



Infrastructure finance

Policy briefing

Key findings

In the UK and elsewhere, investment in infrastructure is falling short of social needs.

In this context, it is important to recognise that infrastructure projects are complex, and how their financing is structured can have a big impact on whether there is sufficient momentum to get them off the ground, as well as on subsequent revenues.

In recent years in the UK, money has been available for suitable projects, but projects that ought to attract support sometimes fail to do so. This is because they fail to offer investors an attractive balance of risk and reward due to inadequate planning, management and financial structures.

Projects that are focused on the construction stage face even greater hurdles securing finance because potential investors are generally exposed to greater risks than if they invest when development is complete and the asset is operational.

UK institutional investors face challenges if they wish to invest in infrastructure. Pension funds often lack the resources to research projects in depth, and defined contribution funds must also meet requirements for daily liquidity. Insurance companies need to reassure regulators that investments meet stringent solvency requirements.

In the long term, a greater focus on sustainability considerations could change investment priorities and help to reduce the infrastructure investment shortfall.

The government can provide a framework to encourage private investment in several ways. These include guarantees to limit investors' risk exposure, incentives to increase the level of institutional investment, publicising a project pipeline to clarify the government's priorities, and streamlining administrative processes for investors.

This paper includes a case study examining an idea inspired by Islamic finance, namely that the government could issue bond-like instruments that offer investors a share of profits or turnover rather than interest, and so avoid adding to public sector debt.

Investing for
sustainable
growth

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Introduction

This paper highlights the infrastructure ‘investment gap’, whereby insufficient private investment is being committed to support priorities for new infrastructure or for improvements to existing infrastructure.

It argues that this is not caused by an inability to raise finance (as the following section explains), but is due instead to a misalignment between investors’ priorities and those of project sponsors which makes it challenging to direct investment to where it is needed. The paper suggests some possible options for addressing this issue, focusing on the UK context. This is not because the issues do not apply in other countries, but simply in order to paint a coherent picture of infrastructure investment in one market.

In 2015 the Institute and Faculty of Actuaries (IFoA) published a paper analysing risk and return in infrastructure investments.ⁱ The following year an IFoA policy briefingⁱⁱ analysed the infrastructure investment gap, and more recently the IFoA has investigated more specific aspects, such as green infrastructure and illiquid assets.

The approach taken to financing can have a big impact on the overall delivery of a project. One striking example is the Thames Tideway Tunnel.ⁱⁱⁱ The purpose of this 25km tunnel running below the River Thames is to prevent millions of tonnes of sewage from overflowing into the river, leading to a substantial improvement in its ecology. Tideway is a regulated infrastructure provider with responsibility for designing, constructing, owning and financing the project.

The construction work is being financed through net proceeds from the issuance of green bonds by Tideway. Tideway’s revenues are collected by Thames Water from its wastewater customers. Each year, Tideway is required to calculate its revenue for the following financial year, in accordance with its licence. The regulator Ofwat notifies the amount to Thames Water, which incorporates it into customer bills.^{iv}

In a short interview the legal adviser to Thames Water on the project explained that:^v

- the regulated asset structure meant Thames Water itself provided a Board and project team, and handled construction contracts. This essentially converted a greenfield to a brownfield project, which was more attractive to private investors
- the financing structure significantly reduced additional costs to consumers
- public funding for the project had ‘contingent’ status, making it ‘off balance sheet’ – not classed as public sector debt and therefore more attractive for the government.

The approach taken to financing can have a big impact on the overall performance of a project.

Matching infrastructure investors with the right projects

The supply of finance

In recent years there has been an increase in the number and size of UK infrastructure projects accessing finance, both through project-specific finance and corporate finance.

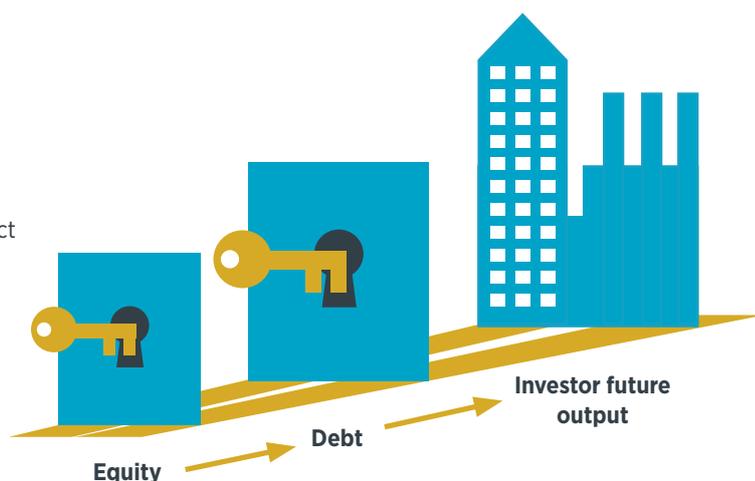
Looking ahead, there has been some concern about the impact of Brexit on loans for UK infrastructure from the European Investment Bank. However, research commissioned by the National Infrastructure Commission (NIC)^{vi} suggests that even if such loans ceased this may not necessarily harm access to finance for UK projects (although it would likely increase the cost of finance).

