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SUMMARY REPORT

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Submitted by:

Cambridge Economic Policy Associates Ltd (CEPA)

CONTENTS

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Acknowledgements

This report was commissioned by the National Infrastructure Commission in October 2016, and reflects work completed over the period October 2016 through to March 2017.

To complete the report CEPA held a number of consultations with professionals involved within the infrastructure and finance industries: both policy makers and practitioners. The report also benefited from the input of industry experts through a roundtable event hosted by the National Infrastructure Commission in March 2017.

CEPA would like to take this opportunity to thank all who gave of their time so generously to contribute to this report.

EXECUTIVE SUMMARY

Cambridge Economic Policy Associates (CEPA) has been appointed by the National Infrastructure Commission (NIC) to undertake research into the strategic financing choices made by the private sector when investing in UK infrastructure and the role public funding and financing interventions can play in facilitating greater private investment. The aim is to provide the NIC with research which examines issues related to the provision of private finance for infrastructure to support the development of the National Infrastructure Assessment (NIA).

Ten year trend analysis

The value and volume of project financing transactions has returned to pre-financial crisis levels. However, over this period the composition of projects reaching financial close has changed, as the volume and value of social infrastructure projects delivered as PFIs has fallen, although this has been compensated for by greater investments in renewables.

The pricing of economic infrastructure assets have generally fallen over time, but only in line with the pricing of government yields.

Commercial banks remain an important source of finance for infrastructure projects. Whilst increasing relative to historical levels, pension fund investment in the equity of non-listed infrastructure projects remains below that of Australian and Canadian counterparts, who have been investing in the asset class for several years. In addition to private sources, considerable finance has also been provided by the European Investment Bank (EIB) and the Green Investment Bank (GIB), especially in renewables.

Investable projects in the UK

Except for some specific risks that cannot be mitigated through alternative sources, most projects are currently financeable without the need for specific government financing guarantees. However, different market participants will have appetites for different risks, and depending on how the project is structured, the universe of potential financiers will differ.

Unsurprisingly, the key constraint that operates in sectors relying on public funding is that of budgetary resource to fund projects which cannot rely fully on user charges. For example, while renewable energy-related projects have been funded through customers' bills, applying cost reflective user charging in transport has been more difficult. As a result, projects in road and rail face significant user funding constraints relative to energy, creating a need for public funding. Whilst aggregate funding constraints may exist in the transport sector, other methods of funding infrastructure projects should be considered, such as those used for some of London's rail transport.

Rather than project risk, the key constraint identified by interviewees was the lack of bankable project opportunities combined with limitations in project preparation and specifically the level of information presented in the current pipeline. A robust pipeline is

especially important where a sector is looking to bring in private investment having not done so, or having only done so on a limited scale before. Visibility of a potential flow of similar opportunities gives investors more incentive to invest in building up their own expertise and understanding of a new sector.

Pipelines should be more than just a list of projects and need to be considered from an investor perspective. At a minimum, investors will typically look for detail on the nature of the funding source for each project, the expected allocation of risks and the anticipated timescale to financial close. There needs to be sufficient detail to allow an investor to gauge whether the project is something to keep monitoring or to prepare for immediately.

Constraints to institutional finance

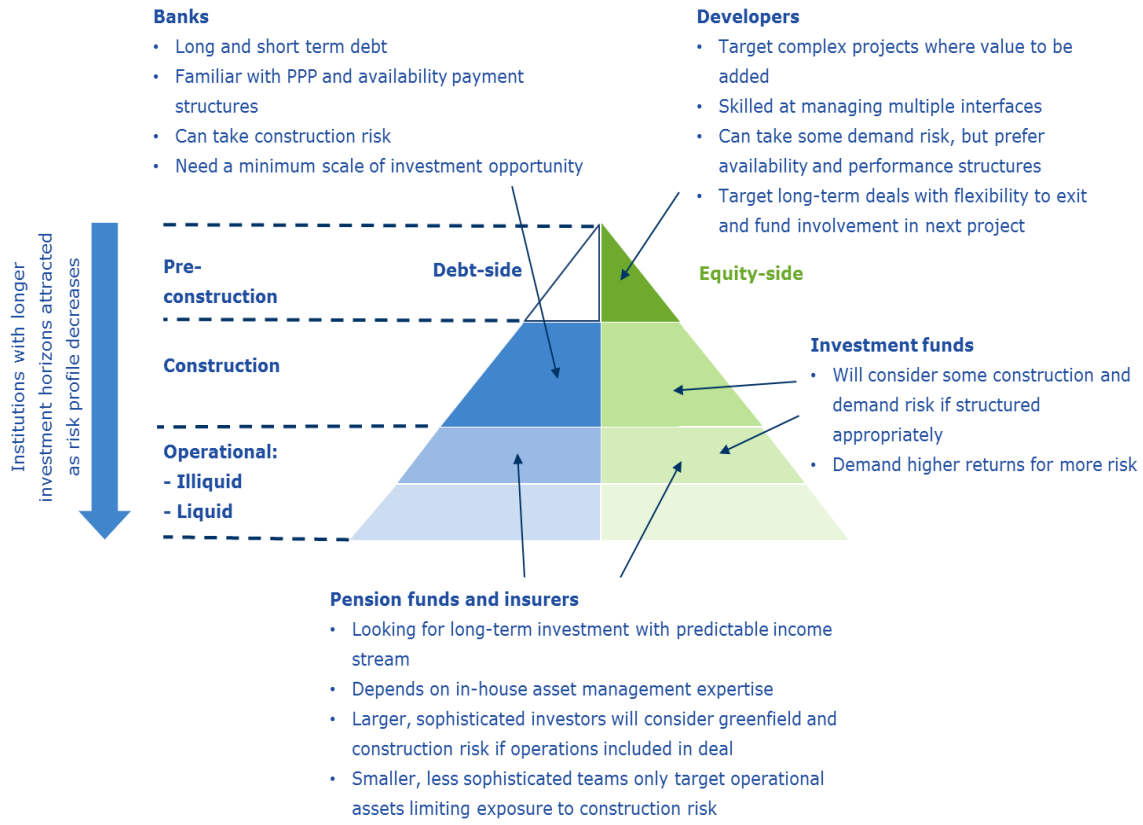
Whilst the overall UK pension fund market is large, it is relatively fragmented compared to countries where there has been large institutional investment in infrastructure. The size of funds is important because it can limit their ability to access infrastructure investment opportunities directly. A related point is that the smaller size of many UK pension funds makes it not worth their while to invest in creating their own in-house investment expertise, although initiatives such as the Pension Infrastructure Platform (PIP) are seeking to address this.

A key constraint facing both defined benefit (DB) and defined contribution (DC) pension schemes is, however, their liquidity requirements, which are determined by a combination of life-cycle and regulatory requirements. Although there are clear incentives to access long term illiquidity premiums, in the case of DB schemes, where outgoings are often greater than contribution payments, there is more of a need for a running yield. DC schemes face greater challenges in terms of the at least perceived regulatory need that their investments can be both priced and traded on a daily basis.

Risk appetite of different providers of finance

Figure.0.1 below provides an illustrative overview of where different types of equity and credit providers sit. Note that all providers can access liquid – that is, quoted – debt and equity should they wish.

Figure.0.1: Appetite/ positioning of different sources of capital



Rationale for government intervention

Government interventions need to be assessed in cases where projects would not otherwise be bankable without interventions and /or when public interventions that alter the risk allocation can help lower the cost of capital or attract a greater pool of investors. Various rationales exist for whether public intervention is required in the case of improving a project's bankability, including addressing affordability, payment risk, public sector performance risk, mitigating uninsurable risks and underpinning the funding of sub-sovereign entities. The second form of intervention is more complex, in which changes to the risk profile are likely to involve trade-offs, which need to be evaluated. As such full ex-ante cost-benefit analyses should be undertaken before making these interventions.

As part of developing different options it should also be remembered that prior to any direct customer or government support, regime design can help optimise risk allocation.

Key considerations going forward

Where revenue certainty is achieved, there is no shortage of capital. It is not so much a question of who pays – as long as they are creditworthy – but investors and lenders need to be able to identify (or "look through" to) the revenue stream(s). Therefore, the first step in ensuring that a project will obtain finance involves ensuring that bankability is achieved. In several instances this can be achieved by the market alone. In other instances a regulatory "wrapper" can achieve this. Government mandated funding from customers or the provision of tax-payer funded revenue streams will be required where subsidies are necessary.

Nonetheless, as the scale of required financing increases, the more challenging it becomes to secure all the necessary finance without some form of support, ranging from regulatory wrappers through to explicit guarantees. It is not possible, however, to locate a threshold in terms of size over which a project requires support since it will vary depending on the specific characteristics of the project and / or sector, as well as financing market conditions prevailing at the time.

Additional support through government guarantees is typically required only on an exceptions basis, where particular aspects of a transaction require additional support. However, in the event of greater devolution of responsibility for projects, the case for a guarantee programme for such devolved projects may need to be considered further.

Greater use of capital recycling approaches might also be appropriate for highly complex problems. In such an approach, government would participate as whole, or possibly as an equity provider in a transaction. Any debt would also most likely be fully credit guaranteed. However, once the project became operational, with a track record, the aim would be to divest government interest.

Strong policy underpinning, as well as institutional coherence and capacity are critical to developing a credible project pipeline, which can attract private finance to a sector. The experience from the UK energy sector has demonstrated that these are critical to mobilising private finance. While unlikely to be completely replicable, some key lessons can be drawn from it and applied to other major infrastructure sectors.

Consideration of how DC schemes might better access illiquid infrastructure opportunities should be an area of future policy focus. Whilst not an immediate priority, DC schemes will inevitably grow in proportion to DB schemes and could be an important source of institutional capital. Improving the match between the financing needs of projects and the requirements of DC schemes will become increasingly important if both are to benefit.

1. INTRODUCTION

Cambridge Economic Policy Associates (CEPA) has been appointed by the National Infrastructure Commission (NIC) to undertake research into the strategic financing choices made by the private sector when investing in UK infrastructure and the role public funding and financing interventions can play in facilitating greater investment.

The aim of the study is to provide the NIC with research which examines issues related to the provision of private finance for infrastructure to support the development of the National Infrastructure Assessment (NIA).The first part of the study reviews trends in the provision of private finance to infrastructure investments in the UK over the last ten-years – with a particular focus on new-build infrastructure projects; large-scale expansion projects; and investments in existing assets that require considerable financing for ongoing maintenance. In the second part of the study we have interrogated the evidence-base to address some of the key strategic questions facing the UK, such as:

- Considering the extent to which the evidence supports the contention that there are insufficient 'investable' projects that match the requirements of institutional investors.
- Examining the key variables and considerations that determine whether a project requires some form of government support to be investable and bankable. This includes reviewing the approaches that have been used in other countries.
- Identifying and then assessing the value for money of the main government support mechanisms that can be used to assist an infrastructure project to attract private finance.

The study is focused on:

- UK infrastructure projects in the transport, energy, water and wastewater, digital communications, solid waste and flood risk management sectors and relevant international comparators for these sectors (defined as the economic infrastructure sectors throughout report).
- Projects that have or are seeking to attract private finance, either alone or in combination with public funding and / or financing. This also includes recycling of capital approaches in which projects that are initially publicly financed are subsequently divested to the private sector.

The report is comprised of the following sections:

- ten-year trends in UK infrastructure financing, which examines projects, sourcing and pricing of finance;
- the extent to which projects face an investability challenge and impediments to flows of institutional finance arising from supply-side constraints facing pension funds;

- the role of differing forms of government policy, funding and financing support and how the value for money of such public interventions; and
- Key conclusions made from the research and considerations that should be taken forward.

Annex A of the report includes a summary of UK and international case studies that were reviewed as part of the research, while Annex B summarises the support mechanisms that policy makers can use to support infrastructure investment.

