



Infrastructure investment - mind the gap?

Policy briefing

Key findings

Globally and in the UK, there is a significant backlog of infrastructure projects. These are critical in driving growth and job creation, but in the wake of the financial crisis the capital to support such infrastructure investment has been in short supply. The IFoA believes that the Government should consider the following as key priorities to encourage increased investment that is sustainable:

- To develop a sustainable 'pipeline' of infrastructure projects so that this asset class can fit into a coherent, long-term investment strategy.
- Policy should recognise that institutional investors differ from the public sector in how they perceive the risks and returns associated with potential projects.
- Different types of infrastructure investment call for different approaches to issues such as financing, regulation and risk management. This is demonstrated by the three case studies in this paper, on renewable energy, transport and housing.
- Funding models should recognise that investors with greater risk appetites will tend to get involved in projects at an earlier stage than investors who are more cautious.
- The National Infrastructure Commission represents a major opportunity to reverse decades of underinvestment. It should have the status and authority to fulfil its aim to promote long term planning and greater certainty for investors.
- The Government and the Prudential Regulation Authority should take full advantage of EU regulatory changes to promote more infrastructure investment by insurance companies.

Future of
Investment
Policy

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Introduction

The infrastructure investment gap

Globally, there is a backlog of infrastructure projects that are critical in driving growth. The World Bank estimates that there is a need for \$3.7tn of infrastructure investment annually, whereas actual investment levels are only \$2.7tnⁱ.

In the UK, a similar investment gap exists. According to Arcadisⁱⁱ, “(...) The UK is behind all other G7 members on built asset wealth per capita, and has had a flat trajectory on investment share of GDP for several years since the financial crisis of 2008.”

So, why does this matter?

Infrastructure investment is positively correlated with GDP growth and integral to supporting the UK economy.ⁱⁱⁱ Well-functioning infrastructure provides support for the delivery of essential services such as energy and water, or for moving goods in trade. With the UK's existing infrastructure becoming older, some of it well over a hundred years old, we are at risk of not being able to support our growing - and ageing - population. At a time when populations are also expanding globally, with the rise of the Asian and Latin American economies, we are further at risk of becoming globally uncompetitive. Over the longer term, the effects of climate change could also have a major impact on the availability of energy and natural resources, particularly water.

Against this background, investing in infrastructure represents an opportunity to re-engineer the UK's delivery and consumption of these and other essential resources and services, putting the adoption of new technologies at the heart of the debate. However, in the wake of the financial crisis and economic stagnation, the capital to support such infrastructure investment is in short supply. The UK Government, private and institutional investors, and UK citizens, alike all face difficult questions and choices.

The risk-reward trade off and capital efficiency

Although infrastructure projects help to generate economic growth, there is often simply a shortage of available capital to get them off the ground because that growth is only in the future. In the years since the financial crisis, many governments have faced a further constraint that they have had to consider whether funding infrastructure investment fits into the wider context of austerity policies they are pursuing. Cuts to capital expenditure are easier to make than cuts that will affect existing resources or services, and which will be felt immediately by voters. When economic conditions are tough governments have less available capital and a harder challenge in selling higher taxes or user fees to the public, so the supply of public-private projects decreases. Even though there is evidence that infrastructure development can promote growth and job creation, governments may be forced to defer such funding until the national balance sheet looks healthier.

Given governments' capital constraints, although they may be partially able to finance infrastructure projects they also need to attract investment from the private sector. What then prevents private investors from viewing infrastructure as an attractive asset class in which to invest? One possible reason is that many large infrastructure projects do not get off the ground because government and institutional investors have a different perception of the risks and returns associated with these kinds of projects.

A government's return thresholds might be lower than private sector thresholds for viable infrastructure investments. However, the government does not have unlimited capacity to finance projects at low costs of capital, since its cost of funding can become considerably higher in certain circumstances. Such a government might therefore choose to seek a reasonable amount of private sector financing to support overall infrastructure needs, but it should only do so with a realistic attitude that recognises that in order to invest, the private sector will need to be able to achieve a reasonable return on capital.

Many large infrastructure projects do not get off the ground because government and institutional investors have a different perception of the risks and returns associated with these kinds of projects

Infrastructure projects must be 'bankable'

Two other reasons may exist for lack of private investment appetite. First, for many investors it is important to have a sustainable 'pipeline' of infrastructure projects so that this asset class can fit into a coherent, long-term investment strategy.

