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INFRASTRUCTURE & PROJECT FINANCE 2019

VIRTUAL ROUND TABLE

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Introduction & Contents

Infrastructure & Project Finance explores the opportunities and challenges with a particular focus on projects in Portugal, the United Kingdom and the United States. We ask the question of renovation versus new development, explore the impact of technology on the wider industry, and identify infrastructure opportunities in the energy and transportation sectors.

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Meet The Experts

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He led several teams involved in most of the transactions carried out by the firm to date on the power (including the renewable energies), oil & gas, road, transport, water and wastes sector. He has also been actively working in regulation and public procurement procedures of those sectors.

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Joshua B. Nickerson represents clients in the acquisition, development and financing of energy, infrastructure and sports-related assets. He has extensive experience negotiating the full range of contracts for these transactions, including concession agreements, stock and asset purchase and sale agreements, credit agreements, construction contracts, power purchase agreements, operations and maintenance agreements, and other related agreements. Mr. Nickerson represents clients across a broad range of assets and services in the energy sector, including solar, wind, waste-to-energy, natural gas, combined heat and power, coal, nuclear, refinery services and power marketing. He also represents clients in public-private partnership transactions involving toll roads, airports and other assets.

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Fraser Hughes is founder and CEO of the Global Listed Infrastructure Organisation (GLIO). He founded GLIO in July 2016. Previously, he was Deputy CEO at EPRA. EPRA successfully increased investor awareness in the global listed real estate sector and helped successfully convince national governments in Europe to introduce REIT legislation. Previously, he worked in a variety of investment positions in the City of London, including a period developing FTSE's global index range. Hughes holds a MSc Investment Management from CASS Business School London.

The Global Listed Infrastructure Organisation (GLIO) is the representative body for the $2.3 trillion market capitalisation global listed infrastructure asset class. GLIO raises investor awareness for the asset class through research, education, events and promotion. GLIO current corporate members represent approximately $750bn in Enterprise Value. Specialist listed infrastructure managers make up a significant part of the membership, along with banks and advisors. The specialist managers manage approximately $85bn in assets under management.

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Geoff is the founder and chairman of IPFA, the largest independent not-for-profit project finance trade association in the world. He is a Solicitor with an LL.B from University of London, an MBA from Henley Business School and a Diploma in Marketing from the Charted Institute of Marketing. Originally a construction lawyer, he has specialised in project finance and Public Private Partnerships since 1985. He has specialist experience in large and complex projects in transportation, energy, water treatment, healthcare and education. He lectures extensively on project finance and designs and delivers a range of training courses for governments, public sector bodies and private companies.

Q1. Who are the main regulators and what are the key legislations that apply to infrastructure projects in your jurisdiction?

Manuel Protasio

Protasio: In general terms, the sector ministries – energy, infrastructure, transports, health, etc., and (when applicable) environment – are responsible for the launching, licensing and major regulation of the infrastructure projects, either directly or through their governmental departments. The approval of the Ministry of Finance is also required when the project involves public investment or, more generally, where the PPP legal framework applies.

The Portuguese Public Procurement Code (PPC) – approved by Decree-Law 18/2008 of 29 January and as amended by Decree Law 111-B/2017 of 31 August – applies to every public tender procedure launched by a public authority. The PPC sets out different procedures for the procurement process and execution of administrative contracts, including those entered into in connection with PPP projects. In this respect, we would highlight the Decree Law 111/2012, of 23 May, which establishes the legal regime of PPPs and aims at reinforcing supervision, scrutiny and consistency of the decisions of the public partner. It also contemplates the creation of the Technical Unit for Monitoring Projects, which centralises and executes all main tasks related to the preparation and execution of PPP contracts. Other PPP projects at a municipal or regional level are prepared and executed by the respective public structures and such projects are not subject to the Technical Unit for Monitoring Projects' control. The legal framework applicable to the PPP projects expressly foresees the need to accommodate the type of expenditure within budgetary regulations and requires the preparation of economic and financial studies which provide the basis for a public sector comparator analysis, as well as establishes general procedure rules applied to any type of PPP contracts.

Depending on the sector of industry in question, there may be other entities with regulation responsibilities, namely The Mobility and Transports Authority (AMT – *Autoridade da Mobilidade e dos Transportes*), the Institute of Public, Real Estate and Construction Markets, (IMPIC, IP), the Electricity Services Regulatory Entity (ERSE), the National Directorate of Energy and Geology (DGEG), the Water and Waste Services Regulatory Entity (ERSAR) and the Health Regulatory Authority (ERS) and specific pieces of legislation.

Joshua Nickerson

Nickerson: Regulation of energy and infrastructure assets in the U.S. is multi-layered, often involving federal, state and local regulators and regulations. For large scale energy and transportation projects, environmental compliance makes up the lion's share of permitting work. And if any federal funding is involved, the project also needs to comply with the National Environmental Policy Act (NEPA), which establishes detailed procedures governing the environmental permitting process. On the whole, the U.S. has a highly decentralised approach to permitting and regulation, which makes infrastructure investment in the U.S. challenging, especially to non-U.S. investors who are used to working with a single national or regional regulatory body.

For electric generation and transmission and for petroleum and gas pipelines, the Federal Energy Regulatory Commission is the primary federal regulator. Each state has its own public utility commission, which has a role in permitting certain projects. The regulatory matrix differs significantly depending on the type of asset. An interstate oil or gas pipeline or a liquefied natural gas (LNG) facility will require permits at the federal and state level, whereas electric power generation assets typically only require state and local permits (in some cases, implementing federal statutory requirements).