2. TEN YEAR TREND ANALYSIS

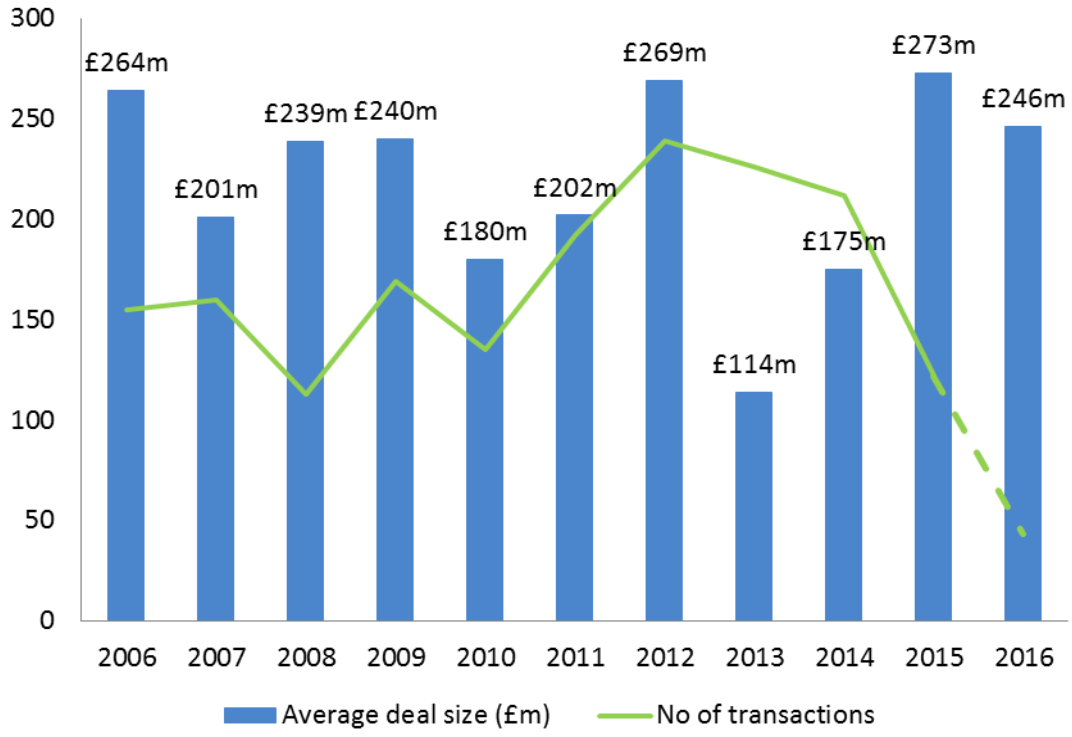
This section provides an analysis of what has happened in UK private infrastructure markets over the past ten years, both from the project and financing perspectives and particularly as regards pension and other institutional investment. The analysis comprises financing trends, including the role of finance provided by public sector financial institutions as well as the key findings from case studies of UK and international infrastructure transactions.

2.1. Value and volume of project financed infrastructure transactions

Recent evidence suggests that the volume of project financing transactions has returned to pre-financial crisis levels although its composition is different

Whilst there has been considerable variation across different years, overall project financed infrastructure transaction values and volumes are currently at a similar level now as they were ten years ago. While both the number of projects reaching close and average deal size have varied significantly across the years there is no evidence to suggest that over the ten-year period there has been a significant fall in the number or size of projects accessing finance since the financial crisis.

Figure 2.1: UK infrastructure projects to reach financial close, £m (note 2016 is 1st quarter only) [1]



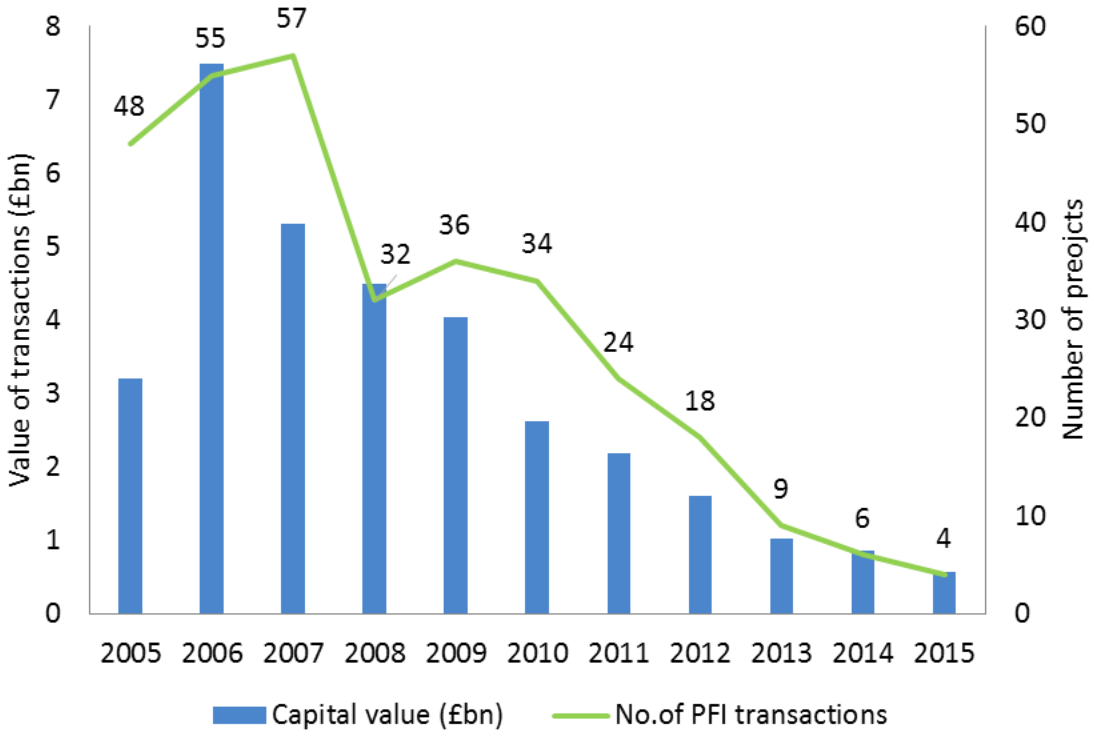
Source: Preqin infrastructure database

[1] Note the chart includes all projects to reach financial close including social infrastructure projects and those that have relied on public financing.

However, underlining this trend it is important to note that there has been a significant decline in the use of the PFI model which was used to finance mainly social infrastructure projects. As such, in terms of the focus of this study, private financing for economic infrastructure has increased.

As shown in Figure 2.2 in 2006 and 2007 there were over 50 PFI transactions per annum worth over £12bn across both years.

Figure 2.2: UK PFI projects to reach financial close (£bn)

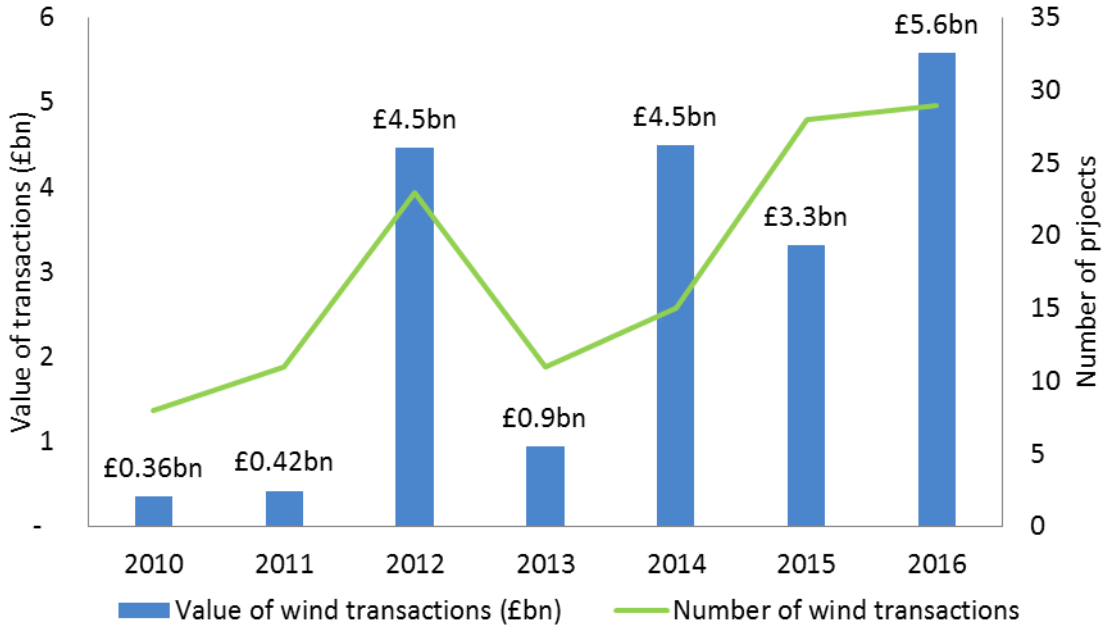


Source: HM Treasury, PFI summary data

By 2015 only four PFI deals reached financial close with a combined value of around £0.6bn, despite the introduction of the Private Finance 2 (PF2) initiative. Although in the immediate aftermath of the financial crisis we understand that the banking sector faced financing constraints, over the latter half of the decade under consideration, the fall in PFI transactions can largely be attributed to two factors. First, the use of PFI became less attractive due to changes in accounting rules regarding PFI projects and concerns around value for money. Second, fiscal consolidation resulted in reduced government spending on social infrastructure and the phasing out of PFI credits that were previously available to government departments and local authorities.

The decline in PFI transactions has in part been compensated for by the growth in renewable energy projects, which have also been predominantly financed through project financing approaches. As shown in Figure 2.3, in 2010 the value of wind generation projects reaching financial close was £360m, while in 2016 this has risen to nearly £5.6bn.

Figure 2.3: UK renewable wind deals reaching financial close 2010 to 2016 (£bn)



Source: IJ Global database, CEPA analysis

The increase in renewable investment has been largely driven by the government's policies of meeting the 2009 Renewables Directive and of developing a low carbon economy.

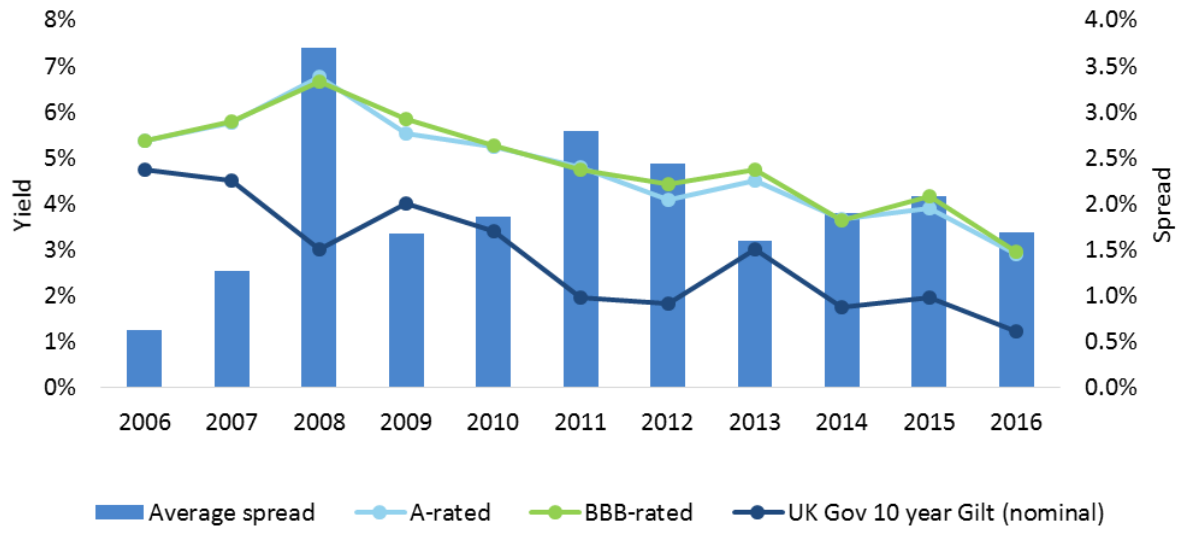
2.2. Pricing of finance

The yields on infrastructure debt and equity look to have fallen in recent years, although with this debt margins have increased

Based on an analysis of the Markit iBoxx Infrastructure A and BBB-rated bond indices, yields on infrastructure bonds have reduced over the last ten years, particularly after 2008.[2] While there has been divergence in some years (particularly in 2008 and 2011/12), the fall in infrastructure bond yields has been broadly in line with UK government gilts, as shown by the changes in the spread between the average yields for A and BBB-rated bonds and government gilts. The trends in yields and spreads are shown Figure 2.4 below.

[2] The Markit iBoxx Infrastructure indices include public bonds issued by companies whose activities are primarily focused in energy, transport, telecoms and utilities.

Figure 2.4: Yields and average spread on Markit iBoxx Infrastructure Bond indices relative to yields on UK Government nominal gilts



Source; Markit iBoxx; Bloomberg; CEPA analysis

As the figure shows, these yields have fallen to lower levels than before the crisis, although spreads have remained above pre-crisis levels and have remained relatively stable since 2013. A possible explanation for this may be that institutional investors have been searching for high yields in relatively safe investments that were previous attainable when investing in government-backed debt. For example Markit iBoxx Infrastructure indices include bonds issued by a number of regulated infrastructure companies, including transmission and distribution companies, Heathrow and Gatwick airports and water and sewerage companies that many investors perceive as relatively safe investments due to these companies having large balance sheets and operating in stable regulatory environments.

While it is more difficult to observe changes in the actual cost of equity over time, UK regulatory determinations over the period suggest that these have also fallen, although to a lesser extent than debt. For example, the average implied market returns suggested from regulatory determinations in energy, water and transport have shown a gradual fall since 2006.[3] These are set out in Figure 2.5 below. The dark blue line and green dots refers to the average implied returns from regulatory determinations, while the dashed line is the trend-line.

[3] The implied market return is calculated by adding together the allowed risk-free rate and the equity risk premium (ERP) estimated as part of the regulatory determinations. Note that the allowed cost of equity in regulatory determinations has not been used as this is driven by different equity beta (volatility of given assets relative to the wider market) and gearing (proportion of debt relative to total company financing) assumptions. These differences mean that it is not possible to fully compare the cost of equity between determinations in different sectors.