Second, investors are more likely to commit funds to a project if it is 'bankable'. This can be defined as having accurate, up to date, sufficient and wide-ranging information and analysis to allow investors to commit funds to a project. Before they commit resources to their own due diligence assessments, potential financiers – banks or companies – need to see evidence of a project's feasibility. This is not just in narrow financial terms but also in terms of social, economic, technical, environmental and administrative factors^{iv}. There should also be a clear sense of the project's purpose and objectives. Project proposals are often of limited use because of outdated information or lack of analysis

The impact of Solvency II

Regulatory issues also have an impact on infrastructure investment. In the wake of the financial crisis, there was a drive toward financial institutions, particularly banks, holding greater capital reserves to ensure that they would be able to better withstand any future economic shocks. Broadly welcomed across the financial services sector, this nevertheless raised concerns that the introduction of the Solvency II regime for insurers could severely hamper their ability to take investment risk. However, the Matching Adjustment under Solvency II helps insurers to invest in social infrastructure projects such as power stations, housing and hospitals, as it actively promotes long-term investment in growth and infrastructure.

In September 2015 the European Insurance and Occupational Pensions Authority (EIOPA) published advice proposing a separate asset class to capture high quality infrastructure under the Solvency II standard formula.^v This approach should encourage increased infrastructure investment by reducing risk charges for qualifying investments in both equity and debt.

Solvency II also introduces a 'Prudent Person Principle' for insurance company investment, which removes restrictions on investments provided they are prudent and in the interests of

policyholders. The Prudential Regulation Authority (PRA) has suggested that this could encourage larger asset allocations to infrastructure and other alternative asset classes.^{vi}

The IFoA believes that the UK Government and the PRA should take full advantage of regulatory changes at the European level to promote more infrastructure investment by insurance companies. In particular, they could consider the scope to relax liquidity requirements. These are appropriate for short-term investments but infrastructure investments are generally long term in nature and realistic investors would not demand the same level of liquidity. We recognise that liquidity risk must be managed appropriately, but the need for more investment means that differential treatment for infrastructure is reasonable in our view.

UK Government Strategy

National Infrastructure Plan

In its 2014^{vii} National Infrastructure Plan, the previous Government announced ambitions to increase infrastructure investment. From 2015-16 until 2020-21, there is planned spending of £411bn across the public and private sectors, with the Government pointing to an increase in overall economic activity of £2.84 for every £1 spent on infrastructure construction.^{viii}

A key reason for the Government to seek private sector involvement in infrastructure is the scale of the largest projects. The Government may believe that a project is in the national interest, and may even prefer it to be publically funded, but the required level of funds may simply not be feasible within its fiscal strategy.

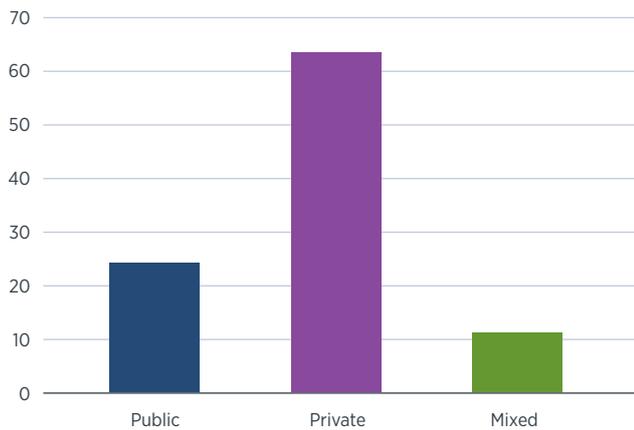
The National Infrastructure Plan explains some of the principles behind the Government's priorities, such as the balance between public and private funding. It cites the potential to achieve value for money as a driver for publicly funding certain areas, including roads, rail and science. In other areas the Government believes that competition can achieve greater efficiency, and so private sector funding is preferred for areas such as water, telecoms, and electricity and gas networks. In some areas such as flood defences a mixed funding model is used.

