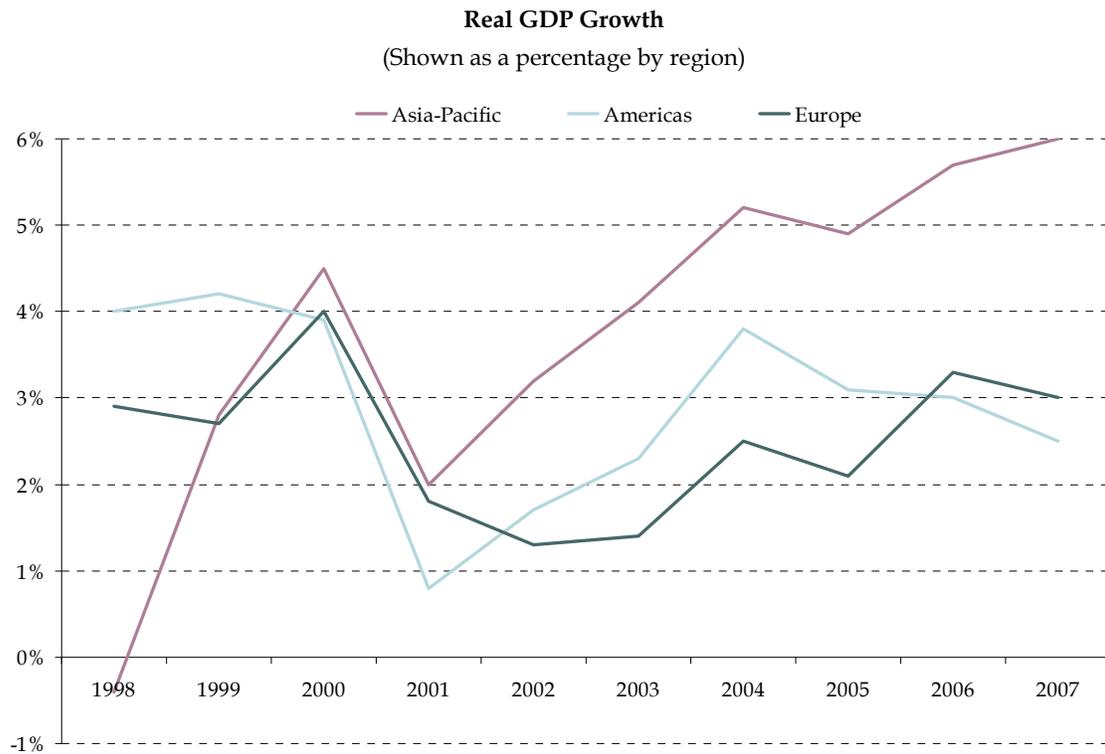
Greenfield projects are new infrastructure projects that typically require development, construction, financing, and operation. The scope of a greenfield project requires a significant initial outlay of capital, as well as the successful management of one or more stages to bring a project to completion. The stages involved in a greenfield project may include siting and permitting, designing, regulatory approvals, financing, construction, and operation and delivery of service. The complexity of new development projects can lead to delays and budget overruns. And, unlike existing projects which may possess long operating histories, greenfield projects rely solely on less reliable forecasts to predict operating costs and user demand.

Brownfield projects consist of investment in existing infrastructure assets with demand patterns that have been tested and whose capital expenditures will primarily be for ongoing maintenance. Examples include the ongoing operations and upkeep of an existing road, airport, or utility. The operator may seek to improve the asset by creating operating efficiencies, increasing revenues, or reducing expenses. Investments in existing infrastructure assets tend to offer more modest returns to the investor in exchange for a lower risk profile.

Geographic Regions

Infrastructure investment has become a truly global opportunity. The Chicago Skyway and Indiana toll road concessions, for example, brought Australian capital and Spanish operating expertise to the American heartland. Infrastructure investors now may choose among funds targeting investments in single countries, regions (e.g., North America, Europe, Middle East, and North Africa, Asia), or global funds. Due to the participation of global investment banks and project operators, as well as multilateral agencies, many aspects of a road project, whether in Thailand, Germany, or Indiana, will share similar development, construction, and operating features.

Nevertheless, differences in growth rates, business cycles, and regulation across geographic regions persist, offering investors the ability to diversify political, economic, and currency exposures, as well as risk and return characteristics. The following chart, which displays the growth rate over a ten-year cycle for Asia, Europe, and the Americas, demonstrates that the business cycle is not perfectly correlated around the world. It also implies that there is a benefit to having a globally diversified portfolio.



Source: RREEF Research, Global Insight (2008)

BENEFITS & RISKS

Benefits

Infrastructure assets normally possess a strategic competitive advantage, commonly in the form of high barriers to entry. These barriers include new development costs, geographical impediments (i.e., limited usable space), and exclusive government contracts. The quasi or full monopoly status granted (and regulated) by the government can protect revenues from competition.