Figure 2.5: Average implied market returns for UK regulatory determinations 2006-14

Source: CEPA analysis of regulatory determinations

Note that no data is included for 2011 given that no regulatory determinations were made in this year for the given sample.

As the figure shows, regulatory determinations allowed for relatively higher returns to be made during the financial crisis and the immediate years following it, while more recent determinations, with lower equity risk premia, such as the PR14 price control in the water and sewerage sector and Ofgem's ED1 determination in electricity distribution, will have driven down realised equity internal rates of return. Evidence from the Thames Tideway Tunnel (TTT) transaction also suggests that investors are willing to accept relatively lower equity returns. For example, CEPA's recent analysis suggested an implied real post-tax cost of equity for TTT of 2.7%-5.2%.[4] TTT in particular, which was determined on the weighted average cost of capital bid (BWACC), as well as the price paid for 51% of National Grid's gas distribution assets, are both indicative of intense competition for utility-like infrastructure and the consequent lower yields that are generally acceptable to institutional investors in the asset class.

2.3. Sources of infrastructure finance for unlisted infrastructure projects

Sources of finance, particularly for unlisted infrastructure projects, have increasingly opened up over the last ten years to several types of capital providers, particularly international ones. These were previously the preserve of only project development divisions of construction companies and project finance banks.

[4] CEPA (2015), *Thames Tideway Tunnel – Cost of Capital Briefing Note.*

Sovereign wealth funds have taken long-term equity positions in leading corporates

Sovereign Wealth Funds (SWF) are investment funds that are owned by a government and typically funded by foreign exchange and reserve assets. The UK does not have a SWF at present, but several other countries have one in place.

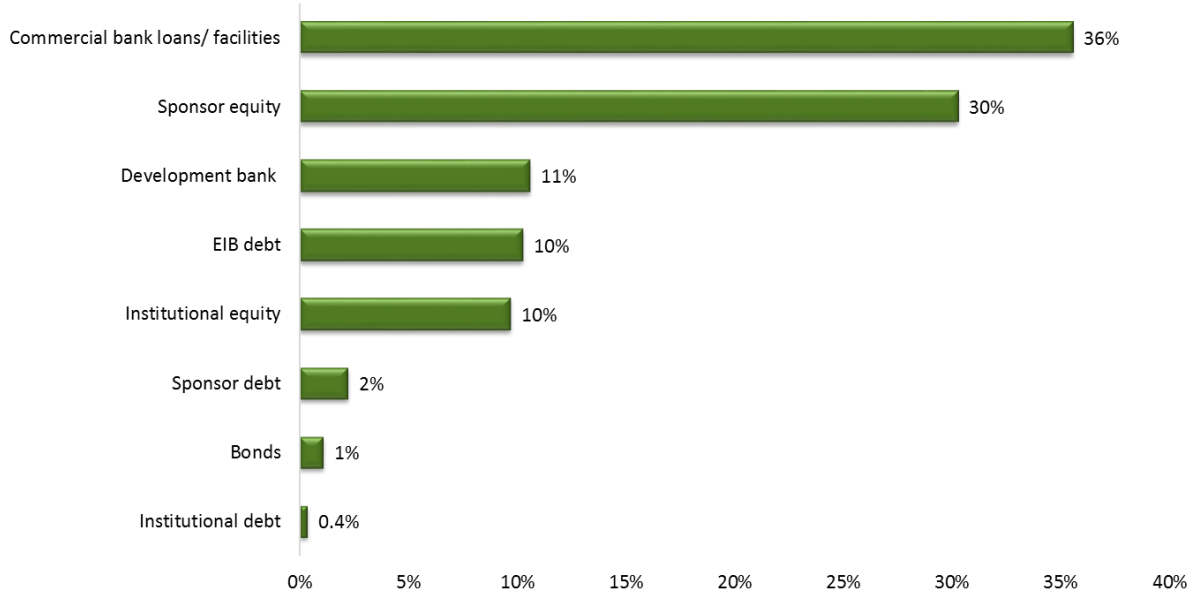
A review of the infrastructure transactions completed by some of the largest SWFs (China Investment Corporation, Abu Dhabi Investment Authority, Australia Future Fund and the Singapore Investment Corporation), suggests that their main role in the UK infrastructure market has been to take long-term equity positions within corporates such as Gatwick Airport (Future Fund for Australia and the Abu Dhabi Investment Authority) and Angel Trains (Abu Dhabi Investment Authority).

Commercial banks continue to play a leading role in providing debt to projects

In recent years tighter liquidity regulation as a result of Basel III, driven by the financial crisis, are commonly cited as having played a role in limiting the ability of banks to provide long-term debt. However, we have not seen any specific data to suggest that there are specific liquidity constraints that have prevented commercial banks from supporting infrastructure investment.

For instance, we carried out a more detailed review of the sources of finance for 17 large primary financing transactions to reach close since 2010. Figure 2.6 below shows that the largest source of finance for these transactions was still commercial bank loans and interestingly, debt from institutional investors was minimal for these transactions, suggesting a degree of aversion to either large projects and / or primary financings.

Figure 2.6: Sources of finance for large infrastructure transactions[5,6]



Source: IJ Global, CEPA analysis

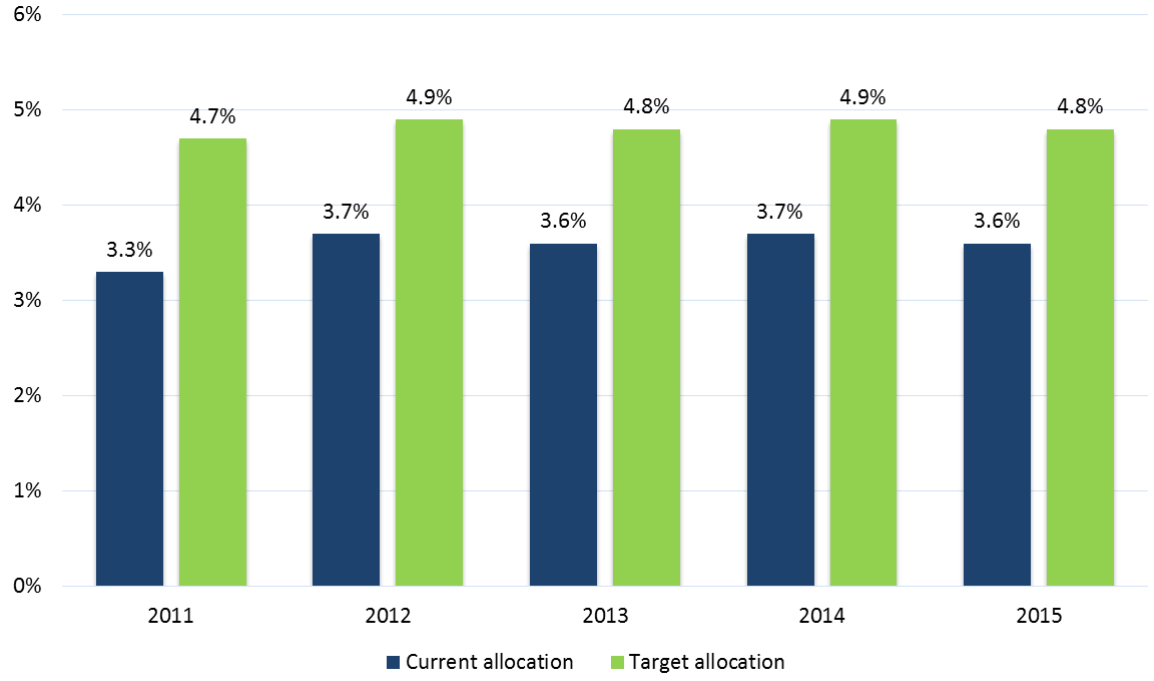
Although there is an increasing range of routes through which UK Pension funds can access non-listed infrastructure investments, exposures remain below those of Australian and Canadian counterparts who have targeted the asset class for much longer

The evidence suggests that there is still some scope for pension funds, to invest more in infrastructure in the UK. Figure 2.7 below shows that pension funds have made limited progress in increasing their average allocations to infrastructure investment.

[5] Definition of categories in chart: Institutional investor: pension fund, infrastructure fund, insurer/ asset manager, sovereign wealth fund. Sponsor equity: provision of equity by non-institutional investor. Development bank: DFI such as KfW or the development bank of Japan.

[6] In one of the transactions the EIB provided an equity investment over £100m

Figure 2.7: UK-based pension funds' average and target allocations to all infrastructure investment



Source: Preqin Infrastructure Online

At below 5% the target allocations to infrastructure by pension funds are below comparator economies such as Canada and Australia. According to Preqin Infrastructure Online the leading institutional investors tend to target on average around 6.9% of their investment allocations to infrastructure (for 2015). For comparison, more experienced infrastructure investors such as the Ontario Municipal Employees Retirement Scheme (OMERS) in Canada targets as much as 25% of its allocation to infrastructure.

However in our discussions with investors it became clear that there is, at least, a perception that all DC fund investments have to be priced daily, since most DC plan members have the option of receiving up to date valuations of their accounts. In addition, there is an associated view that such funds need to accommodate daily liquidity, enabling immediate trading of assets.[7]

Due to increasing life expectancy and workplace pension reforms, DC schemes are likely to make up an increasing share of the UK's pension savings, which suggests there is a risk that these perceptions could limit scale of pension fund resources available for investment in infrastructure. It is not clear exactly why these perceptions exist and further work needs to be done to understand the options for addressing this issue.

Pension funds and other institutional investors have an increasing range of routes to market

Whilst all institutional investors can invest in the UK-listed equity of, for example, utilities such as National Grid and BT, those seeking a higher allocation to infrastructure often obtain

[7] Towers Watson (2012), *The DC trend towards daily pricing and trading*.

exposure through an intermediary. There are broadly three types of entity operating in the market: *asset managers*, *specialist infrastructure investors* and *investment platforms* shared by DB pension schemes.

Active players in the asset management market are typically subsidiaries of large financial services, pensions and insurance firms. Examples include M&G, subsidiary of multinational insurance firm Prudential, and Aviva Investors. These asset managers are focused on investing the pension and insurance assets of their parent group, but are also able to manage investments on behalf of other institutional customers, which gives them sufficient scale to employ in-house infrastructure teams.

Some asset managers have a subsidiary dedicated to specialist infrastructure investment, such as Infracapital which is the European infrastructure division of M&G. They typically go to market directly to source deals. Some managers also manage funds which are generally structured as limited partnerships (LP) and are typically focused on long term equity investment in regulated, or long term contracted availability-based structures (e.g. PFI and OFTOs), such interests being acquired either in primary or secondary markets.

Some funds are also open to debt investment. This offers investors exposure to infrastructure assets via the fund's returns. The liquidity of their investment in the fund is usually determined by the rights conferred by the partnership agreement.

Figure 2.8 illustrates the route to market offered by *asset managers*.

Figure 2.8: Exposure to infrastructure via asset managers

<table>
<tr><th colspan="7">Asset Managers (Pensions and Insurance)</th></tr>
<tr><td>Parent</td><td colspan="2">Prudential</td><td>Legal & General</td><td>Standard Life</td><td colspan="2">Aviva</td></tr>
<tr><td>Investment manager</td><td colspan="2">M&G Investment Management Limited</td><td rowspan="2">Legal & General Investment Management Limited</td><td>Standard Life Investments</td><td colspan="2" rowspan="2">Aviva Investors Global Services Limited</td></tr>
<tr><td>Infrastructure vehicle</td><td rowspan="2">Direct investment in debt assets</td><td>Infracapital (equity-side)</td><td>SL Capital Partners LLP</td></tr>
<tr><td>Exposure</td><td>Funds</td><td>Direct</td><td>Direct</td><td>Direct</td><td>Funds</td></tr>
<tr><td rowspan="3">Funds and underlying investments</td><td rowspan="3">>£45bn infrastructure debt in public and private markets</td><td>Innisfree M&G PPP Fund LP (£225m)</td><td rowspan="3">£7bn in direct investments
e.g. £400m long-term debt investment in DP World</td><td rowspan="3">Direct investments include:
Great Northern rolling stock (£94m)
East Anglia (£50m)</td><td rowspan="3">Direct investments into select projects</td><td>Aviva Investors REaLM Infrastructure Fund</td></tr>
<tr><td>Infracapital Partners LP (£908m)</td><td>European Secondary Infrastructure Credit Fund</td></tr>
<tr><td>Infracapital Partners II LP (£1bn)</td><td>Aviva Investors UK Solar PV Investment Fund</td></tr>
</table>

Specialist investors can offer any or a combination of:

- manging LP funds aimed at institutional investors, for example Dalmore Capital;
- investing their own funds (or those of their owners) alongside institutional clients, for example Rock Infrastructure;
- operating infrastructure investment companies listed on a public exchange. Examples of these include International Public Partnerships (advised by Amber Infrastructure Group) and HICL Infrastructure (advised by InfraRed Capital Partners).

Specialist investors usually manage a portfolio of operational assets but will also look to add value and generate higher returns by investing in the development and construction phases of projects, and are open to exiting such investments at a premium. Figure 2.9 illustrates the approach offered by the specialist infrastructure investors.