Permitting for Transportation projects (e.g., toll roads, rail transit projects, etc.) is typically more complex than energy asset permitting and involves a number of federal state and local planning and regulatory bodies. The initial planning and permitting (typically done by the state or local transportation authority before any engagement with potential private investors) can take several years. Some states are experimenting with implementing permitting and the P3 RFP process on a parallel path in an effort to speed up the overall timeline for project delivery. The State of Maryland, in particular, is considering this approach for the estimated $8 billion congestion relief program around Washington, D.C. that will involve widening the ring road around the capital (I-495 Capital Beltway) and portions of the major interconnecting highways (I-95 and I-270).

Q1. Who are the main regulators and what are the key legislations that apply to infrastructure projects in your jurisdiction?

Geoff Haley

Haley: The main controller of the development of infrastructure lies with the Treasury. The Minister's Department has the final decision under the procurement process as to which projects should be delivered using private sector investment. Specific Acts have been put into place to facilitate procurement.

Q2. Have there been any recent regulatory changes or interesting developments?

Joshua Nickerson

Nickerson: The Trump administration is pursuing comprehensive permitting reform across all of the federal agencies involved with U.S. infrastructure projects. The administration has championed the objective – promoted by reform advocates – of reducing the average permitting time for major infrastructure projects to two years, down from the current average of four years or more, depending on the type of project. This effort carries forward and implements processes established in Obama-era legislation called the FAST Act of 2015. That statute created the Federal Permitting Improvement Steering Council, which is tasked with coordinating the permitting reform efforts at each Federal agency. Permitting reform will have the biggest impact on surface transportation projects, solar renewable energy (because so many of the areas with highest levels of direct insolation are on federally owned lands) and LNG facilities. These reforms are less visible to the public and to investors, but the expectation is that they will help the U.S. improve permitting efficiency, where it currently ranks only 26th in the world, according to the World Bank.

Another major recent development is states and localities passing legislation to increase funding for infrastructure. These efforts principally take the form of increases to state-administered retail gas and diesel taxes and county or city level sales and use taxes. According to the National Conference of State Legislatures, 30 states and the District of Columbia have increased fuel taxes since 2013. These actions are a direct response to failure by Congress to increase federal fuel taxes, which are the primary source of revenues for the Highway Trust Fund, which traditionally has provided the majority of funds for highway construction and maintenance throughout the country. Federal fuel taxes have not increased since 1993; consequently, the Highway Trust Fund is currently projected to be fully exhausted in 2022 if no action is taken.

Q2. Have there been any recent regulatory changes or interesting developments?

Fraser Hughes

Hughes: In the United States, a small number of companies have taken advantage of Real Estate Investment Trust (REIT) legislation as the definition, or interpretation of eligible real estate assets has widened. The telecom infrastructure companies American Tower, Crown Castle were the first to take advantage and convert in 2012 and 2014 respectively. More recently, SBA Communications converted to a REIT in 2017. CorEnergy Instructure (pipelines, storage terminals and transmission and distribution assets) and Landmark Infrastructure (wireless communications and renewable power) have further broadened this infrastructure asset base. The REIT structure allows both domestic and international investors direct exposure to infrastructure assets in a tax efficient wrapper or vehicle. At this stage, the seven listed companies alone represent approximately $170bn in market capitalisation – the vast majority being telecom infrastructure.

More broadly, GLIO believes that given the incredible need for infrastructure investment over the 25 years – estimates range from $60trn[1] to $94trn[2], the broader use of a REIT[3], or even a newly formed Infrastructure Investment Trust (IIT) specifically designed for core infrastructure assets, could be an efficient new route for capital. In addition, should a tax-efficient vehicle could act as a potential part-exit route for Government owned infrastructure which in many parts of the world is in dramatic need of investment both at maintenance and development levels.

1. McKinsey estimates
2. GI Hub estimates
3. REITs exist in 35 countries globally.

Geoff Haley

Haley: Private sector investment, through debt and equity, in public infrastructure has been successfully implemented in the UK using PFI since 1992, PPP from 1997, before recently changing to using PF2. However, political decisions have been made to cease the use of any of these and move to a new model.

Q3. Are there any compliance issues or potential pitfalls that firms need to be cautious about?

Manuel Protasio

Protasio: We would start by pointing out that infrastructure projects launched by public initiative shall comply with the provisions of the Public Procurement Code (approved by the Decree Law 111-B/2017, of 31 August, which implemented the European Union Directives into Portuguese law) and the Decree Law 111/2012, of 23 May, referred above. Moreover, the compliance with all legal conditions and procedures is subject to prior approval by the Court of Auditors, without which those contracts will not become effective.

Environmental aspects must also be carefully taken into account. In fact, procurement procedures may only be launched and awarded after approval of the relevant environment impact assessment (when applicable) and once the relevant environmental and urban planning licences and permits have been obtained. Depending on the sector of industry in question, a project may also be subject to environmental licensing under the new industrial emissions legal framework, approved by Decree Law 127/2013 of 30 August 2013. The environmental licence (which is required, in particular, for industrial projects) must be obtained before operation commences and must be successively renewed during the entire period of the plant's operation.