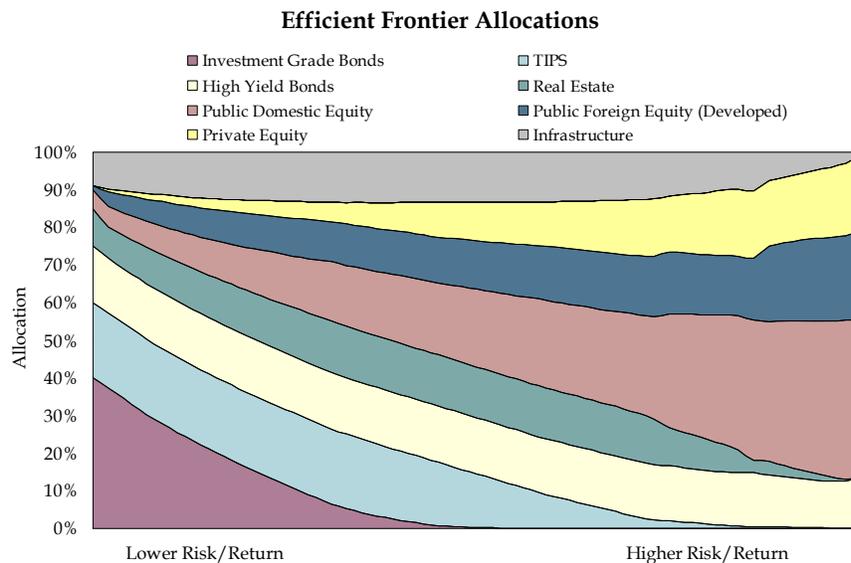
Infrastructure assets also tend to produce a stable stream of income that rises over time. For example, the traffic on a toll road or at an airport will be tied to the health of the economy over the long term, but will vary only slightly in the short term. Once traffic and revenue patterns are established, they tend to be remarkably predictable. Finally, the essential nature of most infrastructure assets ensures their continued use even in weaker economic periods.

Infrastructure concessions are long-term in nature and entitle the concessionaire to the cash flows for the life of the contract. Long-term contractual revenue streams give infrastructure assets similar characteristics to coupon payments on bonds, and they allow for long-term liability matching by plan sponsors. Yet unlike fixed-rate bond investments, many infrastructure assets also provide inflation protection. Infrastructure tends to consist of tangible assets whose replacement costs increase with inflation, thereby protecting their value. In addition, the source of revenues generated by many infrastructure assets are either

explicitly or implicitly linked to inflation, such as rate case settings for utilities or toll rate settings for road concessions.

Despite the heavy debt burden required for most infrastructure investments, there is sufficient data to support the manageable financing of these projects. The data represent that very few infrastructure projects enter financial difficulty, and those few that do exhibit far higher recovery rates than other forms of investment financing, such as corporate bonds.¹⁹

The return characteristics for infrastructure make it an appealing asset class from a mean-variance optimization standpoint. As the following chart implies, an efficient portfolio would target ten percent or more toward infrastructure for all but the most aggressive portfolios. While the expected return depends on the specific sub-sector, investment stage, and geographic region, infrastructure is generally accepted as providing a higher return than core real estate and fixed income. Indeed, infrastructure returns could be expected to be in line with equities, though they involve less risk. Certainly, infrastructure represents one of the higher returning asset classes available to plan sponsors. Given its relatively high return, positive risk-return trade-off, and low correlation with other major asset classes, infrastructure should play a role in most plan sponsors' portfolios. We explore the expected return characteristics for infrastructure in a later section.



¹⁹ According to Standard & Poor's, the long-term median annual default rate on project finance loans is between 2% and 3%. Source: "Project Finance Consortium Study Reveals Credit Performance Trends since the Early 1990s," Standard & Poor's (2007).

Risks

Political and Regulatory Risk -- All infrastructure facilities are financed and operated in specific political and regulated environments, which subjects them to a range of related risks. These risks can take numerous forms. For example, changes in regulation and policy, or shifting political agendas or cycles, can have a significant impact on the operating viability and revenue generation of an infrastructure asset. Since most infrastructure assets are leased using long-term contracts, these contracts must be structured to endure unforeseen changes. In the U.S., individual states have the authority not only to create, but also to amend or repeal legislation that allows for the use of private operators of infrastructure or of private investment. To date, U.S. road privatization transactions have consisted of upfront, lump sum payments to a government, yet they are binding concessions for upwards of 99 years, which in many cases is far longer than the operating history of the road. The terms of such a contract today may seem inappropriate or simply unpalatable to future government bodies.

Governments also have the right to restrict foreign ownership of domestic assets, or to nationalize assets that are currently in foreign ownership. In countries with weaker political and legal traditions, issues with transparency and political stability can undermine the credibility or viability of a concession agreement. Hence, successful contracts should take the range of possible outcomes into consideration upfront.²⁰ Many contracts include a "termination for convenience" clause that requires the government to re-purchase the asset at its fair market value (plus a penalty in some cases) if it decides to terminate the contract prematurely. Of course, contract terms are more likely to be enforced in countries with stable governments, established property rights, and rule of law, such as the U.S.