Figure 2.9: Exposure to infrastructure via specialist infrastructure investors

	Specialist Infrastructure Investors			
Investment manager	**Amber Infrastructure Limited**	**InfraRed Capital Partners Limited**		**Dalmore Capital Limited**
Infrastructure vehicle	International Public Partnerships (FTSE 250 listing)	HICL Infrastructure Ltd (FTSE 250 listing)	The Renewables Infrastructure Group Ltd (FTSE 250 listing)	
Exposure	Direct	Direct	Direct	Funds
Funds and underlying investments	Listed investment company with direct equity investments in a portfolio of economic & social infrastructure assets, including: Various OFTOs Thames Tideway Tunnel Angel Trains	£2.2bn debt and equity investments in a range of public & social infrastructure assets, including: A13 Thames Gateway PFI M80 motorway (50%) M1-A1 link road (30%) Connect UK (33%)	£45m of investments across a portfolio of operational onshore wind and solar energy generation assets (focus on wholly owned equity investments).	Dalmore Capital Fund LP (£249m) Dalmore Infrastructure Investment LP (£440m equity investment in TTT) PPP Equity PiP LP (£534m)
	Notes: Specialist infrastructure investors are able to accept more development and construction risk. Portfolios will contain a balance of operational assets and those still in the development/construction phases. They manage funds on behalf of a range of investors. For example, the type of investors involved in Dalmore's funds include private pension funds (>40% of fund), public pension funds (20-25% of fund), fund managers and insurers (5-15% of fund).			

The listed entities identified above can be seen as offering DC funds exposure to infrastructure, but with a high degree of liquidity. Third party funds provide defined benefit (DB) investors the opportunity to invest in infrastructure indirectly without having to develop the specialist – and expensive – in-house expertise required to invest in projects directly. However, this is expensive and acts as a disincentive to infrastructure investment. Government has therefore promoted the establishment of collective platforms for DB schemes, such as the new Pension Infrastructure Platform (PiP), GLIL, the joint venture between the London Pension Fund Authority (LPFA) and the Greater Manchester Pension Fund (GMPF), and the planned Local Government Pension Scheme (LGPS) infrastructure platform which will serve the new eight local government pension pools. This *investment platform* approach is illustrated in Figure 2.10.

Figure 2.10: Exposure to infrastructure via shared investment platforms

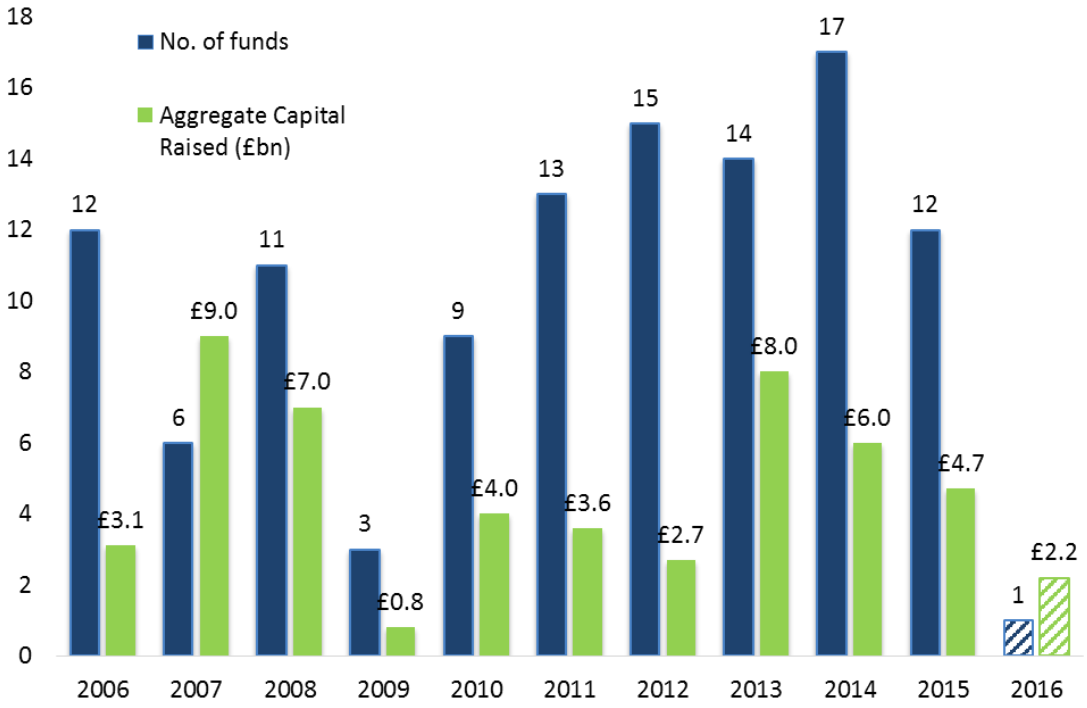
<table>
<tr><th></th><th colspan="3">DB Pension Schemes</th></tr>
<tr><td>Parent</td><td>Various DB schemes</td><td>London Pension Fund Authority</td><td>Greater Manchester Pension Fund</td></tr>
<tr><td>Investment manager
Infrastructure vehicle</td><td>Pensions Infrastructure Platform (PiP)</td><td colspan="2">GMPF & LPFA Infrastructure LLP (GLIL)</td></tr>
<tr><td>Exposure</td><td>Direct</td><td colspan="2">Direct</td></tr>
<tr><td rowspan="2">Funds and underlying investments</td><td>Multi-Strategy Infrastructure Fund
Internally managed by PiP
and c£120m direct investments in renewable energy sector</td><td colspan="2" rowspan="2">Joint venture in unlisted equity
£500m of direct investments including:
·49.9% stake in Clyde Wind Farm
·Great Northern rolling stock
·East Anglia rolling stock</td></tr>
<tr><td>Externally managed investments include:
Aviva Investors UK Solar PV Investment Fund and
£360m equity investment in TTT via Dalmore</td></tr>
<tr><td></td><td colspan="3">Notes: Investors in the Pensions Infrastructure Platform include a mixture of public and private pension schemes.</td></tr>
</table>

The unlisted UK-based infrastructure fund market is the largest in Europe

The unlisted UK-based infrastructure fund market accounts for around 49% of the total capital raised for all European-based infrastructure funds.[8] Though it is important to note that a number of the UK-based funds have a focus on investments outside of the UK. The evidence provided in Figure 2.11 suggests that apart from the immediate aftermath of the financial crisis there has not been any significant drop-off in the ability of UK-based funds to raise capital – though we have not been able to review the price of their offerings.

[8] Preqin infrastructure database.

Figure 2.11: UK-based unlisted infrastructure fundraising, year of financial close (2016 is to end April)

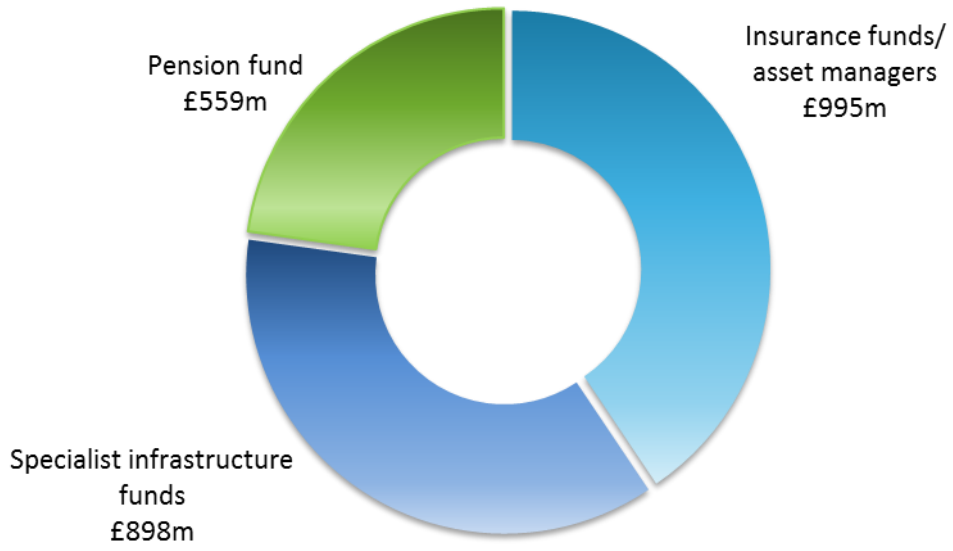


Source: Preqin infrastructure database

As part of this study we completed a review of the transactions, which have involved direct investment by over 20 institutional investors since 2010.[9] This included an analysis of the investment completed by leading asset managers/ insurance funds such as Aviva, Allianz, M&G and Legal and General. The analysis shown in Figure 2.12 below shows the value of their current portfolios.

[9] See Section 3.5 of the Evidence base: 10-year review of infrastructure financing report.

Figure 2.12: Source of debt and equity investment by type of institutional investor (£m)



Source: IJ Global, CEPA analysis

Institutions such as Aviva and Allianz have made investments to build their internal capacity to carry out infrastructure transactions. For instance, we understand from consultations taken as part of this study that Aviva has hired a number of professionals from the monoline insurance industry, increasing its ability to carry out direct credit investments in infrastructure. It is widely reported that the insurance industry is a major competitor to project finance banks in the provision of debt finance to unlisted infrastructure.

The European Investment Bank (EIB) and the Green Investment Bank (GIB) have been involved in many transactions, especially energy renewables

The EIB has been very active in the UK infrastructure finance market, providing as much as 50% of all senior debt provided to infrastructure projects and playing a significant role in financing OFTOs. [10]

While the EIB has been involved in a number of transactions, this does not necessarily mean that these transactions would not have reached financial close without its involvement. EIB can play an important role in providing confidence to other lenders to a project. However, it can also provide cheaper credit than commercial debt providers, as such there can be questions about the extent to which EIB is truly catalytic or whether its role is largely one of reducing the cost of finance faced by projects (and as a result either reducing user charges and / or boosting equity returns). Whether EIB financing will still be available in a post-Brexit world is unknown at this stage. On the assumption that it would not be, in the absence of a

[10] British Banking Association (2015). Financing the UK's infrastructure needs.

UK development finance counterpart, or the wider deployment of the UKGS, *at a minimum* the cost of finance for a typical project will be higher than it would have been with EIB participation. Where UKGS is currently used it can improve the economics of projects by lengthening tenors beyond what they would be in its absence.

Since its establishment in 2012, the GIB has played a major role in investing in offshore wind, waste-to-energy and energy efficient projects. As of October 2016 the GIB had invested in 85 green infrastructure projects and seven funds committing £2.7bn to transactions worth £11.1bn. These investments have included equity and debt finance for innovative projects in the waste-to-energy sector. For example, GIB provided £12m of preferred loan stock and £6.2m of equity finance (via investment in Foresight's UK Waste and Resource Energy Investments, UKWREI) to the Birmingham BioPower project, which converts recovered wood into energy using gasification technology, the first of its kind in the UK.

More recently, GIB also invested £47m of equity in Northern Ireland's £107m energy-from-waste project, the largest project of its type in Northern Ireland to date. GIB also helped raise and manage the UK's largest renewable energy fund, which includes funding from institutional investors.

While GIB's role in the sectors it has invested in has been commended, many have called into question whether it will be able to maintain its catalytic role after its envisaged privatisation. For example, while its focus on green investments is written into law, it will be interesting to see whether such investments will be focused on mobilising investment into technologies and / or sectors where other investors are less familiar with or more on established technologies / sectors with a track record of strong returns.

Use of funding and financing support mechanisms in UK and international case studies

In order to understand the nature of government support to projects we have undertaken a number of UK and International case studies. These are provided in Annex A. From the UK case studies it is possible to observe that:

- The main regulatory model has enabled regulated entities such as Heathrow Airport to finance the £4bn Terminal 5 on a corporate finance basis without any further forms of support. In this approach Heathrow was able to receive revenues during the construction period so long as a number of trigger-point milestones were achieved. This differs from how Heathrow's capital expenditure has traditionally been recovered, with assets typically entering the RAB once operational. This pre-funding approach meant that customers were essentially being charged for assets which were not available at that time.
- Some previously pure merchant-based approaches have become subject to a cap and floor regulatory regime in order to provide more revenue certainty, as is the case with electricity interconnectors.

- There are a number of instances in which elements of the classic regulatory regime have been incorporated into project finance approach. Most notably these include OFTOs and TTT, where in the former protections against asset stranding were provided and in the latter funding of assets in construction.
- The experience of OFTOs also provides an interesting example of how availability-based project finance structures traditionally used in social infrastructure have been applied in energy to help attract investment.
- In the case of Contracts for Difference (CfDs), explicit subsidies that have created a high degree of revenue certainty for investors in and lenders to renewable generation as result of stable prices. These are funded from customer bills rather than central government.
- In the case of the M25 widening, which was set to be implemented just after the global financial crisis, government stood as financier of last resort in the event that insufficient private financing could be raised (although ultimately this was not required).
- Explicit guarantees have been provided in instances where public sector obligation risks have needed to be addressed, such as in the case of Intercity Express Programme (IEP) and Mersey Gateway (where the local authority payee was not a creditworthy payee for such a large project).