Q3. Are there any compliance issues or potential pitfalls that firms need to be cautious about?

Manuel Protasio

Furthermore, in the context of the EU emissions trading system, for projects in certain industrial sectors and meeting certain conditions or thresholds, the operators must hold a permit to emit greenhouse gases and be entitled to emission allowances. Most financial institutions operating in the Portuguese project finance market have already subscribed to the Equator Principles, reflecting the growing importance of environmental issues in Portuguese project finance deals.

With respect to cross-border transactions, namely in the emerging markets, attention must be paid to money laundering and anti-corruption rules, as well as foreign investment and foreign exchange restrictions. Regarding this last point, we would highlight our experience on Portuguese-speaking African countries, where the local content rules (i.e. the enhancement of domestic industry and manpower) assume ever more relevance in the key sectors of economy, like the oil and gas and mining industry.

Joshua Nickerson

Nickerson: Non-U.S. investors looking to invest in the U.S. should familiarise themselves with the recent changes to laws governing national security reviews of inbound investment. Investments in critical technologies, critical infrastructure or businesses involving sensitive personal data of U.S. citizens must receive approval from the Committee on Foreign Investment in the United States (CFIUS).

The Foreign Investment Risk Review Modernization Act of 2018 (FIRRMA) is the first major change to the regulation of foreign direct investment in over a decade. The act codifies long-standing practices and procedures and makes clear that CFIUS has jurisdiction over minority investments in sensitive industries and over a wide range of real estate transactions, including leases and vacant land purchase that either involve buildings with sensitive tenants or close proximity to military or other security facilities. FIRRMA also clarifies the criteria by which limited partners in investment funds may be considered passive investors and disregarded for purposes of determining whether a transaction must obtain CFIUS approval.

Many of the changes introduced by FIRRMA will not be fully implemented until CFIUS passes implementing regulations, which must be complete by February 2020. The regulations should provide additional guidance on what constitutes "critical infrastructure," which is broadly defined in the statute, but covers ports, airports, telecommunications, rail assets, transmission grid assets and pipelines.

One example of how CFIUS reviews affect foreign direct investment in U.S. infrastructure is the recently announced sale by Orient Overseas (International) Ltd., a unit of China's COSCO Shipping Holdings Co., of its interests in the Long Beach (CA) Container Terminal to a consortium led by Macquarie Infrastructure Partners. This transaction was a condition to receiving CFIUS approval of COSCO's takeover of Orient Overseas in 2018. Pursuant to a National Security Agreement entered into by COSCO affiliates and the U.S. government at that time, COSCO first transferred the terminal facility to a trust, whose principal trustee was a U.S. citizen, and then undertook the sale process to identify a true third party purchaser.

"The Foreign Investment Risk Review Modernization Act of 2018 (FIRRMA) is the first major change to the regulation of foreign direct investment in over a decade."
- Joshua Nickerson -

Q4. Which projects, already built or in the pipeline, constitute the best examples of completed or pending infrastructure?

Joshua Nickerson

Nickerson: While most attention on U.S. infrastructure focuses on the inability of Congress and the Trump administration to pass a large-scale infrastructure bill at the federal level, individual states and cities are building wide-ranging, long-term infrastructure programs. No better example of this is Los Angeles, which is undertaking large scale projects to improve its most congested roads, build a rail transit system and, most visibly, upgrade Los Angeles International Airport (LAX). This effort pre-dates, but is now integrated with, the goal of readying the city for the 2028 Summer Olympic and Paralympic Games. Much of the funding for this program will come from the Measure M, a Los Angeles County sales tax approved by voters in 2016.

The most recent milestone event in this long-range program occurred in December of 2018, when a consortium led by Fengate Asset Management achieved financial close for an approximately US$1 billion consolidated rental car facility (ConRAC) at LAX, which, when completed, will cover 5.3 million square feet and will be the largest ConRAC ever built. The project is structured as a 28-year availability payment P3, in which the availability payments to the concessionaire will covered primarily from proceeds of a customer facility charge paid by rental car customers. The ConRAC will be connected to LAX by a new US$2.23 billion automated people mover (APM), which is being constructed under a separate availability payment P3 awarded to a consortium led by Fluor, Balfour Beatty, Hochtief and ACS.

Outside of Los Angeles, the most significant infrastructure program in the U.S. is the plan by the Gateway Development Corporation, and entity established by the States of New York and New Jersey, with participation by federal transportation agencies, to build a new rail tunnel under the Hudson River and into New York City and then rehabilitate the century-old existing tunnel, which suffered extensive storm damage in 2012. The project requires massive capital, currently estimated at $30 billion over a 10-mile corridor, and is considered of critical importance and a potential "single point of failure" for a region that accounts for disproportionately large share of U.S. GDP. Progress on the project is contingent in large part on receiving federal funding to supplement funding commitments made by the states of New York and New Jersey.

Fraser Hughes

Hughes: Moving around the globe and through the listed companies covered by GLIO[1], there are many best-in-class examples of existing infrastructure. Looking at transportation, Transurban owns and operates 17 roads in Australia and North America. The company has a proven track record in building and operating high-quality roads that use state-of-the-art safety and traffic management technology. Ferrovial, the company that owns 25% of Heathrow Airport, is active across toll-roads (through Cintra), airports and infrastructure construction. On the company's 407 ETR highway located in Toronto, which spans 67 miles, the company operates a seamless toll-system which does not require the driver to stop at entry or exit. Moreover, toll charges can be varied freely enabling the user to pay according to the timesaving provided by the highway versus public routes.