Investable opportunities

Although money may be chasing projects, this does not mean that all potentially viable projects are getting the support they need. The ability to source finance for a project is a necessary condition for it to be investable, but not a sufficient one. Actually securing that finance depends on how well the project is planned, managed and structured.^{vii} If these factors are strong the project can be seen as investable.

In the UK various initiatives exist to help sponsors make projects more investable by improving planning, management and structuring. On planning and management, for example, the Risk Group, a joint working party of civil engineers and actuaries, developed a publication entitled *Key front-end issues* that examined the issues involved in planning major infrastructure projects. The executive summary describes why the London Olympics was such a successful project: *“It benefited substantially from strong front-end thinking, with clear objectives, good organisation and leadership, stakeholder involvement, much thought about all the complex details and requirements for operational success, and effective risk control and mitigation.”* On project structuring, the Infrastructure and Projects Authority is a public body that aims to build confidence in the private sector to increase infrastructure investment by creating a clear pipeline of future projects and developing supportive financial structures.

Even if a particular project is investable, if the project faces significant risks it could still struggle to secure support if there is a shortage of potential investors with sufficient risk appetite.



When thinking about investable opportunities it is important to distinguish between debt and equity investment. On average, debt makes up 80%–90% of a project’s capital requirement, with equity making up the remainder.^{viii} Debt is usually associated with projects in their operational stages, when revenues are more stable and investors with relatively low risk appetites may be interested. By contrast, a greater risk appetite is usually needed for equity investment, and this is often associated with the earlier construction stage of the project.

One approach for increasing available finance could be to include more brownfield options (ie existing developments) in the pipeline of future projects. This would make more projects available to investors with lower risk appetites because of factors such as lower start-up costs and quicker construction times (though these are not always present). However, in the longer term, the need for new construction will recur and the challenge of financing higher risk projects cannot be avoided. Another approach is to develop a range of investable structures to suit different risk appetites, which might include offering different tranches of investment to align with the risk profiles of different stages in a single project.

Actuaries have traditionally been involved in advising institutions like insurance companies and pension funds on the financial elements of infrastructure investment. More recently, some actuaries have worked more directly on specific projects, building expertise on project risks which can also provide comfort for investors.

Challenges faced by institutional investors in infrastructure

Every institutional investor will have a unique risk appetite – an attitude to the trade-off between potential returns and corresponding risks – which reflects its particular circumstances. However, it is possible to highlight some important drivers for different types of institution.

Pension funds

For pension funds, for example, infrastructure assets are a good fit with funds' liabilities and therefore should be attractive options. However, in the UK pension funds are allocating on average 3.6% versus a target allocation of 4.8%, so there is scope for more investment.

One important factor behind this investment gap is that even where a project is aligned well with an investor's risk appetite and investment strategy, funds may struggle to build a clear picture of the project risks, especially larger or more extreme ones.

The IFoA has suggested that the quality of information possessed by investors could be improved by giving them access to project sponsors' risk assessments at the planning stage.

One important observation from a 2018 roundtable organised by the IFoA and the NIC was that in infrastructure projects, the measures used to assess how well the construction process is managed are often very basic, eg not exceeding budget by more than a percentage contingency. This contrasts with the sophisticated analysis and risk assessment used for aspects of the project other than construction, such as planning. The limited risk analysis of the construction process is often one of the reasons why projects go off track in terms of budget and timeframes. The negative press and investor outcomes this can create may be one factor behind low pension fund investment in the construction phase. Greater actuarial involvement in the financial aspects of construction could lead to more sophisticated risk analysis and ultimately could help to improve the quality of information available to investors. The RAMP process – Risk Analysis and Management for Projects – is one way in which construction costs and timescales can be managed effectively, and investors taking construction risk could encourage the project team to use RAMP or a similar comprehensive methodology.^{ix}

Many UK pension funds struggle to assess project risks accurately because their limited size and resources mean they lack in-house expertise in infrastructure. Lack of scale also limits the size of deals that funds can access. Solutions for smaller pension funds include accessing investment through intermediaries like asset managers or the Pensions Infrastructure Platform (PIP), and pooling of assets in Local Government Pension Schemes.