Some of the key points to be drawn from the international case studies are:

- The need for a range of central government subsidy and guarantee support in continental European large-scale rail. For example, the South Atlantic High Speed Rail line received a considerable amount of private sector investment, in addition to receiving central government grants and guarantees, as well as finance from publicly-owned institutions.
- Using the government's balance sheet during the most risky phases of the project cycle, and then exiting once project market fundamentals have been established, an approach which has been used in Australia's roads sector.
- The extensive use of development finance / development bank financing in continental European projects in both renewable energy and transport projects. This includes support from EIB for a range of projects and KfW's (the German development bank) financing for renewables.

3. ARE THERE SUFFICIENT INVESTABLE PROJECTS?

A major question facing UK policy-makers is whether private financing for infrastructure is currently constrained as a result of there being insufficient investable projects or whether there are financial market failures, regulatory or other constraints on the financing side that means that capital cannot flow to projects.

In terms of the former, two possible constraints have been investigated. First, whether the risk profile of projects was making them unbankable or uninvestable or whether more activity is not observed largely as a result of an insufficiently developed pipeline of projects; that is, a limited demand for finance. As discussed below, with the exception of budgetary constraints, the latter is seen as being the most immediate challenge.

In terms of potential supply side constraints to financing flows, particularly institutional capital and especially from UK pension funds, we considered a number of possible explanations. Whilst many remain relatively conservative in their outlook, the main constraint faced across DB and DC schemes is that of a need for liquidity. After this, the costs of using third party fund management to originate equity investment opportunities remains high, creating incentives to create in-house investment teams along the lines of Canadian pension schemes and to seek co-investment rights.

3.1. Potential bankability issues

We sought to understand whether the risk profile of projects has made them inaccessible to private finance. The overwhelming view of those consulted was that except for some specific risks that cannot be mitigated through alternative sources, in current conditions most projects are financeable without the need for specific government financing guarantees. However, different market participants will have appetites for different risks and depending upon how the project is structured, the universe of potential financiers will differ. For instance, regulatory mechanisms which underpin revenues and mitigate construction and asset stranding risks, as well as contractual availability-based regimes, will attract a greater range of finance providers, whereas demand will be lower where more challenging risks are transferred, with a need for more specialist investment appraisal and credit analysis skills.

Unsurprisingly, the key constraint that operates in sectors relying on public funding is that of budgetary resource to fund projects where projects cannot rely fully on user charges.

There are many ways in which private sector investors and lenders can mitigate a range of risks in projects without having to fall back on government support

It is important to remember that there is a range of contractual, private insurance and other contingent finance products that private infrastructure investors and lenders can turn to, in order to mitigate market, construction, technical, credit and financing market risks, prior to seeking government support. These are summarised in Table 3.1 below.

Table 3.1: Private sector risk mitigation instruments

Risk	Instrument	Description
Market	Contract design – availability payments	Availability payments are used when infrastructure assets do not offer a direct and/or predictable revenue stream. Revenues are paid by the contracting authority to the project company, as opposed to the project company receiving revenues through user charges.
	Contract design – offtake contracts	Contracts that outline a project company supplies output at a given price, which helps to reduce revenue uncertainties. Contracts include power purchase agreements (PPAs) and bulk water purchase agreements.
	Forwards and futures	Contracts that specify the amount that will be paid for a given asset at a future date. Forward and future contracts can be used to help mitigate against a range risks, but particularly movements in, say, electricity wholesale costs.
Liquidity	Letters of credit (L/C)	L/Cs are provided by banks to ensure that a seller receives timely payments for goods and services. L/Cs are particularly useful when buyers face liquidity issues.
Construction	Engineering, procurement and construction (EPC) contracts	EPC contracts are commonly used to transfer construction risks to contractors responsible for designing and implementing contracts.
Technical	Warranties from vendors	Type of guarantee provided to purchasers of goods to cover potential defects. Warranties are particularly useful for goods where the technology is relatively new and/or unproven.
	Insurance	Insurance cover can be provided in the event of unlikely but adverse events occurring that significantly impact a project, such as the impact of weather or other factors outside the project's control.
General credit	Monoline guarantees	Guarantee (also commonly referred to as credit wraps) given to issuers of debt instruments that provide protection against default on principal and interest repayments in return for a guarantee fee. Important for improving the credit rating of bonds issued by entities provided that the monoline company maintains a strong credit rating, which in turn can help lower debt costs.
	Credit default swaps (CDSs)	These are derivative instruments in which, for a fee, risk is sold to a third party. As such a holder of project debt can hedge its position by purchasing a CDS, either as protection or as part of a trading strategy. The pricing of the CDS will change according to the credit rating of the purchaser, thus a deterioration in credit quality will lead to an increase in the fee paid to the provider of the CDS contract. CDS contracts can be bought without the purchaser being exposed to the risk of an underlying asset,

Risk	Instrument	Description
		whereas purchasers of monoline guarantees need to have underlying risk exposure.[11]
Financial market risks	Interest rate swaps	Interest rate swaps allow for projects to swap the rates paid on a project from floating to fixed rates (or vice versa), which can help stabilise debt repayments on projects.
	Forwards and futures	Forwards and futures can also be used to mitigate a range of financial market risk including pricing risk associated with project bonds and exchange rate risks where foreign currency financing is used.

Source: OECD (2015).

As the table shows, a number of risk mitigation instruments are available to overcome project risks, although some instruments are used more widely than others in infrastructure transactions. For example, contract design plays a fundamental role in efficiently allocating risks between different parties, and can be important for ensuring that other mitigation instruments are not needed. The decision to use private sector risk mitigation instruments should be carefully considered in the context of individual projects, given the different requirements that they pose.

With all instruments, it is important to distinguish between whether risk mitigation is being provided as a guarantee or as insurance. Guarantees can be called upon as soon as a pre-determined event takes place, such as non-payment of a given obligation, while insurance-type instruments require some form of evaluation of a claim before any pay-outs can be made. Given that payments made through guarantee instruments are more immediate, these are generally preferred to insurance policies, which can be more difficult for those holding the policies to receive pay-outs.

As shown in Table 3.2, however, larger projects in particular, both in the UK and internationally have tended to supplement private sector risk mitigation with different types of public involvement.

[11] In order for monoline companies to be able to participate in the CDS market, many set up special purpose vehicles (known as transformers), to issue CDS contracts. These CDS contracts are in turn guaranteed by the monoline provider, meaning that this provider is distanced from the underlying asset by the transformer. Without the transformer in place, the monoline companies would have to provide a guarantee directly to the underlying asset, as opposed to issuing a CDS.

Table 3.2: Projects with private sector risk mitigation and public sector involvement

	Mersey Gateway	Nottingham CHP	High Speed 1	Beatrice Offshore Wind Farm	Gemini Offshore Wind Farm (Netherlands)
Project value	£1.86bn	£30m	£2.1bn	£2.6bn	£2.31bn
Pure merchant/market risk	Tolling revenues, set and collected by Halton BC	None	None	Additional market revenues outside PPA	None
Market-based underpinning	None	Long-term off-take agreement with GDF Suez	Access charges collected from train operators	15 year PPA with Danske Commodities for 50% of farm's production	15 year PPA with Delta, a municipally owned multi-utility company
Public sector funding support	DfT provides: • £86m capital grant • £14.5m annual revenue support payments	None	The "Domestic Underpinning Agreement" provides that UK government will compensate HS1 if domestic services fall below a baseline service level. In practice the baseline level is specified through the TOC (Southeastern) franchise agreement. Guarantees a baseline level of demand, subject to infrastructure availability.	Awarded one of the first EMR contracts for difference (CfD) – strike price set at £155/MWh in 2014-15 falling to £140/MWh by 2018-19	Benefit from support through the Dutch government's SDE+ scheme - similar to the UK CfD arrangement. Strike price set at €168.9/MWh
Additional financing intervention	UK Guarantee Scheme covers commercial bond (£257m)	Green Investment Bank as cornerstone investor	None	EIB facility (£525m)	EIB facility (£482m)

Rail and road transport are less able to rely on customer funding than energy investments

A clear constraint, however, is the availability of budget to fund projects. Whilst essentially most renewable energy related projects have been funded by customers, this has worked because industry structure has enabled these funding requirements to be absorbed into customer bills. If this is compared with, say rail transport, where user charges have increased well above the rate of inflation and a greater proportion of rail is self-funded compared to historically, this trend is facing increasing customer resistance. There are, of course, opportunities in roads for raising more funding, either directly through tolling, or more indirectly through road fund licences, or even hypothecating increased fuel duties to the roads sector, all of these would face considerable challenges. As a result, especially relative to energy, road and rail transport sectors face significant user funding constraints creating a need for public funding.

Whilst there is arguably a considerable budgetary constraint operating at the aggregate level of the transport sector, there are ways in which customer and public funding revenues can be supplemented by other sources of revenue, such as from shared property and other gains from incorporating public assets, particularly land, into a project or else by setting conditions on the need to improve the transport infrastructure. Transport for London (TfL) has been increasingly innovative in doing this in London, such as in the case of the Northern Line Extension between Kennington and Battersea.

Absence of a detailed project pipeline

Rather than project risk, the key constraint identified by interviewees was the lack of bankable project opportunities in a number of the UK infrastructure sectors combined with limitations in the quality of project preparation/ information presented in the current pipeline.

One of the main findings is that apart from the energy sector, the UK National Infrastructure and Construction Pipeline (NICP) presents very few opportunities for private infrastructure finance. There are several reasons for this. Some of the sectors, such as flood defence, are more suited to the use of public finance for investment; whilst in other sectors, such as roads, as set out, the lack of a pipeline is partly caused by the inability/ unwillingness to make wider use of funding options such as user charging.

However, one of the findings from this study is that a lack of government capacity to carry out project preparation activities is limiting the pipeline of bankable projects, with the rail sector being an area where there is potentially more scope to make use of private finance if more could be done to identify projects / programmes that could benefit from private sector investment, and then engaging with investors to develop the opportunities.

A robust pipeline is especially important where a sector is looking to bring in private investment having not done so / or having only done so on a limited scale before. Visibility of a potential flow of similar opportunities gives investors more incentive to invest to build up

their expertise and understanding of a new sector. It gives investors a signal that the costs involved in understanding a new sector and then bidding have more chance of being recovered on future transactions. In contrast, unless the transaction is very large, investors are less likely to incur the costs required to bid for one-off new / complex transactions, making it more difficult for the project to attract a range of investors, potentially increasing the cost of finance.

There are a number of good examples of pipelines in Europe and Ofgem – in terms of its approach to OFTOs – is seen as a leading UK model. Pipelines should be more than just a list and need to be considered from an investor perspective. At a minimum, investors will typically look for detail on the nature of the anticipated source of funding for each project, the expected allocation of risks and the expected timescales to reach financial close. There needs to be sufficient detail to allow an investor to gauge whether the project is something to keep monitoring or to prepare for immediately. Industry leadership and institutional commitment to the pipeline and individual deals within it are seen as important factors in creating investor interest. Sectors should follow a standardised, repeatable approach wherever possible to maximise interest (if a bidder loses a deal there will be another that is similarly structured). Bidding processes and cost should be simplified – the UK is the exception not the rule in this regard.

As regards the existing UK pipeline currently:

- There is a relative paucity of transport projects relative to electricity generation and transmission.
- Although many transport projects may be more complex and less commercially viable, this appears to be more driven by capability / capacity of government side sponsors (including regulators) within sectors than the nature of projects per se, although sectors such as rail do face funding challenges.
- In some sectors – particularly non-regulated ones – UK compares unfavourably on pipeline development (e.g. roads in Germany and the Netherlands).

3.2. Specific constraints to institutional finance

Government is particularly interested in how institutional investors can play a greater role in the provision of finance to infrastructure projects. Historically, as previously set out, all institutional investors with an interest in infrastructure have been able to invest in the traded equity of UK utilities (although these opportunities have been curtailed or at least diluted where such utilities have been acquired by foreign-listed entities or publicly owned utilities, that have not been separately listed in the UK).

There are a number of reasons why UK pension funds have tended to invest less in infrastructure than funds like OMERS, but this manifests differently according to whether they are DB or DC schemes, As regards the former, size is an issue – whilst the overall UK pension

fund market is large it is relatively more fragmented compared to Canada. OMERS pension fund has over £64bn of assets under management. In comparison the 89 local government pension schemes are much smaller; at end 2015 the schemes had a total of £217bn assets under management but with an average size of less than £2.5bn.

The size of the funds is important because it can limit the ability of the funds to access infrastructure investment directly. For instance a £5bn fund investing 10% of its assets to infrastructure could only invest £500m – according to the IJ Global database, the average size of UK infrastructure transactions over period 2010 – 2016 was £258m.

A related point is that the smaller size of many of the UK pension funds means that it is not worth their while to invest in the creation of their own in-house investment expertise, because the in-house teams would not be in the position to generate a sufficient scale of investment to justify the costs involved. OMERS was large enough to set up Borealis Infrastructure to manage its infrastructure assets back in 1999. Borealis has gone on to become one of the largest institutional investors in infrastructure in the world. The lack of in-house infrastructure expertise and experience of executing transactions is another factor that has limited UK pension fund direct investment in infrastructure.