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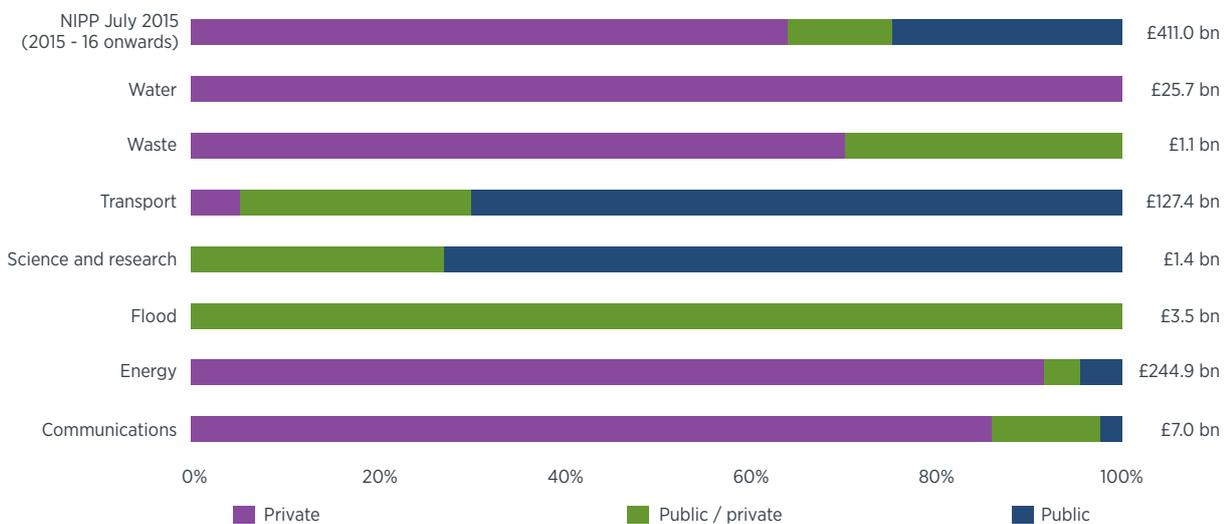
National Infrastructure Pipeline

The planned breakdown of funding between public and private sectors in the National Infrastructure Pipeline is shown below and demonstrates the crucial role of the private sector. In terms of industry sectors, energy accounts for around 60% of the Pipeline, while transport accounts for around 30% (and for the majority of the individual projects).

UK National Infrastructure Pipeline, 2015-2021: sources of funding



The second chart¹ shows the planned sector breakdown of the Pipeline and the split between public, private and mixed funding for each sector. By far the greatest planned spending coming purely from the private sector is in energy, with approximately £220bn over the 2015-2021 period. Water is next largest (£26bn), followed by Communications and Transport (each around £6bn). Turning to public-private partnerships, the greatest planned spending is in transport (around £30bn), followed by energy (around £10bn) and flood (£3.5bn).



National Infrastructure Commission

In October 2015 the Government announced the establishment of an independent National Infrastructure Commission (NIC) to set national priorities for infrastructure projects. In his initial comments the incoming Chair Lord Adonis said the Commission would focus on building political consensus on the country's long-term infrastructure needs. The NIC will set out an integrated 5-year assessment of the country's infrastructure needs at the start of each Parliament, in the context of a 30 year outlook. The Government intends that these 5-yearly infrastructure reports "will help promote forward planning and timely investment decisions, and provide greater certainty for investors".

The need for fresh and innovative public-private financing models

The complexity of infrastructure finance brings opportunities to innovate. New, more efficient financing structures can reduce the risks faced by investors. There is a clear market demand for such structures: for example, in a recent article^{ix} the Chief Executive of the Pensions Infrastructure Platform notes that there are too many 'greenfield' projects with relatively high risk profiles in the government's pipeline, and the PIP wants to see "more government projects structured in such a way that sufficient risk is mitigated to make the projects an appealing investment opportunity for pension fund investors."

Debt investment generally provides 80-90% of the capital for infrastructure projects^x with the rest coming from equity. This balance may reflect that relatively fewer investors will be comfortable with the greater risks and uncertainties associated with equity. It may also be a reflection of the type of financing balance that infrastructure projects and companies are seeking.

¹ National Infrastructure Pipeline Factsheet July 2015
<https://www.gov.uk/government/publications/national-infrastructure-pipeline-july-2015/national-infrastructure-pipeline-factsheet-july-2015>

Although equity investment is a fairly small proportion of the total, this tranche of finance is crucial because it plays a bigger role at the early stages that determine whether a project will go ahead. As we note in the case study on renewable energy, investors with greater risk appetites will tend to get involved in projects at an earlier stage than investors who are more cautious. We believe that UK Government policy should take this into account by designing equity-based structures to target the types of investor vehicles that dominate in the initial stages of a project.