The North American freight rail network which covers approximately 140,000 miles of track is predominately owned by listed companies like Union Pacific, CSX, Canadian National and Norfolk Southern. The Federal Highway Administration recently forecast that total US freight shipments will rise from approximately 18bn tonnes to 24.2bn tonnes in 2040 – a 37% increase. In the past five years these companies have spent over $110bn on new infrastructure and equipment. They are now employing innovative technologies like ultrasound and drones to inspect network infrastructure with greater precision and frequency. This is one of the best examples of critical national infrastructure built and maintained over past 150 years!

1. The GLIO Global Coverage, comprises 145 core listed infrastructure companies which collectively total approximately $3.5 trillion in enterprise value. The companies cover the mission critical infrastructure sectors: Regulated Utilities, Energy Transportation Infrastructure, Transportation and Communications Infrastructure. The full coverage can be downloaded at www.glio.org.

Q4. Which projects, already built or in the pipeline, constitute the best examples of completed or pending infrastructure?

Fraser Hughes

Looking at utilities, the United States provides a great example of the changes occurring in clean energy. The Edison Electric Institute (EEI) represents the interests of electric companies in the United States. In terms of size, approximately 75% of the assets are in listed companies such as NextEra Energy, Duke Energy, Southern Co, Dominion, and American Electric Power. In enterprise value terms, these listed utilities are in the region of $1 trillion. Collectively, they invest more than $100bn per year to make the US energy grid stronger, smarter, cleaner, more dynamic, and the sources of energy more diverse. Importantly, by the end of 2018 the industry's carbon dioxide emissions were 27% lower than 2005 levels and almost at the lowest level for 30 years. By 2030, it is projected that CO2 emissions will be approximately 50% lower than 2005 levels. It is worth noting that more than 50% of new electricity generation capacity in the United States was wind and solar.

Q5. How do the rules and regulations alter between publicly-funded and private projects?

Joshua Nickerson

Nickerson: All infrastructure projects – whether publicly or privately funded – are subject to local, state and, in some instances, federal permitting requirements. But there is a significant additional layer of permitting and regulatory requirements that applies to projects that receive federal funding (including loans from federal credit programs). Currently, federal funding is most prevalent in transportation and water projects, although some electric generation projects have received federal support in the form of loan guarantees from the U.S. Department of Energy. Perhaps the most important addition regulation applicable to federally funded projects is the National Environmental Policy Act (NEPA), mentioned above. Compliance with NEPA routinely adds several years to the permitting process for a project and also can (and does) expose the project to legal challenges based on alleged non-compliance with specific procedural requirements (as opposed to violations of substantive environmental law).

There are other important rules and regulations applicable to federally funded projects that affect total project costs and schedule, among them (i) the Davis-Bacon Act, which establishes minimum "prevailing wage" requirements for worker pay, (ii) the Buy America Act, which requires, subject to waivers and exclusions, the use of U.S. manufactured or sourced equipment and materials in federally funded projects and which was recently strengthened by a January 2019 Executive Order from President Trump, and (iii) the Cargo Preference Act, which requires that U.S. flagged vessels be used to transport specified percentages of imported equipment and materials used in federally funded projects. Each of these federal statutes is administered by separate federal government departments. Thus, compliance can require developers to hire or retain significant additional resources.

Q6. What opportunities do Public-Private Partnerships (PPPs) present?

Manuel Protasio

Protasio: As for Portugal, there is some uncertainty associated with political pressure – from left-wing parties supporting the government – to avoid PPP schemes, at least in areas of greater social sensitivity, such as health and public transport. The existing public-private partnerships (PPPs) have indeed became the subject of strong public disapproval, given the heavy burden that payments by the Portuguese State under those projects represent to the national budget.

However, the PPP model has not been completely abandoned and recently the Portuguese Government has launched the project of the Hospital Lisboa-Oriental Complex, which is probably the most important project under a PPP model launched in recent years. The Portuguese Government have also publicly announced plans for the modernisation of the Portuguese rail freight sector and to develop and expand the capacity of major Portuguese ports.

Other opportunities may arise from the Portuguese government's recent focus on developing the green economy and green growth in Portugal, in relevant areas such as climate and energy (including increasing the interconnections between national electricity systems in the EU), water and waste management, biodiversity and sustainable cities and mobility.

We take the view that there are also opportunities to the PPP model in emerging markets, including in the Portuguese-speaking countries in Africa. In fact, considering, on the one hand, these countries' needs for infrastructure (namely in transportation, water distribution and sanitation, sewage collection, internet, voice communications and electricity) and, on the other hand, that most governments in Africa do not have the funds required to develop such infrastructure, the PPP model has started to be seen as a privileged instrument for purposes of equipping the countries with modern infrastructure and services.