Investors can mitigate political risk by taking steps to align their interests with foreign governments. Investment in local currency and through partnership with local entities (e.g., banks and construction firms) strengthens the alignment of interests, and marketing and education can be valuable tools to mitigate public concerns such as displacing workers, loss of oversight, foreign ownership, higher user costs, and maintenance and safety. For example, the prospect of a Middle Eastern-based company assuming responsibility for several high profile U.S. ports caused a political uproar in 2006. Yet, it was not widely reported that approximately 80% of U.S. ports were at that time leased and operated by foreign companies.²¹ Further, the local port authorities remain the actual owners of the assets and the responsibility for security at these ports lies with U.S. security officials, including the U.S. Coast Guard.

Illiquidity and Valuation Risk -- Private market investments, and those in infrastructure in particular, tend to be illiquid. Without a deep and actively traded secondary market, plan sponsors should expect the bulk of their commitment to be tied up for five to ten years. In addition, infrastructure investments tend to be both lumpy and non-standard in size, which

²⁰ Source: Ryan J. Orr, "Living Agreements for a Risky World," Harvard Business Review, (2006).

²¹ Source: Leonard C. Gilroy and Adam B. Summers, "Detailing Foreign Management of U.S. Infrastructure," Reason Foundation (2006).

make them even more difficult to trade and to value accurately. Assets are usually valued on a discounted cash flow (DCF) basis, sometimes using third-party cash flow projections. As there is a limited secondary market and many of these assets are unique, there is a scarcity of market comparables for valuing these assets. The best means of determining an accurate value is the sale or “exit” of the asset to a third party. Finally, it is worth noting that valuations from a fund manager are typically not available until well after the valuations for public market portfolios, thus presenting a drawback from the administrative and accounting perspectives. To bring the valuation of private market assets more in line with that of publicly listed assets, the Federal Accounting Standards Board issued Statement Number 157 (“FAS 157”), which introduced standard definitions of fair value and valuation techniques.²²

Financing Risk -- Infrastructure projects typically utilize high degrees of leverage. With the percentage of debt ranging from 50% to 70% of enterprise value on new or more speculative projects to upwards of 80% to 90% on mature assets, the cost of debt financing can have a significant impact on profitability. As with any investment, the more leverage a project uses, the more it is subject to non-financial conditions, as losses will be magnified. However, the structure of the debt employed can often present a greater risk than the percentage of debt alone. From 2004 to 2007, fixed-rate long-tenor bonds, which were previously a common source of debt in U.S. infrastructure transactions, were replaced with increasingly complex and financially-engineered structures. The aggressive use of debt in these transactions enabled a range of objectives that were not necessarily aligned with the operations of the underlying asset, such as financial closure on the deals or the payment of up front, lump sums to public sponsors. In certain cases, these structures put added stress on project operations and left both investors and sponsors exposed to refinancing risks.²³ In addition to project-level leverage, plan sponsors also must pay attention to debt that is incurred by the fund itself to pay distributions to investors.

There are a number of other risks related to the ongoing operation of an asset. The public purpose of infrastructure exposes project sponsors to *litigation risk* stemming from structural deficiencies resulting in severe losses or liabilities, while *Force Majeure* (“Acts of God”) such as catastrophic weather (e.g., hurricanes, ice storms, earthquakes) and terrorism, may result in unrecoverable damage and loss of revenues. Greenfield projects introduce *development* and *construction risk*, related to siting and permitting, or cost and time overruns. *Business* and *operational risks* stem from the long-term nature of most concessions, which introduces uncertainty about future usage and costs. Despite robust traffic volume studies and usage data, revenues may come in below assumptions, or costs above assumptions.

²² Among the biggest changes is the requirement that General Partners value assets in line with the price expected in an orderly market sale, rather than holding them at cost. As a result, valuations will likely be less “stale,” as GP’s will be inclined to adjust the value of portfolio assets to reflect market conditions.

²³ Sources: “The Changing Face of Infrastructure Finance: Beware the Acquisition Hybrid,” Standard & Poor’s (2007); and Jacques Bertran de Belanda, “Infrastructure Acquisition Finance: An Encounter of the Third Kind?,” Infrastructure Journal (2007).

Many of the risks described above are not necessarily unique to infrastructure, and experienced investors and operators have tools to mitigate them. The key question for plan sponsors is whether the benefits of the asset class sufficiently offset these risks.

A DISTINCT ASSET CLASS?

When considered as an asset class, infrastructure exhibits certain characteristics of both private equity and real estate. Most infrastructure transactions occur in the private markets, making them illiquid and distinct from public market assets. Second, infrastructure transactions use an amount of leverage that is somewhat comparable to that of private equity and real estate transactions. Depending on the specific sub-sector, some infrastructure assets behave more like private equity investments, while others behave more like real estate. For example, utilities operate very much like any other private company with a broad customer base, seeking to reduce operating costs and enhance revenues. On the other hand, airports more closely resemble real estate, as they include a substantial underlying (hard) asset and generate revenues from a tenant base that should resemble the steady income received from highly leased real estate investments.