Similarly, debt-based approaches could be tailored to the construction and operational phases of projects. The ratings agency Standard and Poor's (S&P) has identified^{xi} 10 factors it thinks would unlock long-term infrastructure investment and develop project bond markets. These include having standardised financing structures which are nevertheless flexible enough to accommodate specific deals. Interestingly, S&P suggest that the UK's PPP and PFI project bond markets could be a model for rolling this out across Europe. Another of S&P's recommendations is putting in place a construction credit support package, for example an unconditional letter of credit from a financial institution to cover, e.g. the replacement costs from a failed contractor.

Sponsors' and investors' perceptions of project risks are almost as important as the risks themselves, and here there are opportunities for innovation to make information more transparent, so that perceptions are more realistic and less exaggerated. The IFoA has been working with the Institution of Civil Engineers on a guide to 'front-end thinking' (previous collaborations include RAMP, which is discussed later).

One of the guide's key themes will be to emphasise the need for good quality information when making the case for a particular project. For example, potential investors could be given access to the sponsors' risk assessments. The onus should not be just on the sponsors to provide information, but also on investors to maximise their income by being alert to opportunities to enhance the asset during the project lifetime. As S&P comment, there should also be enough publicly available information on projects to avoid having a two-tier market between private lenders and institutional investors.

Actuaries are well-placed to contribute to efforts to bridge the infrastructure investment gaps, especially in relation to Public Private Partnerships. Actuaries have the relevant skills to identify, analyse, measure and mitigate the risks faced by potential private sector investors, and have developed techniques (some described in this paper) that have already been successfully applied to infrastructure. Much actuarial work is concerned with long-term projections, while investors in infrastructure will often have a 20 or 30 year time horizon. Actuaries work for, or advise many of the biggest potential infrastructure investors, such as life insurers and pension funds, and therefore understand these institutions' requirements.

As the following three case studies illustrate, different types of infrastructure investment call for different approaches. For example, on renewable energy we discuss how a Danish wind farm has been financed using a 'co-mingled' investment platform in which the construction company and a private equity fund jointly own the equity. Similarly, on transport we discuss the social cost-benefit analysis, which is a means of translating the non-financial issues affecting major construction projects into more quantifiable terms. Finally, on housing we refer to research highlighting the potential benefits of easing regulatory restrictions on investment in affordable housing.

Sponsors' and investors' perceptions of project risks are almost as important as the risks themselves

Renewable energy

Case study 1

Securing our energy future/going low carbon

As populations expand, the demand for energy is increasing. This, combined with the Government's commitment to becoming low carbon by 2020, means that the Government is calling on pension funds and life companies to invest in new, renewable technologies.

In 2003, the proportion of UK energy supply coming from renewable sources such as wind and solar was only 3%. By 2014 this had grown to 18%. The Government's target by 2030 is 27%, suggesting continued rapid growth and investment opportunities over the next few years.

Some of the growth to date has been encouraged by Government subsidies, but this is a double-edged sword because the subsidies are not guaranteed for the long term. Money is often available for new incentives but stops when they are no longer new – for example feed-in tariffs for solar power providers were reduced in April 2015. The risk of this happening can discourage investment.

The Government will introduce a new regulatory regime called Contracts for Difference by 2017. Under this scheme the Government will pay renewable providers the additional cost of the technology over and above the wholesale electricity price. This will continue for 15 years, giving providers more stable returns and therefore leading to more stability for investors in the sector.

It seems that some regulatory constraints, such as the Matching Adjustment under the Solvency II regime, have been alleviated from an infrastructure viewpoint. This is in part due to EIOPA consultation with the insurance industry, but another major factor is the requests from and need of governments for institutional money to finance infrastructure projects and emission and energy targets. As such, and given this proposed new role for insurance companies and pension funds, it seems wise for the actuarial profession to pay especially close attention to the potential pitfalls and possible rewards from providing institutional financing towards these infrastructure development goals.