Joshua Nickerson

Nickerson: The U.S. P3 market continues to grow at its own pace, which may be slower than many desire, but still makes the U.S. one of the most significant current and emerging P3 markets in the world. To date, 37 out of 50 States, the District of Columbia and Puerto Rico have passed some form of P3 legislation, most recently New Jersey in 2018. While toll roads dominated the first generation of U.S. P3s, there is now much greater diversity in the types of projects and deal structures utilised for U.S. P3 transactions. For example, in the airport sector there have been a number of recent P3 transactions not involving a full airport concession but rather P3's for either a terminal building, such as Denver Great Hall and New York LaGuardia Central Terminal Building, or for related infrastructure, such as the previously mentioned LAX consolidated rental car facility and automated people mover P3s. Civil and educational facility P3s are also on the rise, including the Maryland Howard County Courthouse P3, which was awarded in 2018 to a consortium led by Edgemoor Infrastructure and Star America, and university energy system P3s, such as at California State University – Fresno and Dartmouth College, which are both currently in the market. Each of these projects is structured as an availability payment P3, demonstrating willingness by public sector sponsors to depart from the traditional revenue risk P3 model.

Geoff Haley

Haley: PPP offers the ability to provide projects built on time and within budget. The investment, management and ownership of the risks are duly transferred to the private sector.

Q7. Have you noticed any other trends or strategies in the way projects are being prepared and financed?

Joshua Nickerson

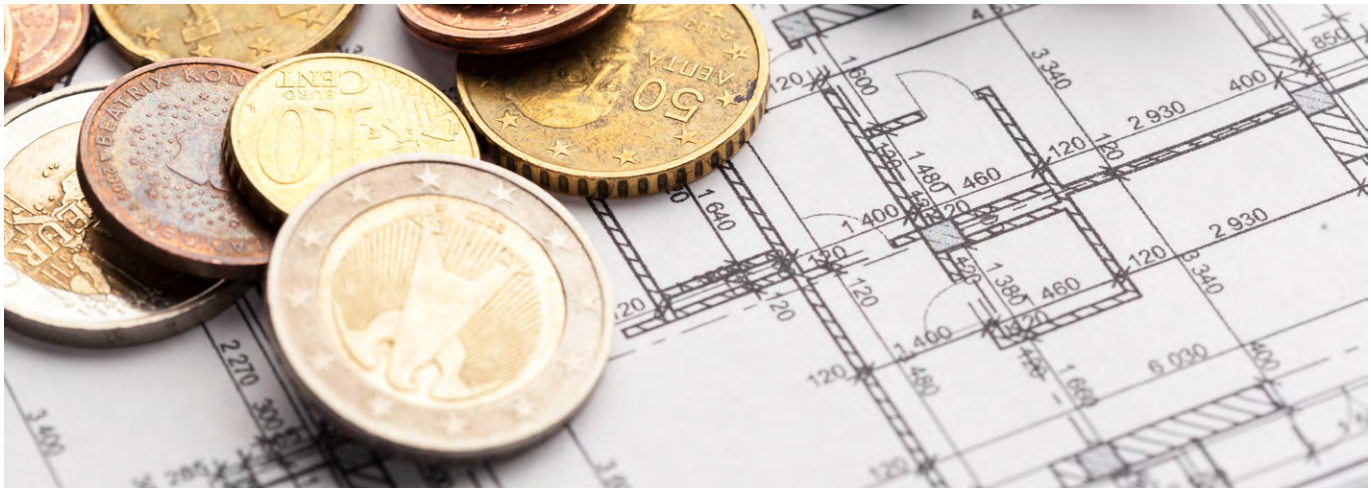
Nickerson: Traditionally, private project finance in the U.S. was the domain of commercial banks. In the last decade, there has been a pronounced shift away from bank loans to private placements, Term B loans and 144A bond offerings to meet a project's debt capital needs. The longer tenors (often at fixed rates and featuring delayed draw mechanisms that avoid negative carry during construction) and more limited diligence requirements and covenant packages make these products very attractive and frequently outweigh relative disadvantages, such as less flexibility in obtaining amendments and waivers. Currently, there is a tremendous amount of capital held by institutional investors (insurance companies, pension funds, etc.) that is focused on the U.S. infrastructure market, which helps make pricing for private placements very competitive.

In the P3 marketplace, bank debt has been replaced largely by private activity bonds (PABs), which are tax exempt bonds (thus having a lower interest rate) that can be used by a private sector entity that is building a public asset, and where applicable long-tenor, low-interest rate loans provided by the U.S. Department of Transportation (USDOT) under its Transportation Infrastructure Finance and Innovation Act (TIFIA) federal credit program. PABs are restricted to statutorily defined qualified private activities (currently there are 27 categories). They are also subject to state volume caps (based on population size) and, for certain types of projects, total volume caps. USDOT is responsible for approving the allocation of PABs to specific transportation projects.

In the water sector, one recent trend is the use of long-term, low interest federal loans from the U.S. Environmental Protection Agency (EPA) under its Water Infrastructure Finance and Innovation Act (WIFIA) federal credit program. The WIFIA program was created in 2014 and completed financings for the first round of loan applicants in 2018. Based on this early success, there are now approximately 40 new projects identified for WIFIA financing. WIFIA loans can be sized up to 49% of the total costs for drinking water, waste water, sewer system, desalination projects and other critical water infrastructure facilities.

Geoff Haley

Haley: Infrastructure finance has evolved from the conventional project finance models to a combination of corporate and project finance structures. In addition, institutions and pension funds have entered the market offering protection during the construction phase.



Q8. How can investors better assess the projects they choose to invest in?

Fraser Hughes

Hughes: Strong performance and attractive investment features have led to significant funds flowing into the asset class over the past 10 years. This trend shows no sign of abating, with 71% of public pension funds believed to be allocating more money to infrastructure within the next 12 months.