However, infrastructure is distinguished from these (and other) types of investments by the relative stability and predictability of the asset class. While infrastructure assets share some characteristics with other asset classes, most infrastructure assets possess several basic features that make them distinct from more conventional assets, including:

- **Monopolistic positioning** - legal or business-related barriers to entry
- **Inelastic demand** - essential nature of services creates predictable demand
- **Long-term operating contracts** - concessions between 20 and 99 years
- **Stable yields** - contracts offer long-duration cash flows
- **Inflation-linked revenues** - regulatory bodies often provide inflation and cost-based revenue increases

Correlation

One of the most attractive features of infrastructure investments is the relatively low correlation they exhibit with other asset classes. Like equities and other generative assets, infrastructure returns will be linked to economic growth over the long term. But the similarity to public equity returns stops there. Public market assets like stocks and bonds are subject to significant short-term volatility based on many factors, only some of which affect infrastructure assets. Infrastructure assets should be less susceptible to business cycles or commodity prices than most business enterprises. Infrastructure will perhaps be most highly correlated with real estate or high yield bond returns over the long term, given the large income component inherent in each. However, infrastructure should be only modestly susceptible to the boom and bust cycles that have historically affected real estate, and the credit cycles that drive the returns of high yield bonds will likely also have a muted impact.

One study found a relatively low correlation of U.S. infrastructure to U.S. real estate (correlation of 0.28) or REITs (correlation of 0.23) from 2000 to 2006.²⁴ Interestingly, this study also found that while U.S. infrastructure had a significant correlation to foreign infrastructure (correlation of 0.53), the level was still low enough to offer U.S. plan sponsors opportunities to diversify through exposures to the relatively mature European and Australian infrastructure markets.

Returns and Volatility

The expected return behavior also distinguishes infrastructure investments from other asset classes. In the absence of a readily available benchmark for private market infrastructure, it is difficult to measure the historic performance of the asset class. However, several studies have collected return information on select segments. The results are displayed in the following table.

Investment Category & Period	Annualized Return
1996 - 2005:	
European private infrastructure funds	12.5%
European listed infrastructure funds	14.3
<i>European public equities</i>	12.6
<i>European government bonds</i>	7.2
1995 - 2006:	
Australian private infrastructure funds	14.1%
Australian listed infrastructure funds	22.4
<i>Australian public equities</i>	12.9
<i>Australian government bonds</i>	7.2

Source for European data: RREEF Research.

Source for Australian data: Peng, Hsu Wen and Newell, Graeme, "The Significance of Infrastructure in Investment Portfolios" (2007).

The research indicated that private market infrastructure funds produced returns similar to those of the public equity markets in their respective regions, but with less volatility. Similarly, several benchmarks comprised of publicly listed infrastructure companies exhibited returns that surpassed those of global equities over the relatively brief period since their inception.²⁵ Each of the benchmarks is comprised of a different set of listed companies operating in infrastructure-related sectors, and their relationship to the unique assets which comprise private investments should become clearer over time.

²⁴ Newell, Graeme, and Peng, Hsu Wen, "The Role of U.S. Infrastructure in Investment Portfolios," *Journal of Real Estate Portfolio Management* (2008).

²⁵ There are currently four listed infrastructure indices: Dow Jones Brookfield Infrastructure Index; Macquarie Global Infrastructure Index; S&P Global Infrastructure Index; and UBS Global Infrastructure and Utilities Index.

The observable data indicate double-digit historical returns from infrastructure. However, this performance may represent a “first mover” advantage, as deals may have been purchased at significant discounts to underlying value. In these cases, the concessionaire was able to achieve operating improvements coupled with revenue enhancements that made the investment much more profitable than envisioned by the seller. Additionally, like many risk-possessing asset classes, infrastructure assets are likely to have benefitted from the great bull market that ended in 2007. In particular, transactions that were closed between 2004 and 2006 benefitted from a low cost of capital and a high tolerance for aggressive leverage structures. These “mispricings” will likely be corrected during the assets’ resale or recapitalization. Over time, like any market, this sector will become more efficient as more information becomes available about the value of these assets.

Meketa Investment Group expects that investments in core infrastructure assets will produce returns similar to those of public equities in the future. Therefore, infrastructure returns will likely fall between those of private equity and core real estate. We are projecting a roughly 6% risk premium, though we acknowledge this could contract rapidly as more institutional assets flow into this space and sellers become more sophisticated.

There is neither sufficient historical data to conclusively justify this (or any) risk premium, nor is there sufficient data on the volatility of the asset class. The illiquid nature and infrequent pricing of the asset class further complicates any observation of historical volatility (and correlations). However, we provide our 2009 projections for infrastructure, and several often compared asset classes, in the following table.

Meketa Investment Group’s Expectations

Asset Class	Expected Return (%)	Expected Risk (%)
Core Fixed Income	4.0	6
Core Real Estate	8.6	15
Infrastructure	9.6	14
Public Equity	9.7	16
Private Equity	12.2	24

Sources of Return

Like real estate, infrastructure investments should exhibit a large income component to their returns. However, the income component will vary by type of asset. Yields from utilities can vary from 6% to 12%, depending in large part on the regulator. Roads can generate yields in the 6% to 10% range, while airports and ports may yield from 4% to 9%. The returns for a pool of infrastructure assets will be driven by income until an exit event occurs for one or more of the assets.