In order for insurance companies and pension funds to source 'bankable' assets, it may be necessary to adopt a flexible approach to the provision of finance. Recent years have seen asset prices being bid-up, as many investors crowd into the sector. Those investors who are able to adopt a nimble investment process may find that they are able to remain involved in negotiations for assets. For example, commercial banks are traditionally in the business of structuring loans on flexible terms, and institutional investors could perhaps allocate funds/finance with flexible draw-down terms as and when the project needs to purchase equipment and pay for services; this would aid the project to lower financing expenditures.

Renewable energy case study

Jädraås Wind Onshore Windfarm is an interesting example of innovative finance because it contains many elements often cited by institutional investors as pre-requisites for infrastructure investment, more specifically, renewable energy projects. These elements are:

1. Cross-border jurisdictions
2. Electricity certificate¹ scheme which supports the revenue
3. Exports credit guarantees
 - 3.1 Supported the economy through exports of manufactured goods,
 - 3.2 Enabled the purchase of debt securities by an institutional investor, by acting as insurer of last resort should the project fail to pay on schedule.

It is also an example of a mid-sized pension fund with €13bn of asset under management, which has an articulated investment strategy into renewable energy. A co-mingled investment platform was used. We have chosen to use a mid-sized pension fund as an example, as opposed to the larger institutional investors, as this will be of interest to a greater number of midsized investors who could replicate or benefit from this investment process.

¹ The principle of "electricity certificates", (ECs) is different to feed-in-tariffs [in which the producer receives additional revenue per kWh of electricity generated]; under the EC scheme, producers of renewable energy receive ECs from the government per kWh of electricity generated from renewable sources. If a producer at year-end-audit fails to display ECs in proportion to electricity sold (ie. ECs are linked to revenue), then the producer is financially penalised. ECs are structured to be a penalty for not producing electricity from renewable energy sources, as opposed to a payment which positively subsidises generation from renewable energy sources.

The co-mingled platform organises the development, construction, operational and investment process by collaborating with site developers and project sponsors:

- **Site developer:** perform site survey, planning permission.
- **Project sponsors:** purchase the project from site developer, and own it via equity. In this case, a private equity fund, and the construction company are co-project sponsors.
- **Special Purpose Vehicle (SPV):** set up by the project sponsors. The project SPV takes on both revenue and costs (capital, operational, and financing costs).
- **Financial arranger:** commercial bank arranging the transaction, and which also provided the loan.
- **Loans:** provided both by a mid-sized pension fund and by a second commercial bank.

Asset Allocation: Thanks to the export-credit guarantee of the loan provided by the pension fund to the project SPV, the pension fund was able to allocate the EUR120mn loan as a sovereign asset as the loan was effectively AAA-rated and backed by the Kingdom of Denmark. This is interesting, as pension funds may have a proportionally smaller allocation of assets to the alternative asset class, under which renewable energy and infrastructure investments may often fall.

Merchant Revenue and Revenue Risk: Merchant revenue is a market-based revenue. The Scandinavian electricity markets are liberalised, and project revenue is therefore exposed to market fluctuations of the price of electricity. In this case, the revenue risk was mitigated through entering hedging contracts.

Decommissioning costs are comparatively low at €1.6 per kW; likewise decommissioning risks are low.

In order for insurance companies and pension funds to source 'bankable' assets, it may be necessary to adopt a flexible approach to the provision of finance

Transport

Case study 2

Becoming globally competitive

Transport is the second largest sector (after energy) in the National Infrastructure Pipeline, and the largest in terms of individual project numbers.

The Government's flagship rail project, High Speed 2 (HS2), aims to connect 8 of the UK's 10 largest cities and improve capacity and journey times. The experience of seeking private finance for High Speed 1, the rail link between the Channel Tunnel and London, was that the private sector could not raise enough money and the Government had to issue bonds to finance the work. In the case of HS2, the Government intends this to be publicly funded because of the size and complexity of the project, although there may be limited private sector involvement, for example in financing the building of new stations.^{xii}

Turning to roads, forecasts suggest population and GDP growth will lead to major increases in volume of traffic in the coming years. The Government's strategy is therefore to increase road capacity and reduce congestion. The National Infrastructure Plan includes £15bn proposed investment from public funds in road improvements which will create 1,300 new lane miles over the current Parliament. The Government's priority for roads is the Strategic Road Network, which represents only 2.4% of all roads in England but carries a third of cars and two thirds of HGV traffic.