The combination of increasing allocations and fund raising combined with a limited availability of assets means that asset managers have found it increasingly difficult to deploy capital. The latest Preqin figures estimate that $173bn of dry powder, or unspent capital commitments, is waiting on the sidelines to invest in unlisted or private infrastructure. Exacerbating this capital backlog is scarcity of core infrastructure assets in the direct market and high multiples. Not unsurprisingly, given the strong flow of investment, a recent survey undertaken by Preqin found that 59% of unlisted infrastructure fund managers see high valuations as the major challenge to capital deployment, while 52% of managers believe that infrastructure assets are currently overvalued. Furthermore 81% of managers are seeing more competition for assets relative to 12 months ago.

The graph displays the total return performance of global infrastructure – listed and unlisted versus equities, bonds and a CPI +5.5% benchmark. Infrastructure clearly outperforms equities and bonds over the long-term. In addition, listed infrastructure tracks unlisted infrastructure[1] closely over the 17 year time-period, which highlights the fact that it acts as a good substitute for direct or in unlisted infrastructure funds. Coupled to this, investors will also achieve:

- Diversification across regions, countries and core infrastructure sectors
- Exposure to quality core infrastructure assets and experienced management teams
- Attractive risk-adjusted returns versus a range of other asset classes
- Attractive yields underpinned cashflow stability
- Good levels of transparency and disclosure
- Defensive qualities (lower drawdowns and betas)
- The liquidity of public markets

Source: GLIO/Preqin

Ultimately, a carefully defined listed infrastructure market is made up of a large number of high-quality infrastructure assets, covering regulated utilities, energy transportation, transportation and communication infrastructure. These assets are mission critical to the needs of the global economy. Most institutions would gladly include these assets within their direct infrastructure portfolios if they were available in unlisted form. Accordingly, the $2.3 trillion listed infrastructure market demonstrates desirable investment characteristics over many years and can and should play a valuable long-term strategic and tactical role within an institution's broader infrastructure allocation.

1. The Preqin unlisted infrastructure index is valuation based. We 'lag' the Preqin index seven months to account for the lag and use the low point of the GFC as the anchor point.

Q9. What impact does political and economic factors play in determining the success and viability of regional infrastructure projects?

Joshua Nickerson

Nickerson: Political factors are often just as important as economics to the outcome of an infrastructure project or transaction in the U.S. While the U.S. enjoys a well-deserved reputation as a stable investment market where the rule of law prevails, political risk is an undeniable factor in infrastructure deals. This is especially true in the P3 sector, which by its nature involves assets and systems relied on by the general public. Certain states and localities have built up experience and expertise in P3s over the past fifteen years. They have well designed procedures to evaluate whether a P3 is the correct solution for a particular infrastructure project and, if it is, to conduct a robust P3 RFP and approval process that allows political and stakeholder input but reduces the risk of a project being held hostage by political controversy or gamesmanship once the investor community has been engaged. In states or cities where there is either no statutory authorisation for P3s or the authorising legislation untested or not well understood, political risk becomes a much bigger issue and success for a project becomes dependent on having a political champion who can shepherd the deal through whatever opposition exists.

The need for political coordination becomes amplified when an infrastructure project affects multiple states. For example, the Gateway Development Corporation's Hudson River tunnel project, mentioned above, is a marquee regional infrastructure project that cannot succeed without close political cooperation between the federal government and the states of New York and New Jersey. The states are doing their part, by committing funds for project costs, conducting geotechnical and other value engineering studies, and by sponsoring parallel bills in each state's legislature that will create a new bi-state commission that has the authority to enter into project and financing contractual arrangements with private sector and governmental entities and to receive grants. The next critical steps are for the Federal Transit Administration to finalise and release an environmental impact statement for the project and revise its "overall project rating" for the project from Medium-Low to at least Medium, so that he project is eligible to receive funding under the Federal Transit Administration's Capital Improvement Program.

Political factors also affect the availability of project financing in other important ways. Consider the U.S. Export-Import Bank, which has lacked authority to make loans or guarantees in excess of US$10 million since 2015 because a group of U.S. senators – who consider the bank to be a form of corporate welfare – has blocked the appointment of nominees to the bank's board of directors and deprived it of the minimum quorum needed to approve such loans and guarantees. That problem, however, will go away at least temporarily as the U.S. Senate, on 7 May 2019, finally considered and approved nominees to the bank's board who will be sufficient to form a quorum for voting purposes. Congress will need to act again in September to reauthorise the bank's charter for another five years.

Q10. Can you detail how technology has altered the current infrastructure landscape and outline how further development and innovation is likely to impact the industry?

Manuel Protasio

Protasio: Technology and data are increasingly driving and disrupting infrastructure projects. This impact is going to keep increasing over time. And how so? Firstly, infrastructure is now more efficient to end-users, with, for example, automated payment for tolls, electronic passport control (or even electronic boarding passes on planes), employment of drones and 3D technology in the construction of infrastructure; secondly, technology has helped improve the quality and efficiency of operation and maintenance of infrastructure. For example, motorways use sensors on roads to help monitor traffic flow on roads.

Q10. Can you detail how technology has altered the current infrastructure landscape and outline how further development and innovation is likely to impact the industry?