An investment that represents greater risk through higher leverage, development risk, or sovereign (e.g., emerging markets) risk, should command a higher return. While leverage will add to the return in most environments (i.e., when the return exceeds the cost of capital),

many infrastructure managers expect a much larger increase in return to result via their exit strategy. In most cases, managers anticipate being able to re-sell assets at a higher multiple than what they paid. Alternatively, general partners might re-package and securitize part of the asset, enabling them to return a significant amount of cash to the limited partners. Finally, managers could boost the returns by refinancing and taking on larger amounts of debt, again enabling them to return cash to the partners. This last strategy can be effective only if revenue growth will support a higher amount of absolute debt and if the capital market environment is supportive of increased debt loads (i.e., not risk averse).

AN EVOLVING ASSET CLASS

The definition of infrastructure is not universally agreed upon, and, in fact, appears to be evolving. As the definition of infrastructure expands, the range of investable assets will also broaden. It could include nearly any kind of income stream that can be capitalized, such as student loans, casino licenses, or lotteries. It may include assets that are viewed as more recreational than essential, such as libraries, parks, and stadiums. Investments in parking garages, metered parking, student housing, and even low-income housing are considered to fit the definition for some, though not all, infrastructure investors.

Notwithstanding the favorable portfolio characteristics of core infrastructure and the fact that it remains an essential backbone that allows societies and private businesses to thrive, its potential to generate high investment returns is limited by regulation, public financing assistance, competitive bidding, or simply the fact that it is a means to producing a product but not a product in itself.

Enhanced Infrastructure

“Enhanced infrastructure” represents the next generation of investment opportunities developing around the traditional infrastructure asset base while being equally critical to the backbone of nations and economies. Traditional infrastructure assets require engineering, service contracts, support systems, and many other points of contact in order to operate effectively. For example, gas pipelines require contractors to monitor operations and safety, seaports require private security details, and airports rely on private vendors as their daily lifeline to provide food, local transportation, and other essential services.

Providing the design, construction, operation, maintenance, and upgrading of all necessary infrastructure assets frequently requires a public-private partnership. For example, roads may be built by private contractors yet maintained by city work crews. Internet software may be developed by private companies but distributed on networks providing public service and maintained by the national government. GPS satellites built by the military may be used to guide private delivery trucks. Public parks may be maintained by private companies.

While traditional infrastructure is commonly defined by the physical characteristics of the underlying asset, enhanced infrastructure more broadly describes both new infrastructure (i.e., greenfield) development and an array of businesses providing the services these assets

require for operation and which serve the population as a whole. The paved surface of a toll road and the traffic signals along it are both essential infrastructures necessary for safe driving. Once a road surface is paved, it must be maintained, but it is hard to improve it. The efficient flow of traffic, however, benefits enormously from continuous improvements in traffic signal and toll collection technology. For example, LEDs can replace incandescent bulbs prone to burning out. And signal timing and electronic toll collection can reduce labor costs while effectively increasing highway capacity.

Companies providing infrastructure services share investment attributes of both traditional infrastructure and private equity-style investments. Operating companies that support underlying infrastructure assets often share the attractive characteristics of traditional infrastructure, including stable cash flows, monopolistic positioning, contractual or quasi-contractual relationships, and inflation protection, and they are often buffered from market volatility and risks that face nonessential or discretionary service sectors. In the example above, roads will continue to be utilized and require servicing across market cycles. A company providing necessary services and equipment or other enhancements to the road asset may share the stability and predictability or revenues of the road itself.

Expanding the base of contracts with infrastructure assets or entering and diversifying across new regions are just some growth strategies available to companies servicing infrastructure assets. Enhanced infrastructure opportunities also feed the growing need for intelligent infrastructure. As outlined in an OECD report,²⁶ this is not only driven by improved technologies but the need for safeguarding public health and security related to infrastructure assets. Much of the existing infrastructure in OECD countries was built prior to the advent of remote monitoring, security, and automation systems for assets such as water distribution systems or telecommunications networks. Many of the world's largest ports are becoming outdated because they lack the ability to handle modern "Panamax" ships or to offload sensitive cargo. Technological advances can also reduce the operating costs of many infrastructure assets through automation and increased energy efficiency.

The highly specialized and often regulated nature of infrastructure assets creates a high barrier to entry to private sector companies which service and operate around them. While not traditional infrastructure assets, established and proprietary market positions and contracts with concession-like characteristics are common among companies providing necessary support to them.