Most investment in both rail and road is publicly funded, reflecting the limited scope to achieve efficiency through competition. However, the private sector accounts for nearly a third of the proposed transport spending, mostly through PPPs. Examples of private sector finance include ongoing investment

in rolling stock by the train and freight operating companies. On the roads side, the Government is seeking match funding from industry to develop technology for Ultra Low Emission Vehicles (ULEVs), and in 2014 the Highways Agency appointed 26 companies to a Collaborative Delivery Framework to carry out design, engineering and construction work on major strategic roads.

An interesting longer-term development is the evolution of autonomous vehicles. In February 2015 the Department of Transport published a major report^{xiii} which cites a number of potential advantages of such vehicles, including mobility for more of the population, greater productivity, reduced emissions and congestion, and ultimately better road safety.

The development of driverless cars at a significant scale would require major infrastructure, including sophisticated 'collaborative' IT systems and networks of electric charging points. If the report's assumptions are correct, the relatively relaxed regulatory environment in the UK will attract major investment in developing these technologies by manufacturers and testing organisations over the next few years. These companies will seek access to finance. There are many potential risks for investors: technological problems, legal issues, uncertainty about future demand for driverless vehicles, and ethical concerns around potentially allowing those vehicles to 'make' life-or-death decisions in accident situations. Manufacturers will carry out risk audits but there will also be a need for independent audit, and we believe that actuaries could play a role in this by researching, analysing and assessing these risks.

A typical route into infrastructure investment is listed debt ... this could be an attractive option for investors in current initiatives like ULEVs or indeed driverless cars in the future

A typical route into infrastructure investment is listed debt, and according to the IFoA's Working Party on Non-traditional Investments^{xiv} this could be an attractive option for investors in current initiatives like ULEVs or indeed driverless cars in the future. The Working Party notes that such listed debt generally has an investment grade rating. The rating is usually given early on, at the construction phase, but it doesn't usually change. However, default rates are higher during construction and into the first year or two of operations, so projects that survive past that stage may have a stronger underlying credit rating than the 'official' one. This could make the debt attractive for investors in the operational phase.

Risk Analysis and Management for Projects (RAMP)

As mentioned in the previous section, the IFoA and the Institution of Civil Engineers have collaborated to develop a methodology known as RAMP (Risk Analysis and Management for Projects), which provides a framework for analysing and managing project risk to promote better decision-making and greater likelihood of success. RAMP is an example of how actuarial risk management techniques can be of practical benefit to investors in assessing potential infrastructure investments. This framework is in fact already used by Crossrail in its risk-management process.

One of the distinguishing features of RAMP is that it focuses on quantifying the financial impact of risks wherever possible. For example, the RAMP framework includes a description of the social cost-benefit analysis. A traditional cost-benefit analysis captures projected cost and revenue cash flows for a project under a range of scenarios. In a social cost-benefit analysis non-financial impacts can be imported into the analysis by converting them into monetary values. An example relevant to the transport arena might be reduced congestion on local minor roads resulting from additional lane capacity on the Strategic Road Network.

There is a close connection – which the Government acknowledges – between transport infrastructure and major housing developments. In a recent consultation paper,^{xv} Transport for London argues that Crossrail 2 could stimulate house building in areas with poor transport links, which would lead to regeneration of the local economy. It points to evidence that merely the expectation of future benefits from Crossrail 1 has led to significant housing developments. We now look at housing in more detail.

Housing

Case study 3

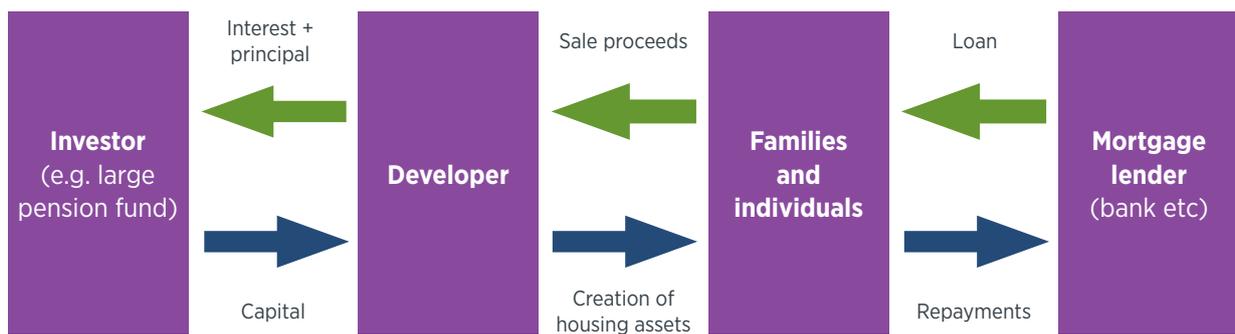
Ensuring housing for a changing demographic