Manuel Protasio

It is highly likely that new technologies and developments will have a significant impact on the infrastructure sector. New technologies, such as data analysis technologies, which collect and analyse information regarding each infrastructure will improve efficiency, especially regarding maintenance of the infrastructure, by predicting and detecting errors even before they happen and anticipating needs that validates the implementation of a new infrastructure. The growing use of drones is also expected to have a considerable effect, either by increasing the amount of inspections some infrastructure may be subject to, dealing with incidents without having to endanger human lives, and so on. New mobility (electric vehicles, autonomous vehicles), smart cities, and smart buildings, are also predicted to impact this industry.

In this respect, it is worth mentioning that the legal framework of public procurement, at European level, provide a host of opportunities and facilities to enhance the promotion of innovative aspects. This goal may be achieved not only through a supply-oriented policy such as the promotion of research and innovation projects, but also from the demand side through public procurement of innovative products, system solutions and services. In fact, public contracting authorities are required to act according to the principles of efficiency and economy in the procurement of supplies, services and works. This innovation guideline may be found in the European framework for public procurement in the demand for innovative products and on the structure of procurement process itself.

Joshua Nickerson

Nickerson: There are several technological developments that should dramatically impact transportation, energy and telecommunications infrastructure in the near future. For surface transportation infrastructure, autonomous vehicles and drones are two technologies that will have large and lasting effects. For each of these technologies, there are far-reaching societal questions that remain to be answered from a policy perspective, and those issues will need to be resolved in some way before it is possible to articulate a regulatory scheme for integrating these technologies into ordinary commuting and freight hauling operations. From a transportation planning and finance perspective, the key question is how will the development and expansion of autonomous vehicles and drones affect road utilisation and congestion, especially on tolled roads and lanes that depend on toll revenues to pay debt service and, where applicable, provide an equity return for P3 investors.

In the electric utility sector, the development of battery storage technologies will transform the market and accelerate the shift towards renewable energy in the electric generation stack. The single biggest flaw with renewables other than some hydropower is that they are an intermittent resource. If the wind subsides or the sky is cloudy, no electricity is produced. High capacity batteries can bank excess energy produced by the renewable facility during peak operating periods and can discharge the stored electricity during periods when the renewable resource is unavailable. The Federal Energy Regulatory Commission (FERC) promulgated Order 841 in 2018 to remove barriers to participation of electric storage resources in capacity, energy and ancillary service markets and direct regional transmission grid operators (RTOs) to establish market rules to allow energy storage to participate in wholesale markets. The RTO's issued their compliance filings at the end of 2018 and now have until the end of 2019 to implement those market rule changes.

It's also worth mentioning the impact that changes in ship building technologies are having on port investments and port competition in the U.S. Post-Panamax cargo ships require deeper and wider ship channels, larger turning notches and berths, taller cargo lifting gantries and larger storage facilities and intermodal facilities to handle the larger cargo loads from each ship. U.S. ports are spending hundreds of millions of dollars to adapt to this technological change. They are also in a race with each other to provide post-Panamax ready facilities as quickly as possible so as to win new business or preserve existing business from shippers.

Q10. Can you detail how technology has altered the current infrastructure landscape and outline how further development and innovation is likely to impact the industry?

Fraser Hughes

Hughes: Mobile data usage will continue to grow over the next five years. CISCO estimate that average global traffic per month will grow from 1GB to 6GB. In the United States and Europe, these numbers are much higher. Plus, as 5G emerges, the need for expanded telecommunication infrastructure is critical. 5G applications fall into two broad categories:

- The Internet of Things (IOT) for large populations of objects as well as low latency usages such as connected cars
- Massive broadband in specific areas (i.e., fixed to mobile substitution)

In order to ensure we stay connected, independent telecom infrastructure companies like America Tower, Crown Castle and SBA Communications are developing innovative ways to densify the network which includes the densification of macro sites (towers) and the expansion of smaller small cell micro sites.

Q11. To what extent could the development of existing infrastructure help reduce infrastructure costs?

Manuel Protasio

Protasio: This is a complex question, as some factors – such as population growth, urbanisation, climate change and ageing of the existing infrastructure – are ought to increase the investments needed in infrastructure. Demand on the existing infrastructure will increase and the need for greener energies will rise as well. However, the use of new technologies (sensors, data analysis, artificial intelligence, etc.) that makes infrastructure and its operation and maintenance more efficient will certainly help to reduce infrastructure costs. For instance, the employment of drones on the surveillance of buildings and road infrastructure is a good example of how the technology may help to improve the performance of the operation and maintenance of infrastructure.

The infrastructure will be increasingly focused on best performance and OPEX optimisation. As mentioned above, under the EU procurement rules enacted in 2014, a contract must be awarded based on the most economically advantageous tender (MEAT). Cost or price will form part of the assessment of any procedure and is usually one of the most decisive factors. Purchase price, however, is just one of the cost elements in the whole process of purchasing, owning and disposing. Lifecycle costing (LCC) means considering all the costs that will be incurred during the lifetime of the product, work or service, which shall be divided as follows: (i) purchase price and related costs (delivery, installation, insurance, etc.), (ii) operating costs, including energy, fuel and water use, spares and maintenance and (iii) end-of-life costs (such as decommissioning or disposal). LCC may also include the cost of externalities (such as greenhouse gas emissions) under specific conditions laid out in the directives. The current (2014) directives provide for specific rules also apply regarding methods for assigning costs to environmental externalities. By applying LCC, public purchasers take into account the costs of the resource use, maintenance and disposal which are not reflected in the purchase price. Often this will lead to 'win-win' situations whereby a greener product, work or service is also cheaper overall.