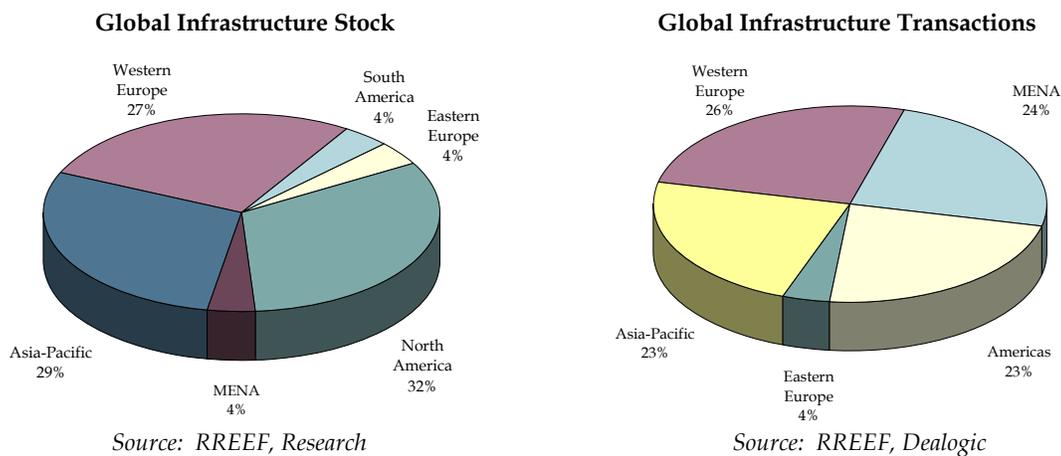
Enhanced infrastructure shares many of the risk-mitigating characteristics of traditional infrastructure, while at the same time being free of the attendant regulation and constraints imposed by physical assets. These enterprises benefit from the application of operating efficiencies, the development of new technologies and the operating leverage which flows from scale. These characteristics can provide the upside more common among private equity investments.

²⁶ Source: OECD, "Infrastructure to 2030" (2006).

IMPLEMENTATION ISSUES

What Size Allocation?

In addition to its risk and return characteristics, the opportunity set is a major determinant of how much a plan sponsor should allocate to an asset class. As noted earlier, the number of infrastructure funds has grown rapidly in recent years, though the universe of funds is not yet as robust as the private equity and real estate universes. However, the future opportunity set is enormous, as determined by the stock of infrastructure available around the world. RREEF estimates that the size of the global infrastructure market is \$20.5 trillion.²⁷ This is roughly half the value of global GDP. A breakdown of the infrastructure market by region is displayed in the following charts.



Given the attractive characteristics of the asset class and the expanding opportunity set, we recommend that plan sponsors with a long-term time horizon that are new to infrastructure investing consider allocating 3% to 5% to infrastructure assets. A larger allocation may be warranted for investors more experienced in infrastructure investing and for whom capacity constraints are not an issue. As opportunities continue to become available, capacity constraints should cease to be an issue for even the largest institutions in the future.

Like private equity partnerships, most infrastructure funds require an advance commitment of capital. The majority of the commitment is drawn down (“called”) by the general partner over a period of usually two to five years, during which time the actual investment is less than the committed amount. Also, while one commitment is being drawn down, other partnerships may be paying off, effectively reducing the plan sponsor’s allocation to the asset class. Therefore, to maintain a fixed level of actual investment in infrastructure, it is necessary to make a commitment that is larger than the target allocation (i.e., over-commit). There is insufficient history to establish a hard rule on how much to over-commit, but we estimate it will be necessary to commit 1.2x to 1.5x the desired allocation. A comprehensive

²⁷ Source: RREEF Research, “Estimating the Size of the Global Infrastructure Market” (2008).

cash flow study can assist plan sponsors in determining what commitment amount is necessary in order to meet their target allocation.

Public vs. Private

Many of the more attractive characteristics of the asset class are attributable to its private market nature. As such, we have a strong preference for achieving a plan sponsor's allocation via private market funds.

However, as noted above, it may take some years to fully achieve the desired target allocation. Therefore, plan sponsors may wish to consider investing the balance of their target allocation in listed (i.e., public) infrastructure vehicles. There are three options for doing so: 1) closed-end funds, 2) open-end funds, and 3) passive vehicles.

As several managers of private infrastructure have chosen to publicly list a number of their vehicles, there is a small universe of closed-end funds that trade primarily on the Australian, London, and New York stock exchanges. These vehicles most closely match the true definition of infrastructure investment, as the underlying assets are the same as can be found in private funds.

Several traditional asset managers have started managing open-ended infrastructure funds comprised of publicly traded stocks that meet the managers' definition of infrastructure. These vehicles invest primarily in regulated utilities, energy companies, and construction firms who derive some of their revenue from infrastructure contracts. Importantly, these strategies behave much like public equity portfolios, and as such will exhibit substantial volatility.

There are a growing number of indices that are being used for publicly listed infrastructure mandates. Currently, there are ETF's (exchange-traded funds) that track two major public infrastructure indices (the FTSE/Macquarie Global Infrastructure index and the S&P Global Infrastructure index), and passively managed funds are also becoming available. This is likely the lowest cost way to achieve diversified exposure to the publicly traded infrastructure sector.

The most significant drawback of these publicly traded vehicles is their very high correlation to the returns of utility and energy stocks, as the universe includes mostly these types of equities. It is important to realize that all three public market options will behave more like public equities than will their private market counterparts.

Diversification

To remain prudently invested, a portfolio must be diversified across many different individual investments. This means investing in assets of different types (e.g., transportation versus utilities) and sizes that are situated in different geographic areas. It also means investing in multiple managers, to reduce manager- and strategy-specific risk, and diversifying across time (i.e., vintage year) to reduce susceptibility to various market cycles.

A prudently constructed portfolio should take only those risks that a plan sponsor is willing to accept.