Consultations suggest that there is a perception amongst project developers/ sponsors that UK pension funds, at least, do not bring anything to a deal and lack the credibility that other more established investors have. From the perspective of the sell-side of opportunities, bidding consortia comprising inexperienced pension funds are perceived as lacking execution capability.

A key constraint facing both DB and DC pension schemes is their liquidity requirements, which are determined by a combination of life-cycle and valuation requirements. In the case of DB schemes, where outgoings are greater than contribution payments there will be more of a need for a running yield. This is particularly the case with *private* DB schemes which are largely closed to new members and can for instance make the absence of yield during construction a major barrier to investment (even in the absence of the greater risk faced). In the case of some DC schemes, a widely held view is that daily pricing requirements inhibit investment in illiquids. Due to increasing life expectancy and workplace pension reforms, DC schemes are likely to make up an increasing share of the UK's pensions savings, which suggests there is a risk that these perceptions limit the growth in pension fund investment in infrastructure.

3.3. Risk appetites of different providers of finance

Once projects have been structured so that they are investable / bankable, they are in a position where they face financing choices and sponsors need to determine where, across a spectrum of finance providers, they pitch their project. This is because, from the supply of capital perspective, different investors and lenders will target different risk / yields.

Considering which lending or investing institutions are likely to be attracted to a project and whether the range is sufficient is an important part of structuring a transaction. A pre-

requisite in all cases, however, in order to absorb transaction costs, a scale of opportunity of c£75m appears to be a minimum.

If the credit quality of debt is considered, significantly de-risked projects will have the greatest volume and variety of sources of finance. Highest demand is for operational assets, especially those with either availability-based payment structures or predicable, low risk regulatory regimes. Most infrastructure debt – certainly for regulated assets – falls within this. Institutional investors are increasing liquidity for most assets.

Debt ratings will typically fall a couple of notches into investment grade territory (so that they are protected against one to two down-grades). Such projects are likely to have availability-based structures, and are likely to be financed through private placement. Whereas at one time illiquid assets were the preserve of project finance banks our interviews and analysis suggest that there is now more competition for these assets.

Against this, some specialist institutions will actually focus on borderline investment grade / speculative investment in order to obtain higher yields. Such projects may involve more challenging risks, including construction and market (volume) risks where there is less demand for assets. Some UK banks are open to taking both the former and the latter where it is sensibly structured. The chase for yield has created a strong incentive to understand risks such as volume and pricing.

Behind the scenes, a number of insurance investors are taking a strong interest in private debt placements and competing with banks. They are looking at direct investment in illiquid debt whereas previously they would have only done so with a monoline wrap. As set out, it appears that many credit analysts who previously worked for specialist monoline insurers now work for multi-line insurers.

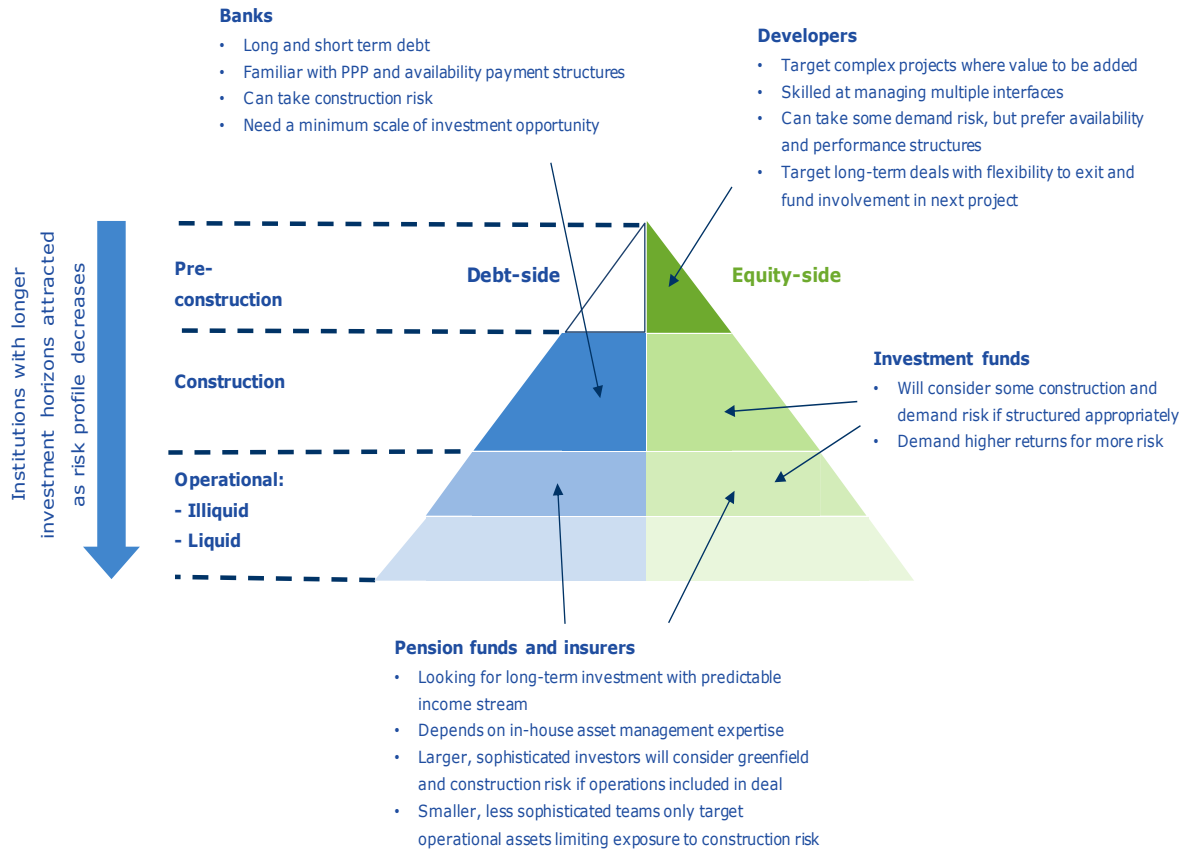
We understand that some institutional investors are actively looking at taking construction risks. In taking construction risk, often it is the ability to forgo project revenues for several years, rather than the increased risk per se, that can determine appetite (which as set out, can be a limiting factor for private DB pension schemes with a need for a running yield).

Only the most sophisticated institutional investors are able to finance illiquid equity opportunities *directly*, whereas others can invest through intermediaries, specifically infrastructure funds. As shown, several pension fund managers own their own specialist vehicles such as M&G which owns InfraCapital whereas others have their own specialist in-house teams. The former will also raise capital from third party sources.

Developers are the only group interested in pre-construction phase risks. They will often look for more complex projects where they think they can add most value. As they typically have large contracting arms used to working with the public sector, interfaces are not seen as a major risk – these are there for all infrastructure types and they are used to managing them. Their starting point is that they are in for the long term but are also willing to sell down their position – often to specialist infrastructure funds during the construction phase of projects.

Figure 3.1 below provides an illustrative overview of where different types of equity and debt providers sit. Note that all providers can access liquid – that is, quoted – debt and equity should they wish.

Figure 3.1: Appetite/ positioning of different sources of capital



4. SUPPORT MECHANISMS, GOVERNMENT OBJECTIVES AND VALUE FOR MONEY

Government interventions can arguably take three main forms. *Policy* (including regulatory policy as implemented through licences) in which market participants are required to do things that they otherwise would likely not do; *funding* (which can be provided either by customers or else through taxpayer payments); or *financing* in which government provides explicit financing support to projects and / or companies by way of direct intervention.

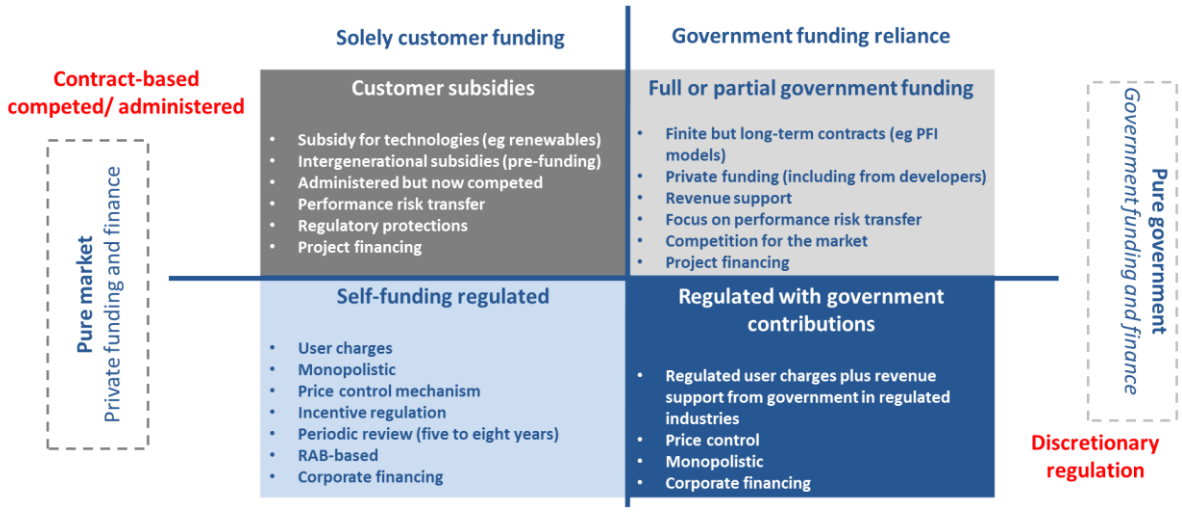
This section provides a framework for differentiating between these different forms of support as well as setting out how government might approach explicit financing interventions.

4.1. Support mechanisms

Stretching features of the traditional regulatory model to support project-financed transactions has played a significant role in mobilising private finance

It is possible to see how in recent years government has increasingly made policy interventions to enable infrastructure funding; not so much by direct funding, but by stretching the established regulatory model such that customers fund several arrangements involving different types of cross subsidy. It is useful to analyse this by way of a simple four box framework which analyses the differing ways in which government directly, or indirectly, has influenced private financing of infrastructure, by examining solely customer funding models versus those which have a heavy reliance on government funding and by separating out discretionary regulatory models from those governed by long-term contracting arrangements in which, for example, licences have been developed with many of the features of long-term contracts. This is illustrated in Figure 4.1 below.

Figure 4.1: Funding four-box model



Outside of the space in which *private financing* is shaped by different forms of government involvement, at one extreme, both funding and financing are privately provided, as is the case with many airports or traditionally electricity generation. At the other extreme government

is responsible for both funding and financing infrastructure, in which private capital takes no commercial risk.

The first bottom left quadrant of the model captures classic, self-funding network regulatory models. As a result of the large-scale privatisation programmes of the 1980s and 1990s, much of the UK's network infrastructure is now financed as well as funded privately. As these were by and large natural monopolies in which the potential to introduce competition in the market was limited, they have all been subject to economic regulation through licences which has sought to balance the interests of consumers for efficiently provided utilities and infrastructure with the needs of the private sector for financeability. Although, as corporate financings, it is more difficult to measure, classic regulated network investment accounts for a significant proportion of investment in infrastructure.

Whilst many regulated economic infrastructure sectors have relied solely on user charging, others have required government funding support. This has included UK rail transport investments where user charges have been insufficient to cover network investment costs, and also characterises utility sectors in a number of other countries. This is reflected in the bottom right-hand quadrant which captures regulated sectors where there is a need for supplementary government funding support.

Above this, the top-right hand quadrant includes sectors with varying degrees of reliance on government funding, but where private financing is governed by contract rather than by discretionary regulation. The PFI programme, although largely focused on social rather than economic infrastructure, introduced the concept of combining government funding with private financing. This approach also differs from traditional RAB-based regulatory approaches as private capital has been raised using long term contracts of typically 20 years, which require agreement from both parties to be amended rather than one-sided licences which are subject to five to eight year price control resets.

The PFI approach was successful at mobilising significant amounts of capital and its successor PF2 has the potential to mobilise financing for economic infrastructure such as roads, flood defences etc. where availability-based structures can be employed.