"The employment of drones on the surveillance of buildings and road infrastructure is a good example of how the technology may help to improve the performance of the operation and maintenance of infrastructure."
- Manuel Protasio -

Q12. Where will the best opportunities be in the near future?

Manuel Protasio

Protasio: Infrastructure is essential for improving everyday life and, as such, it must always be seen as an opportunity.

Regarding the opportunities ahead, we would highlight the need to upgrade existing infrastructure, in order to meet current and future needs and the increasing demand for infrastructure. Secondly, and as referred previously, the best opportunities in infrastructure are related to the development and implementation of new and smart technologies on the infrastructure industry ("Infratech"). One of the main challenges of players in the infrastructure industry will be to put in place fully developed digital strategies to respond to new risks and possibilities. In addition, how will technology companies take advantage of the new opportunities that these major projects present? We believe that both infrastructure and technology sectors need to engage further with each other to drive a new era of Infratech and take full advantage of this "revolution".

Moreover, infrastructure must be adjusted to be more environmentally sustainable. The procurement of new products and services may be more economical than the conventional solution when the medium and long-term utility value and total life-cycle costs are taken into consideration. In many cases, innovative services and products with positive environmental effects, for example through energy savings, are linked.

As for the sectors where major opportunities are expected, mobility will certainly be one of those cases: autonomous cars and new roads designed for that purpose, improvement and upgrade of public transportation, as to reduce the use of private vehicles, the use of electric vehicles, or new ways of car sharing, these are all future opportunities arising hand in hand with the increasing acceptance of the MaaS (Mobility as a Service) as concept in many countries.

The energy sector is another key opportunity: moving from fossil fuels to renewable energy, adapting electricity structures for the use of electric vehicles, the opportunities are several.
Additionally, there are plenty of opportunities in emerging markets, where there is a huge gap for basic infrastructure (like water and sanitation, electric network and hospitals) because it simply does not exist or is not adapted to the needs of the population.

Finally, with respect to the construction industry, it is worth mentioning that the recent boost of the tourism sector has proved to be vital for the renovation of the historical centres of main cities, with a positive impact on small and medium-sized construction companies.

All in all, infrastructure presents itself as a long-term opportunity.

Geoff Haley

Haley: Country opportunities change from year to year depending on the political powers in place. It's often better to look for a country with a public strategy for PPP, who are providing and have published a list of deals they will procure and a fixed time period to achieve them.

Q12. Where will the best opportunities be in the near future?

Fraser Hughes

Hughes: Energy transportation infrastructure is a great example of new opportunities. A leading development in recent years is the emergence of liquefied natural gas (LNG). LNG is clean, secure, affordable and moreover transportable. A case study of these new developments is the operations of Cheniere Energy. Cheniere is operating, constructing, and developing two LNG facilities on the United States Gulf Coast. Cheniere's Sabine Pass liquefaction project (SPL Project) located in Cameron Parish in southwest Louisiana, and the Corpus Christi liquefaction facility (CCL Project) is under construction in South Texas. CCL is expected to become fully operational in 2019. In February 2016, Cheniere became the first company to ship LNG from a commercial facility in the contiguous United States. Since start-up, more than 500 cumulative cargoes of LNG originating from Cheniere have been delivered to 30 countries and regions worldwide highlighting the transportability of this product.

As LNG supply increases, companies such as ONEOK, which is one of the largest energy midstream service providers in the United States are well positioned to accommodate new volumes. The company owns a 38,000 integrated network of LNG and natural gas pipelines. The company has $6bn earmarked for growth projects in LNG alone. China's rising demand for natural gas has given the LNG market a big boost and some say the best is yet to come. The main driver for the increased Chinese demand for natural gas is the desire to reduce pollution in at home. Coal is the primary source of energy in China which is among the dirtiest forms of energy. Substituting coal in favour of much cleaner natural gas is one way of cleaning up pollution.

Q13. In an ideal world what would you like to see implemented or changed?

Fraser Hughes

Hughes: Infrastructure maintenance, upgrades and developments are a high-order priority for federal governments worldwide. More specifically, this means investments in critical economic infrastructure such as roads, railways, bridges, sea-ports, airports, utilities such as power and water, energy transportation and telecom infrastructure. Estimates for the scale of what's required vary, but the numbers remain eye-watering as mentioned earlier. Moreover, the gap between capital needed and predicted levels of investment is alarming.

McKinsey estimate US$69 trillion is required in infrastructure investment to support the world's economic needs by 2035. On an annual basis the world needs to invest an average of US$3.7 trillion in infrastructure assets every year through 2035 in order to keep pace with projected GDP growth. McKinsey also state that needs could increase further by up to US$1 trillion annually in order to meet the United Nations' sustainable development goals. The bottom line is that they estimate a US$5.5 trillion spending or investment gap globally between now and 2035.

We believe that the further expansion of current REIT legislation, or the introduction of a specifically defined core Infrastructure Investment Trust (IIT), would offer the asset class many benefits. The tax-efficient ownership of infrastructure through a liquid vehicle will appeal to a broad range of global investors (as we have experienced with REITs over the last 20 years). Moreover, the vehicle could be an extremely effective part-solution for the estimated infrastructure investment funding gap.

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