Direct vs. Fund Investing

The time constraint, special due diligence, deal size, and lack of diversification makes direct investing impractical for all but very large plan sponsors who have substantial resources available to evaluate individual infrastructure projects. Accordingly, most plan sponsors will find that the most practical approach is to invest via a commingled vehicle that allows assets and resources to be pooled.

Given the precedent set outside the U.S., we expect that many large plan sponsors will start investing in infrastructure through commingled vehicles, but as they build out their expertise internally, they will shift to investing either partially or fully in direct deals. In many cases, we anticipate they will start by “co-investing” in projects with the funds in which they are invested. Co-investing offers the dual benefit of being able to lever the expertise of the infrastructure manager and not incurring management or performance-based fees.

Benchmark

No commonly used benchmark has yet emerged for private infrastructure vehicles as it has for real estate or private equity. Plan sponsors seeking to benchmark infrastructure portfolios will likely have to rely upon either a public market benchmark or an absolute return target (e.g., inflation plus 5%) until such an index is developed.

For publicly traded assets, several benchmarks have materialized. These include the Macquarie Global Infrastructure 100 index, S&P Global Infrastructure index, the UBS Global 50/50 Infrastructure and Utilities index, and the Dow Jones Brookfield Global Infrastructure index (see appendix 3 for an analysis of these indices).

Vehicle

There are four categories of investment vehicles available for investors who wish to invest in infrastructure, including two types of private vehicles and two types of publicly traded vehicles. The private vehicles are either “closed-end” or “open-end,” depending on whether investors are allowed to liquidate their investment. The two types of publicly traded (i.e., listed) vehicles are traditional open-end funds and publicly traded closed-end funds, whose share prices may deviate from their net asset value as the fund’s price fluctuates daily.

Most of the current universe of infrastructure funds is structured similarly to private equity partnerships. They are closed-end private funds, with a pre-determined term and investment period, as well as management and incentive fees (explained below). Though most private equity funds have a ten-year term, many infrastructure funds have terms as long as twelve or fifteen years, along with the customary extension periods (e.g., two one-year extensions). Several funds have also offered a provision to convert to an open-end structure at the end of the term, though this model has not been put to the test.

There are a few open-end, or “evergreen,” private market funds available that are structured like open-end real estate funds. The liquidity terms for many of these funds are not well resolved or tested, as the managers are anticipating that inflows can be used to offset outflows, as has been the case for open-end core real estate funds historically. Pricing is a very important issue for these funds, as investors will have the ability to enter or exit on a regular, if infrequent, basis.

As of early 2009, there were approximately eighteen closed-end funds listed on the Australian, London and New York stock exchanges. In addition, more than a dozen open-end funds that invest in public equities have come to market, and we expect that the size of this group will continue to grow.

Costs

Like private equity partnerships, the fees on private infrastructure funds are high, and they generally include both a management fee (ranging from 1.0% to 2.0% per year) and a performance-based fee. The latter may or may not include hurdle rate (usually 8%) and commonly includes a carried interest of 20%. All of the costs and fees associated with infrastructure investing are higher than for public market securities and will be dilutive on returns. Any investor must consider these costs carefully.

Another characteristic that infrastructure funds will share with private equity partnerships is the J-curve. For many acquisitions, there will likely be improvements made to the asset at the outset of the investment that require additional up-front capital. This will dampen the early returns on the investment. However, this is mitigated by the high yields generated by the asset from the outset. Hence, the J-curve should be less pronounced than that to which private equity investors are accustomed.

An allocation to infrastructure will require an added commitment by the plan sponsor, both in time and resources. Administratively, the capital calls and distributions associated with infrastructure funds are unpredictable. Fund administrators must have procedures in place to accommodate these cash flows reliably and efficiently. These assets will also require additional monitoring by the plan sponsor. A plan sponsor that wishes to participate in direct investing or co-investing will require even more resources.

RECOMMENDATION

Infrastructure represents a fairly new asset class in the U.S. However, as governments continue to confront the problem of financing necessary infrastructure projects while facing budget deficits, it is likely that private capital will be called upon more frequently and infrastructure investing opportunities will increase. Thus, investors should become familiar with the asset class and its characteristics, and begin determining whether and how to invest in this burgeoning area.

Infrastructure assets are structured to provide a stable, predictable, long-term cash flow stream to investors. We believe that infrastructure is a unique asset class and that plan sponsors should treat it as such. The primary reason for this is the return behavior of the asset class, which includes a low correlation with most other asset classes, as well as different risk and return expectations.

Meketa Investment Group recommends that plan sponsors with long-term time horizons consider initial allocations of 3% to 5% to infrastructure investments and then review the allocation as the opportunity set develops. A larger allocation may be warranted for investors more experienced in infrastructure investing and for whom capacity constraints are not an issue.