Defined contribution (DC) pension fund investment is becoming more important with the decline of defined benefits (DB) and the growth of auto-enrolment. Many illiquid infrastructure investments are suitable for DC funds but they face structural barriers such as daily liquidity requirements. Managers of illiquid investments often charge performance fees, and the government is considering regulatory changes to ensure that existing caps on fees to protect investors do not damage the illiquid market. This accords with a recent paper by the IFoA Working Party on Accessing Illiquidity in the DC Market,^x which recommends that regulators and governments should focus on value for money rather than the absolute cost of member charges.

Insurance companies

For insurance companies, like pension funds, there are potential benefits to investing in infrastructure, which could include diversification, matching liabilities and higher risk-adjusted returns that reflect the illiquid nature of the assets.

As with pension funds, however, there are also challenges for insurers. In particular, they are subject to the regulatory requirements of the EU's Solvency II framework. Solvency II has given insurers more responsibility for investment decisions and increased reporting requirements on their assets. This is particularly difficult for private infrastructure investments: these *"do not have quoted market prices and typically the long duration debt is unrated. Strong governance of valuation methodologies and internal credit ratings are essential in the investment process and critical to assessing insurers' solvency and capital efficiency."*^{xi}

Regulators have made adjustments to allow the Solvency II capital requirements to be relaxed for qualifying infrastructure investments that have positive risk profiles meeting certain criteria. In doing so they have recognised the need to balance insurance capital requirements that are designed to maintain financial stability against the economic and social benefits from a vibrant infrastructure sector.

Infrastructure and sustainable investment

The UK has made domestic and international commitments to achieve environmental and sustainability targets, such as the Paris Agreement limiting carbon emissions, and the UN Sustainable Development Goals. To meet these targets, a considerable amount of new and resilient infrastructure will be needed, requiring significant capital investment.

In October 2017 the IFoA held a joint roundtable with the Aldersgate Group on sustainable infrastructure investment.^{xii} One of the conclusions from that discussion was that: *“The externalities of all investments should be incorporated into the risk assessment in order to level the playing field and bolster the fundamentally strong case for investment in infrastructure.”* As well as taking account of externalities, there was agreement about the importance of using a lifecycle approach to value projects from inception to decommissioning.

As these kind of approaches focusing on sustainability become more integrated into mainstream investment thinking, this could help to increase the overall allocation of investment to infrastructure projects with the right characteristics.

How can the government address the infrastructure investment gap?

The government has a key role to play in making particularly large or complex infrastructure projects attractive to private investors, from regulatory mechanisms to full government guarantees.

In its interim response^{xiii} to the National Infrastructure Assessment produced by the NIC, the government stated its commitment to a range of tools for ensuring that projects can raise the finance they need. This includes the UK Guarantees Scheme, which provides £40 billion of Treasury backing for loans to major infrastructure projects. For example, guarantees might cover construction risks, such as credit to cover replacement costs for a failed contractor.

In the UK in recent years, an important model for securing private finance for public sector infrastructure has been the Private Finance Initiative (PFI). In this model, the government uses private contractors to build and maintain public infrastructure and then pays an annual fee to use it.

A Public Accounts Committee inquiry in June 2018^{xiv} was critical of PFI on value for money grounds, and in November 2018 the Chancellor announced in his Budget speech that the programme is being discontinued. He also said that the government will create a new centre of excellence to manage the 700 existing PFI contracts across the public sector.

Even before this announcement the PFI programme had been in decline, leading to an awareness that without a template like PFI, the market will need to develop bespoke deal structures. Although there is some concern that this could be more expensive and time consuming than the old approach, this could be remedied by greater reliance on private investments and more innovative methods of government funding.

The government dictates the pipeline of infrastructure projects that are deemed important to implement over the next few years (see *Figure 1*). This gives the government strategic influence over the types of project it wishes to prioritise. For example, it could make investable brownfield projects available to institutional investors, and then reinvest the sale proceeds into greenfield infrastructure developments.