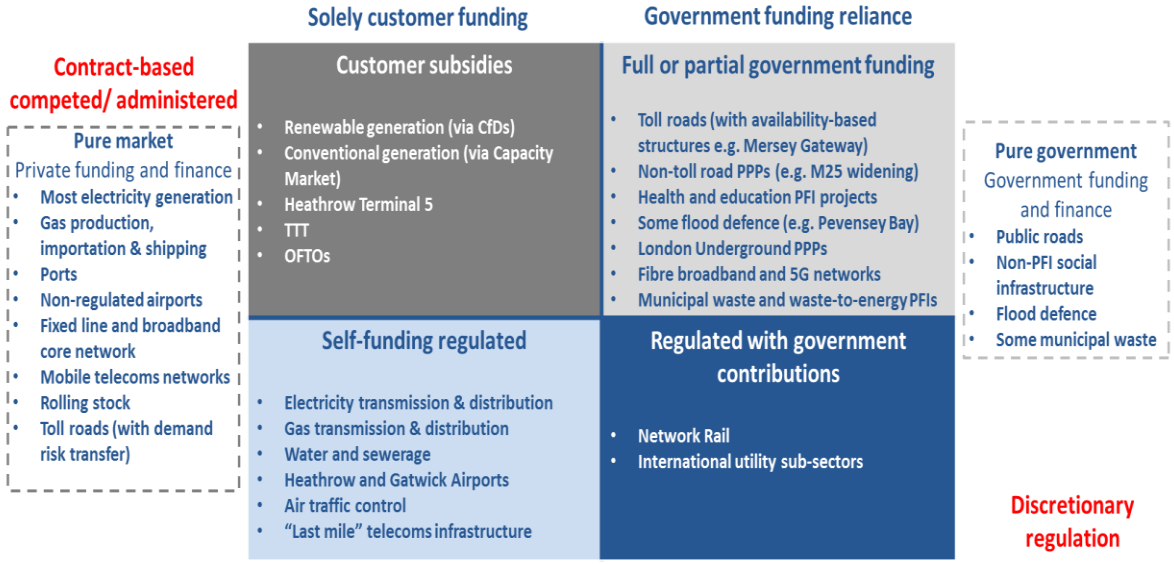
Models included in this space include Mersey Gateway, which is funded by a mix of grants and user charges. Models in which developer contributions can operate alongside government funding and user charges, such as in the case of the Northern Line Extension also fall within this quadrant. Whereas there may be most potential for this in London where property and land prices are highest, there may be more potential than is currently being exploited.

Finally, the top-left quadrant captures models which combine certain aspects of the regulatory regime but which are principally governed by contract (and licenses with contractual features) and funded by customers, typically involving customer funded subsidies of different kinds. Whereas sectors such as electricity generation were traditionally privately funded and financed purely by market means, government policy interventions to support

low carbon generation, including renewables, has involved the consumer funding the additional costs of these technologies. In cases such as this, most renewables financing would not have been possible without these consumer subsidies. Although pre-funding of assets in construction was incorporated into the Heathrow Terminal 5 this became a major aspect of the TTT. Essentially, a range of projects such as OFTOs, TTT and electricity interconnectors which could have been financed as merchant arrangements, for a variety of reasons, have been structured more as utilities. These approaches have combined elements of competitive procurement of long term contracts with a degree of regulatory protection, such as against asset stranding.

Figure 4.2 shows how different infrastructure sub-sectors fall within the model.

Figure 4.2: Infrastructure sub-sectors within the four box model



The regulatory model and stretching it into new contexts has been a successful approach that has been sufficient in many instances and has the potential to be extended further. Regulators still have greater freedom on the revenue front (renewables control levy aside) to fund infrastructure in an age of austerity. They may also be better placed to fund very early stage policy and project development.

4.2. Funding versus financing interventions

As shown above, *funding interventions* have been undertaken in several different contexts. They can take several forms, including being either:

- administered (in which the level of subsidy is estimated by government) such as in the case of renewables generation banding for different technologies, or competed in which the subsidy is allocated through a reverse auction;
- a periodic revenue stream, such as in the case of CfDs or else as an upfront grant to buy-down capex (and reduce consequent financing requirement as has occurred in the Dutch roads sector);

- full – as in the case of most PFI – or partial / variable through demand support in HS1; and
- "one way" or pure subsidy or else "two way" in which the beneficiary repays amounts, such as in the case of a CfD.

Financing interventions, which in the UK are typically made on a market rather than subsidised basis, can be either through:

- "funded" approaches, such as investments through debt and equity products (provided through institutions such as the GIB); or
- "contingent" through guarantees (all risk or specific) as provided under the UKGS, and which can be drawn down in specific circumstance such as the EIB bond credit enhancement facility.

4.3. Rationale for government intervention

Once government has chosen to pursue private financing approaches, rather than pure public ones, when should it intervene through funding and financing interventions in private finance infrastructure markets to move risks away from private investors and lenders, either to bill-payers or tax payers in order to either mobilise or else reduce the cost of private capital?

This needs to take account of a range of government objectives. These include value for money, efficient delivery, minimising costs and risks to either bill-payers or the public purse. Some of these can be delinked from private financing; for instance, it is possible for publicly-financed projects to be delivered by potentially more efficient private sector contractors through performance-based contracts. Likewise, value for money can be enhanced by competitive procurement rather than relying on public sector provision. However, combining performance risks and the responsibility for raising finance can be useful in aligning incentives. Competitive procurement can create innovation that would not have occurred otherwise.

There are essentially two high level contexts in which policy interventions which secure customer funding for projects, or direct government funding, or financing interventions need to be assessed:

- First, projects which would *otherwise not be bankable* in the absence of such interventions.
- Second, those projects in which *changing the risk allocation* (or distribution of risk) can lower pricing or the project's ability to access different sources of financing, but by putting either bill-payers or tax-payers at greater risk.

The research suggests that rationales for the first of these can involve:

- Addressing *limited affordability* and therefore a *lack of revenue certainty*. Put simply, this will occur when revenues are projected to be insufficient to cover

costs. This can include infrastructure services with public good characteristics, or market failures such as in the case of renewable generation where carbon costs are not taken into account in the costs of conventional generation. The typical form of this intervention will be either a fixed or variable ("top-up") revenue stream.

- Addressing *payment risk* where the public contractual counter-party is not creditworthy. These *explicit* guarantees (and other forms of contingent support) are most appropriate because of the financial standing of the public sector payee (where this risk cannot be structured away).
- Addressing *government or public sector performance risk* in which a private project is dependent on government delivering on its commitment. IEP is a good example of this, where investors needed to be clear that government would lease the trains in the event that they were delivered on time.
- Mitigating *uninsurable* risks; in other words, no part of the private sector is willing to take them. Unproven technology risks could fall into this category and could, for instance, include some aspects of nuclear power generation.
- Where it is a *sub-sovereign* seeking to raise private capital directly, such as publicly-owned Network Rail or the Greater London Authority (GLA), which has insufficient funding on a stand-alone basis.

In essence, unless government steps in to cover these risks in some way the project cannot progress. The policy choice is therefore either to do it fully on government balance sheet or else to accept the need to back-stop such risks either by funding or financing interventions. From a policy perspective, this provides a relatively clear rationale for intervention, although it needs to be embedded into the policy framework for given sectors. For instance:

- consumer subsidies of renewables will be tolerated in support of renewable generation up to a given level in order to support renewables directive and carbon policy objectives; or
- the UKGS can be used to support otherwise viable projects with sub-sovereign payment risks.

The second form of intervention is however more complex, in which changes to the risk profile are likely to involve trade-offs, which need to be evaluated. As such they involve optimisation of risk transfer, and involves a high degree of judgement in terms of the appropriate course of action, which is likely to be context specific.

A good example of this is de-risking a project financing such that it looks more like a utility; examples include pre-funding in the case of TTT or removing asset stranding risk in the case of OFTOs. In both of these cases alternatives are likely to have existed; however, this would have likely pushed up financing costs and / or reduced the sources of capital available.

Such de-risking can also involve bill-payers and tax-payers taking on *remote but high impact risks* (e.g. extreme cost overruns in the case of TTT). Although there may be contexts in which certain risks are uninsurable it is more likely that the costs of doing so – for instance through excess of loss insurances - are not optimal, in terms of their impact on cost of capital.

De-risking can have the effect of enabling access to wider capital pools where there is more competition for assets thus driving down cost of capital; although as set out by leaving bill-payers or tax-payers with more risk. However, in these instances governments and / or customers can be better placed to take risks than private sector markets.

This involves an assessment of how *specific risks* and *trade-offs* between them are evaluated in a given context. It is more difficult to have an upfront policy position on this, rather it is necessary to undertake a quantitative and qualitative ex-ante cost-benefit that reflects the specifics of the context. The pure market solution would reflect the counter-factual – whereas policy options would involve altering the risk allocation. In doing so, it will be necessary to assess both any reduction in costs (benefits) arising from different options as well as the distribution of these between industry and customers.

Ex-post assessments of government interventions can also be helpful for determining the value for money of previous interventions and informing future decisions. When undertaking such assessments, reasonable counterfactuals are needed, but these can be difficult to establish. Anecdotal evidence of where interventions have been effective include:

- TTT, where the latest estimates of the project's impacts on annual customer bills is expected to be £20 to £25 in real terms, significantly lower than the initial estimate of £70 to £80 per year at 2011 prices made in Thames Water's economic case for the project. It has been noted that one of the key drivers of these cost estimates was the cost of finance, which as a result of the competitive procurement and government support package provided to the project were considerably lower than cost of capital allowances in regulated industries and other greenfield assets.[12] This, of course, could be higher in the event that construction risk were to crystallise.
- OFTOs, where recent analysis has suggested that the approach to tendering assets as part of recent round has saved between c.£680m and c.£1.1bn in present value terms at 2014/15 prices. This is compared to the counterfactual of wind farm developers operating the assets on a pure merchant basis and the assets being incorporated into the regulatory asset bases of onshore transmission companies and being regulated as part of the price control framework. [13] However, it should be noted that the distribution of these benefits did not all flow to customers.
- CfDs, in which downside market risks have been transferred from generators to customers (although relative to the previous renewable obligation certificate regime,

[12] CEPA (2015), Thames Tideway Tunnel – Cost of Capital.
[13] CEPA (2016), Evaluation of OFTO Tender Round 2 and 3 benefits.

any increases in wholesale market prices would result in lower subsidy payments). As with OFTOs, once the subsidy was competed, the CMA estimated that the amount of public sector support required for CfDs was 25% lower than it would have been had CfDs been awarded at the administered strike prices initially set by the government, which they suggest shows the potential efficiency gains from introducing competitive procurement into the allocation process.[14]

As part of developing different options it should also be remembered that prior to any direct customer or government support regime design can help optimise risk allocation. Figure 4.3 illustrates a number of different types of transaction in different sectors and means by which to address specific key risks. It shows which of the latter can be dealt between parties on a purely commercial basis without any policy or regulatory design interventions; where the latter have helped address risks and finally where specific funding and financing interventions have been made.

Figure 4.3: Key risks and their mitigation by infrastructure sector

Key: Pure market mechanisms; regime / concession / contract design; explicit government funding / financing intervention

Risk	**Selected sectors and sub-sectors**						
	Energy			**Water**	**Transport**		
	Renewable elect generation	**OFTOs (Generator build)**	**Interconnectors**	**TTT**	**Bridge (Mersey Gateway)**	**Rolling stock (IEP)**	**Rail (HS1)**
Construction	Generator	Generator developer	Developer	Infrastructure provider Government "excess of loss" guarantee	Sponsor / EPC	Hitachi (vendor)	Developer
Market (price)	Contracts for difference	Availability structure	Cap and collar on revenues	Thames Water off-take	Availability structure	Availability structure	Government minimum revenue support Traffic revenues
Market (volume)	PPAs with suppliers CfDs						
Technology	Vendor warranties	Market insurance		EPC contract		Vendor warranties	
Payment	LCCC	NGET not windfarm is payee	NGET	Thames Water	Government guarantee		
Other		Asset stranding risk borne by customers				UKGS guarantee on public sector performance	

[14] CMA (2016), Energy market investigation – Final report.

5. CONCLUSIONS

Where revenue certainty is achieved, there is no shortage of capital

The greatest driver of investability is *revenue certainty*. If this is achieved the vast majority of projects will be financed. It is not so much a question of who pays – as long as they are creditworthy – but investors and lenders need to be able to identify "look through" to the revenue stream(s). Projects with *input cost uncertainty* are more challenging (e.g. biomass, waste to energy) where specialist investors are more likely to be required who are better placed to understand and manage these risks.

Therefore, the first step in ensuring that a project will obtain finance involves ensuring that bankability is achieved. In several instances this can be achieved by the market alone – such as in the case of many airports – in other instances a regulatory wrapper can achieve this. Government mandated funding from customers or the provision of tax-payer funded revenue streams will be required where subsidies are necessary. Naturally, such an affordability / budgetary constraint is key determinant of what can be financed. Where a subsidy is required, value for money is best achieved by competing it.

Additional *support through government guarantees* is typically required only on an exceptions basis, where particular aspects of a transaction require additional support, typically to address payment risks or remote / high impact risks through excess of loss protections. However, in the event of greater devolution of responsibility for projects such as Mersey Gateway to devolved administrations, regions / cities etc. - PPPs in which funding is through a mix of user charges and local authority payments – the case for a *guarantee programme* may need to be considered further. Such guarantees should not expect to be called, projects should expect to be otherwise robust apart from the financial standing of the public sector payee.

Over and above this, however, there is the option for interventions to achieve a more optimal allocation of risk in which absorption of risk by bill-payers or tax-payers reduces the cost of financing either by reducing risk premia and / or increasing the potential supply of capital and competition for assets. Whether this is undertaken on either a specific project or programme basis any trade-offs need to be carefully evaluated through ex-ante cost-benefit analysis which considers any cost saving against a market counterfactual as well as the distribution of such benefits. The main possible exception to the attractive financing markets outlined above is potentially for one-off mega-projects such as Heathrow's third runway, which at a projected £18bn is considerably larger than, say, the TTT (c£4bn). The inability to break up this cost – say in the way that a rail line can be disaggregated into different sections with the potential for recycling capital, is a complicating factor. At this point, however, it is difficult to know with precision where the threshold lies over which projects may require support, and what additional bespoke funding and financing mechanisms may be needed to deal with this, as it

will vary depending on the specific characteristics of the financing and the prevailing market conditions at the time.