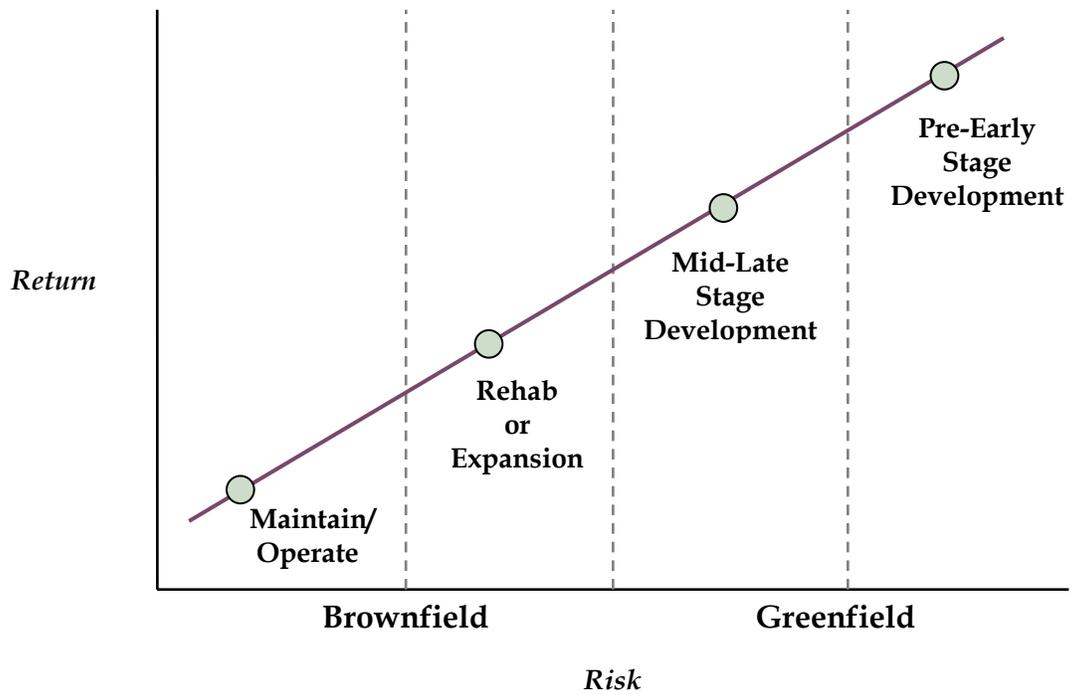
As many of the more attractive characteristics of the asset class are attributable to its private market nature, we recommend achieving as much as possible of a plan sponsor's target allocation via private market funds.

Importantly, investors entering the infrastructure area should do so in a diversified manner. Diversification can minimize many of the risks inherent to infrastructure, without impairing the expected returns from the asset class.

APPENDIX 1
INFRASTRUCTURE SECTORS

Energy	Environmental	Transportation	Communications	Social
Power Generation	Water Treatment	Roads	Broadcast Towers	Hospitals
Electricity Transmission	Water Distribution	Bridges	Cellular Towers	Schools
Electricity Distribution	Waste Management	Tunnels	Copper Wiring	Prisons
Oil and Gas Storage		Railways	Fiber Optic Cable	Courthouses
Oil and Gas Refining		Airports	Satellites	Police and Fire Stations
Oil and Gas Distribution		Ports		Parks
		Waterways		

APPENDIX 2
RISK-RETURN SPECTRUM FOR INFRASTRUCTURE



APPENDIX 3

LISTED INFRASTRUCTURE BENCHMARKS²⁸**Dow Jones Brookfield Global Infrastructure Index**

A global free float-adjusted market capitalization weighted index. Constituent companies must derive at least 70% of cash flows from infrastructure assets which include: Airports, Communications, Transmission & Distribution, Oil and Gas Storage and Transportation, and Water. The index excludes all power generation utilities and does not restrict individual security weightings. The index was first published on July 1, 2008 and has back-filled history to 2003.

UBS Global 50/50 Infrastructure and Utilities Index

A global free float-adjusted market capitalization weighted index comprised of 100 publicly listed infrastructure companies. To ensure diversified exposure to different infrastructure clusters and to remove the skew toward utilities, the constituents are distributed at each rebalancing as follows: 50% infrastructure and 50% utilities, based on market capitalization. The index does not have exposure to emerging markets nor to merchant power. The index does limit individual security weightings to 5%. The index was started in 2006 and has back-filled history to 1995.

S&P Global Infrastructure Index

A global free float-adjusted market capitalization weighted index comprised of 75 of the largest publicly listed infrastructure companies. To ensure diversified exposure across different infrastructure clusters, the constituents are distributed at each rebalancing as follows: 20% Energy, 40% Transportation, and 40% Utilities. The index has exposure to emerging markets and to the shipping industry, but it does not have exposure to merchant power or telecomm. The index does limit individual security weightings to 5%. The index was started in 2007 and has back-filled history to 2001.

Macquarie Global Infrastructure 100

A global free float-adjusted market capitalization weighted index comprised of 100 publicly listed infrastructure companies. The Index is a composite of the broader Macquarie Global Infrastructure Index, which is based on 255 stocks within the following subsectors: Pipelines, Transportation Services, Electricity, Gas Distribution, Multi-utilities, Water, and Telecommunications Equipment. The index has exposure to emerging markets, and it does not restrict individual security weightings. The index was started in 2006 and has back-filled history to 2000.

²⁸ All data is from the index providers and is provided as of December 31, 2008.