Electoral pressures can lead politicians to have much shorter time horizons than infrastructure investors, and this can make investors wary, even when seemingly generous government support is on offer. For example, in 2015 the UK government reduced subsidies for householders to install solar power. The government explained that the market was establishing itself and its costs were falling, and the decision reflected the desire for *“a low carbon energy sector that can stand on its own two feet rather than relying on subsidies”*.^{xv} While this is a reasonable rationale, the wider problem is that investors value political stability and struggle to factor political uncertainty into their long-term decisions.

One further role for government is to make the investment process easier by simplifying administration as far as possible, facilitating access to projects for the maximum possible range of investors, and ensuring that potential investors have adequate and accurate information. Such measures would allow investors to make more accurate assessments of the risks involved.

Figure 1. Funding mix of the infrastructure projects pipeline 2018/19 - 2020/21 by sector



Case study - sukuk finance

Most governments aim to keep a tight rein on public sector debt. This case study examines a possible approach that might allow the UK government to finance infrastructure projects without adding to government debt.

The term 'sukuk' is Arabic for financial certificates.

Sukuk are Islamic bonds that generate returns for investors but do not involve interest. When you buy a sukuk bond you are investing in the issuer's project, and your money becomes part of the assets of that project in order to generate profit or turnover. You then receive some of the profit or turnover, based on a pre-agreed ratio.

Sukuk bonds have grown in popularity since 2000, when the first sukuk was issued by Malaysia. Currently they are used by both Islamic corporations and state-run organisations, and make up a significant share of the global bond market. As noted earlier, the infrastructure investment gap is not just a UK issue, and therefore there could be relevant lessons for the UK from studying the development of sukuk finance in markets such as Malaysia and Bahrain.

The UK government could potentially issue sukuk (or sukuk-style) bonds to finance infrastructure projects. It could do this in two ways: it could seek investment from Islamic investors (largely outside the UK) by ensuring strict compliance with sukuk requirements, or it could look to attract domestic investment while using financial structures broadly in line with sukuk principles. Both approaches could be used concurrently.

Taking the first approach, there is evidence^{xvi} that the UK is already one of the most important centres of sukuk finance outside the Muslim world, but according to Sultan Choudhury, CEO of Al Rayan Bank, there are opportunities to grow the sector still further: *"I know that in the last few years the government presented a number of UK development projects to Islamic finance and GCC [Gulf Co-operation Council] investors ... I think there is potential for the UK to receive FDI [foreign direct investment] for infrastructure from the Islamic finance market. But the government needs to understand how to structure these projects to make them attractive to Islamic finance investors and come up with more innovative ways to put these opportunities together."*

The second approach would involve the UK government seeking investment in infrastructure projects from domestic, non-Islamic private sector investors.

Under the first approach, the sukuk structure would be used to increase overseas investment in the UK. In the second, it would be a way for the government to act in partnership with domestic investors and thus to avoid adding to government debts on the public sector balance sheet.

The IFoA's Infrastructure Working Party recently devised a (non-sukuk) model for leasing transport infrastructure in which the investor buys a lease for a sum agreed at the start of construction, with the lease not set to begin until the project starts its operational phase. A proportion of the operating company's revenues is paid to the investor as income. This model would be a logical extension of existing practice for some infrastructure with a defined revenue stream, in which institutional investors accept rents from the tenants of their commercial property investments in the form of a percentage of audited turnover.

This model could potentially be implemented by combining two of the many variants of sukuk:^{xvii}

- **Al-Salam**^{xviii} – a special purpose vehicle (SPV) agrees to buy an asset at a future date in exchange for advance payments.
- **Ijarah**^{xix} – these are sukuk leases.

The UK government could potentially issue sukuk (or sukuk-style) bonds to finance infrastructure projects.

Summary and next steps

There is a relatively deep supply of finance for infrastructure projects in the UK, but there are challenges in making projects investable, especially if they are large and complex. This paper highlights these challenges and the role government can play in this area.

Many projects are simply not investable because of a combination of poor planning, bad management and lack of robust financial structures. Potential investors too face a range of challenges, and the paper explores some of the distinct issues that different types of institutions are dealing with, such as lack of infrastructure expertise for defined benefit pension funds, defined contribution funds that struggle to invest in illiquid infrastructure assets because they need to demonstrate their own liquidity on a regular basis, and insurance companies that must show their infrastructure investments comply with the Solvency II regulatory framework.