More needs to be done to understand the options for addressing the perception that DC pension schemes are unable to access infrastructure assets

Whilst capital may be readily available at the moment, this may not always be the case. In the context of this, it is therefore worth exploring ways in which DC, as well as DB schemes, might be able to access more illiquid infrastructure investments more readily, enabling them to benefit from the illiquidity premia that exist in such markets.

The perception that DC schemes are limited in their ability to access infrastructure assets by the liquidity requirements placed on them has the potential to hamper the growth in pension fund investment in infrastructure. This is particularly so because of the growth DC schemes means they are likely to make up an increasing share of the UK's pensions savings over time. It is not clear exactly why these perceptions exist and further work needs to be done to understand the options for addressing this issue.

Greater use of capital recycling approaches might also be appropriate for highly complex problems

An approach which is not used extensively in the UK, at least from an ex-ante perspective, is that of capital recycling. In such an approach, government would participate as whole, or possibly as an equity provider in a transaction. Any debt would also most likely be fully credit guaranteed. This would mean that such direct and contingent exposures would be on government's balance sheet. However, once the project became operational, with a track record the aim would be to divest government interest. Whilst this has occurred ex-post through privatisation of public corporations or joint venture investments (e.g. HS1), the objective of capital recycling has not necessarily been a primary objective from the outset.

A possible approach could involve central government either alone or in partnership establishing and capitalising a project company. As with other divestitures, exit could be either through a public listing or trade sale. Such an approach may be appropriate where there is a need for extensive guarantees, covering say construction and market risks, because the project is either in a new sector or there is another aspect of it which increases its complexity, such as where there are multiple interdependencies, several within the control of government. Possible opportunities for this could include, say Crossrail 2, with government risk capital being sourced from a divestiture of Crossrail 1. The approach might also be relevant to projects in which it is not possible to extend a regulatory wrapper to generate revenues during the construction period.

Strong policy underpinning, as well as institutional coherence and capacity are critical to developing a credible project pipeline, which can attract private finance to a sector

The best results in terms of marrying projects and financing would appear to come from a combination of strong policy underpinning, institutional coherence and (in network industries) a key player(s) with capacity to access capital markets for risk capital:

- **Policy underpinning** can serve as a driver of getting projects done. Examples of this include:
    - Interconnectors in electricity influenced by market coupling and energy security policies;
    - wind farms and OFTOs are driven by the Renewables Energy Directive and Carbon reduction legislation;
    - nuclear by energy security and decarbonisation; and
    - TTT by threat of environmental fines.
- **Institutional coherence** includes strong regulatory capacity and budget for implementing policies that go beyond traditional regulatory remit. For example:
    - Ofgem did extensive preparatory work including detailed design on many new initiatives, e.g. OFTOs, CATOs, inter-connectors etc; and
    - TfL has an increasingly strong implementation capacity.
- Given its credit quality as a borrower, National Grid has ready and cost efficient **access to capital markets** unlike Network Rail, which has enabled it to effectively "anchor" the electricity and gas sectors:
    - National Grid has capacity to undertake investments or else bid for them where the opportunity is competed; in comparison Network Rail has never had to bid for opportunities.
    - National Grid is highly-rated as a payee which has been used in the context of OFTOs, whereas Network Rail is not creditworthy on a stand-alone basis, being highly reliant on budgetary transfers and a government credit guarantees.

ANNEX A SUMMARY OF UK AND INTERNATIONAL CASE STUDIES

Table A.1: Summary of UK case studies

Case studies	Description of regime/project	Nature of policy intervention	Risks mitigated	Benefits and drawbacks of support
Contracts for Difference (CfDs)	Contracts for low carbon generators that allows them to obtain fixed prices for the electricity supplied (in real terms).	• Design of bespoke regulatory regime. • Contractual counterparty (via Low Carbon Contracts Company (LCCC)).	Fixed price in real terms mitigates generators from inflation and (partial) pricing risk.	Projects have benefited from certainty on their prices, which are contracted. However, the use of CfDs has raised some value-for-money concerns for the impact on consumers (prior to competing the subsidy)
Offshore Transmission regime (OFTO)	Offshore transmission assets are competitively tendered, winning bidders own the rights to operate and maintain assets for a fixed revenue (in real terms) over 25 years.	• Design of regulatory regime, including the fixing of OFTO revenues (in real terms). • Competitive procurement	OFTOs protected against a range of project risks, including design, planning and construction risk.	Risks are allocated across appropriate parties, although specific risks to OFTO are relatively limited.
Cap and floor regime	Regulatory regime for new interconnectors in which allowed revenues (in real terms) can fluctuate within an upper (cap) and lower (floor) bound.	• Design and regulation of cap and floor regime.	Demand and inflation risk.	Extends regulatory precedent to a previously merchant market.
TTT	A new separate entity – Infrastructure Provider (IP) – formed to limit Thames' exposure. In addition a bespoke regulatory regime was put in place alongside government support package.	• IP regulated by Ofwat under Regulatory Asset Base approach. • Prefunding of assets in construction • Mechanisms to cover against low probability, high impact construction risks.	Some mitigation against construction risk. Revenues to set by Ofwat, providing some security to investors.	Risks have been allocated sufficiently to ensure that the overall financing costs of the project are limited. However, many have questioned whether the government's support for the project was too extensive.

Case studies	Description of regime/project	Nature of policy intervention	Risks mitigated	Benefits and drawbacks of support
IEP	PPP programme to replace existing rolling stock with electrified trains. DfT guarantees are in place to provide certainty that the trains will be leased when available.	• Guarantee of stock being leased (DfT).	Payments made depending on availability of the trains. Investors are protected from Network Rail/ demand risk.	The public sector took on risks that the private sector was not willing to bear, although some key risks were transferred (such as planning, subject to it becoming a condition precedent for financial close).
Northern Line extension	3.2km extension of London Underground's Northern line from Kennington to Battersea. The project is using a novel funding mechanisms whereby developer contributions and incremental business rates are used to pay for the construction. Project developed by the Greater London Authority (GLA), which issued a commercial bond guaranteed by the UKGS.	• UK government guarantee - 50 year £750m standby refinancing facility in place.	Guarantee gives investors more certainty about credit worthiness of investment.	The government's guarantee to the project has enabled GLA to raise debt through issuance of some innovative bonds. The design-build contract is also structured so that the private party will only be paid at certain construction milestones. However, the private sector does not have any ownership in this project, therefore risks are relatively limited.
M25 widening	Widening of sections of the M25, refurbishment of the A1(M) Hatfield Tunnel and O&M of M25 and Dartford crossings. Government agreed to commit £500m of debt on commercial terms, signalling to private lenders that the Government was committed to the deal.	• Government agreed to provide credit to the project to attract private finance. This commitment attracted private investors, subsequently government finance was not needed. • Unitary charge payments.	Provision of the unitary fee meant that risks were limited to the availability of the road rather than any demand risks.	Government willingness to commit to the project allowed private finance to be mobilised during financial crisis when availability of private finance was more limited.
Mersey Gateway	Construction and operation of new toll bridge. The project's capital costs included a mix of public sector grants and private finance.	• Availability payments (Halton Council, with guarantee from Treasury under the UK Guarantee scheme).	Revenue risks protected through the availability payments structure.	Enabled small local authority to raise large amounts of finance that would otherwise not have been possible, although risk transfer limited to availability of

Case studies	Description of regime/project	Nature of policy intervention	Risks mitigated	Benefits and drawbacks of support
		• Guarantee to commercial bonds. • Capital grant (DfT).	Provision of a government guarantee provided security to investors.	road and construction risk (i.e. payments are not made until the bridge is constructed).
Heathrow Terminal 5	£4.3bn construction of Heathrow Terminal 5. Heathrow Airport Limited (HAL) was provided with pre-funding for the project during the construction period.	• Asymmetric trigger mechanism in place. HAL received pre-funding for meeting construction milestones, with penalties in place if timeframe not met.	Some protection from demand risks provided through pre-funding.	Pre-funding mitigated cash flow problems and provided comfort to investors. But opposition from airlines and concerns about incentives – penalties for not meeting triggers not large enough to incentivise delivery.
Broadband investment	Government in process of establishing the UK Digital Infrastructure Investment Fund. The fund will work to increase access to commercial finance to investments to develop UK's ultrafast broadband network.	• Establishment of new Fund with government committing £400m to the fund, which they expect to match with private sector commitments.	Not clear at this stage.	The design of the fund is still in development but presumably the aim is to try to leverage private investment in an area where it could be perceived that there is potential for technology, construction and demand risk.

Source: CEPA analysis

Table A.2: Summary of international case studies

Project name	Description	Private finance details	Public sector support	Key lessons
Gemini Offshore Wind Farm, Netherlands	• Two greenfield windfarms • Largest project finance transaction in offshore wind at financial close.	• Equity consortium led by green energy developer • Majority of senior debt sourced from commercial banks • Mezzanine facility	• 15 year CfD guaranteeing fixed prices. • Local government-owned utility company as off-taker • 26% of project debt finance provided by EIB • Export credit facility guaranteed some of the debt.	• EPC and turbine contracts in place before raising finance • Limited number of contracts reduced potential issues between different parties • Backing of main equity provider with large balance sheet and management expertise • Stable and transparent government policy • EIB and export credit was helpful in mobilising commercial lending
Meerwind Offshore Wind Farm, Germany	• 288MW wind farm • First European project to be operated by a private equity investor (as opposed to utility) • First windfarm built under KfW's approx. £6bn renewables financing programme	• Project equity • Some of the initial debt finance • Bond facilities that were issued as part of the refinancing of the project • Credit facilities	• 51% of debt finance provided by KfW at financial close • Feed-in tariff regime offers certainty of prices until 2027, followed by optional price floor from 2028-34 • Export credit provided by EKF, the Dutch export credit agency (ECA)	• Important role played by KfW in providing initial financing and then recycling capital during the later stages of the project, which was provided without EIB support • Construction risk effectively managed through an availability guarantee provided by Siemens, which was supported by EKF
Logan Motorway Enhancement, Australia	• Upgrade and expansion of highways and interchanges in Queensland, Australia • Entirely financed by private sector operator of toll roads • Project originated by concessionaire through Market Led Proposals (MLP) framework	• Fully privately financed	• Contracting of concessionaire • Development of MLP framework • Providing necessary consents.	• Large brownfield toll road projects can be financed entirely by the private sector under certain conditions • Acceptability of user charging on roads crucial • Close engagement of the public and private sector through the MLP framework

Project name	Description	Private finance details	Public sector support	Key lessons
A7 Bordesholm-Hamburg Motorway PPP, Germany	• Widening of 65km of the A7 motorway to six lanes • 30 year DBFMO contract, with transfer of construction, availability and performance risk	• Majority of equity and debt finance provided by institutional investors	• EIB and KfW invested in the commercial bond issued. • EIB supported the project through its Project Bond Credit Enhancement Scheme	• EIB support helped raised the credit rating of the capital market instruments by 1 and a half notches to A3 (Moody's) • Early engagement with the market allowed the project to be structured in a way that enabled bond financing in Germany's greenfield road sector for the first time
WestConnex Road (Phase 2), Australia	• Upgrading of existing interchange and extension of motorway • Initial traffic risk taken by New South Wales Government	• 30% of debt finance • Planned sale of concession once operational and traffic volumes established	• Grant finance provided by federal and state government • Concessional loan provided by Australian government to bridge financing during construction.	• Sale of the assets built during initial phases will allow the government to recycle the capital to fund future phases, once traffic volumes have been demonstrated
South Atlantic High Speed Rail (HSR), France	• 303km construction of new high speed line • 50 year concession contract, where construction and traffic risk have been transferred	• Nearly 75% of equity finance • Uncovered (c.£385m) and covered (c.£660m) debt finance	• €3bn of grants provided by French Government, local authorities and the EU. • €1bn grant from state-owned rail company SNCF • 25% equity via French state-owned CDC Infrastructure, guaranteed SNCF • 25% of senior debt via CDC • EIB loan covering 20% of all debt, with two thirds of this guaranteed by state • Guarantee of c.£660m of commercial debt	• Extensive public sector support likely to be required for financing major high speed rail schemes • Government guarantees were important in lowering the cost of private debt finance, with the unsecured debt being priced at 155bps higher than secured debt, stepping up to 255bps difference

Source: CEPA analysis

ANNEX B POTENTIAL PUBLIC SECTOR SUPPORT MECHANISMS

Funding	Financing
Public sector capital grants	Contingent guarantee
Public sector availability based payments	Tax Increment Financing
Contracts for difference	Co-investment
Cap and floor protection	Support in the event of low probability, high impact construction risks
Fixing revenues in advance / feed-in tariffs	First loss credit
Capital recycling	Standby credit / back up liquidity facility
Usage/traffic guarantees	Concessional loans[15]
Public sector off-taker	
Economic regulation	
Pre-funding of assets in construction	

[15] As was the case for some road projects in Australia.