The paper discusses ways in which the government can help to address some of these problems, such as providing loan guarantees, managing the project pipeline and regulating to make the investment process more straightforward. For investors with a long-term stake in infrastructure it is just as important to feel confident that the political environment is relatively stable. In addition, the government has a role in promoting sustainable investment, which in time should help to expand the infrastructure sector. The case study considers whether the government could use approaches based on sukuk finance to attract more private investment without increasing its own debt.

Actuaries' training and practical experience gives them a good understanding of problems involving finance, risk and long-term horizons. This makes them well-placed to study some of the issues discussed in this paper. However, since few actuaries are infrastructure specialists, collaborative efforts between actuaries and non-actuaries are likely to be most effective. We would welcome ideas from both groups on future research and policy engagement by the IFoA.

We believe that government also has a role in promoting sustainable investment, which in time should help to expand the infrastructure sector.

References

- i. IFoA Infrastructure Working Party (2015) Infrastructure – a sensible investment <https://www.actuaries.org.uk/documents/infrastructure-sensible-investment>
- ii. IFoA (2016) Infrastructure investment – mind the gap <https://www.actuaries.org.uk/documents/infrastructure-investment-mind-gap-policy-briefing>
- iii. Thames Tideway Tunnel <https://www.tideway.london/the-tunnel/>
- iv. Thames Tideway Tunnel <https://www.tideway.london/corporate-info/revenue-statement/>
- v. Allens Linklaters international lawyers – Thames Tideway case study video available at <http://allens.publish.viostream.com/thames-tideway-tunnel-and-the-regulated-asset-base?text=true>
- vi. Cambridge Economic Policy Associates Ltd (2017) Financing for infrastructure – Background evidence – review of the UK infrastructure financing market <https://www.nic.org.uk/wp-content/uploads/Review-of-infrastructure-financing-market.pdf>
- vii. Torsten Ehlers (2014) Understanding the challenges for infrastructure finance <https://www.bis.org/publ/work454.htm>
- viii. EY (2015) Infrastructure investments - An attractive option to help deliver a prosperous and sustainable economy [https://www.ey.com/Publication/vwLUAssets/EY-infrastructure-investments-for-insurers/\\$FILE/EY-infrastructure-investments-for-insurers.pdf](https://www.ey.com/Publication/vwLUAssets/EY-infrastructure-investments-for-insurers/$FILE/EY-infrastructure-investments-for-insurers.pdf)
- ix. IFoA and Institution of Civil Engineers (2014) Risk Analysis and Management for Projects <https://www.ice.org.uk/eventarchive/risk-analysis-and-management-for-projects>
- x. IFoA Working Party - Accessing illiquidity in the DC market (2018) Illiquid solutions for better DC outcomes <https://www.actuaries.org.uk/documents/illiquid-solutions-better-dc-outcomes>
- xi. Richard Pereira in Financial Times online (2018) Insurers have a big role to play in closing infrastructure gaps <https://www.ft.com/content/56504c1c-011f-11e8-9650-9c0ad2d7c5b5>
- xii. IFoA joint roundtable with Aldersgate Group (2017) Understanding risk in sustainable infrastructure investments <https://www.actuaries.org.uk/documents/roundtable-summary-understanding-risk-sustainable-infrastructure-investments>
- xiii. HM Treasury (2018) Interim response to the National Infrastructure Assessment https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/752340/NIA_Interim_Response_pdf.pdf
- xiv. UK Parliament Public Accounts Committee (2018) Summary of report on Private Finance Initiatives https://publications.parliament.uk/pa/cm201719/cmselect/cmpubacc/894/89403.htm#_idTextAnchor000
- xv. Adam Vaughan in The Guardian online (2016) UK solar power installations plummet after government cuts <https://www.theguardian.com/environment/2016/apr/08/solar-installation-in-british-homes-falls-by-three-quarters-after-subsidy-cuts>
- xvi. John Foster in Raconteur (2018) How Islamic finance could plug the UK investment gap <https://www.raconteur.net/finance/islamic-finance-plug-uk-investment-gap>
- xvii. Fiona Ho in iMoney (2016) Investing In Sukuk: How Does It Work? <https://www.imoney.my/articles/investing-in-sukuk-how-does-it-work>
- xviii. IslamicMarkets.com Sukuk al-Salam <https://islamicmarkets.com/education/sukuk-al-salam>
- xix. FinancialIslam.com Ijarah <http://www.financialislam.com/ijarah.html#>



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