According to the ONS, around 230,000 new homes need to be built each year in England to meet future demand (without addressing a large historic backlog), but only 137,000 have been built on average over the last 10 years^{xvi}. A significant increase in construction is needed to meet future demand and to plug the historic gap. The National Infrastructure Plan does not devote a specific chapter to housing, unlike energy, roads, rail, water, flooding and communications. This is because the UK Government does not classify housing as infrastructure, even though most other European countries do. One view is that this approach leads the Government to give less priority to housing, which explains the size of the investment shortfall and the lack of private investment in the sector.^{xvii}

The reason for the Government's position may be that to build homes which are then sold on to individuals is a short-term business model; it does not meet the expectations of most infrastructure investors who are seeking a secure and regular income stream over many years. However, it is possible to convert the sale proceeds of the new housing stock into a more typical infrastructure income stream. For example, a simplified structure for an institutional investor could look like this:

In 2015 Legal & General formed a partnership with Dutch asset manager PGGM to construct affordable accommodation for the rental market^{xviii}. The rental income will be available to institutional investors as an asset class, aiming to offer high income security and diversification.

Should the public or the private sector be in the vanguard of devising credible housing infrastructure projects and financing structures? The Housing Forum, a membership network of private and public sector UK housing organisations, argues that this is a Government role, citing examples from France, Germany and Scandinavia of institutions which are “essentially state investment banks which invest in long-term projects of ‘public good’ such as infrastructure and affordable housing.”^{xix} They are better able to assess both the borrower and the project. However, they are also technically expert and are able to advise developers using their in-house teams.” What the Housing Forum proposes goes well beyond the National Infrastructure Commission's role, which will be largely advisory. Their proposal for ‘state investment banks’ would be radical in terms of UK political culture, but it does highlight the challenge of attracting sufficient private sector investment to meet the UK's housing needs.



The IFoA would urge the Government to focus on making the regulatory environment supportive to housing associations given that they build the great majority of affordable homes

So what is the Government actually proposing?

When launching its National Infrastructure Plan in December 2014, the Coalition Government announced £2bn of spending on housing until 2020. In its November 2015 Spending Review, the Government announced a doubling of its housing budget over the current Parliament, to deliver at least 400,000 affordable homes including 200,000 Starter Homes, 135,000 new Help to Buy Shared Ownership homes and 10,000 Rent to Buy homes. The Government will also release enough public sector land for 160,000 homes, and provide £310 million of funding to deliver 15,000 homes at Ebbsfleet, the first garden city in the UK for over 100 years.

In order to build the planned 200,000 Starter Homes, the Government will pay house builders £2.3bn over the next five years. The government funding will allow the builders to provide at least a 20% discount on these new homes, which will only be available to first-time buyers under 40. By providing subsidies up front rather than when homes are sold, the Government is likely to increase participation in the scheme by developers.

Starter Homes will fall into the category of 'affordable homes' – housing which is available to rent or buy at below-market rates. Affordable homes are an important component of the overall

housing market, representing around a third of all current construction. Housing associations build the great majority of affordable homes (although there is some evidence of interest from other players including insurance companies like Prudential)^{xx}, but according to think tank Policy Exchange they have the capacity to double the level of building, which would help to clear long local authority waiting lists for social housing. Policy Exchange argues that the reason housing associations are not doing this is that they face restrictions in the way they can invest capital, and lack access to cheap debt finance. The IFoA would urge the Government to focus on making the regulatory environment supportive to housing associations given that they build the great majority of affordable homes.

Any long term approach to meeting national housing priorities must engage with a range of political issues, including the consequences of an ageing population. This is one of the IFoA's policy priorities, and in particular we have made important contributions and continue to be engaged in policy on the funding of long term care, including the degree to which it is necessary or desirable for individuals to sell their homes when they need residential care. The ageing population also suggests increased demand for care and nursing home accommodation.

Conclusions

The IFoA welcomes the UK Government's recent actions to encourage private sector infrastructure investment. The National Infrastructure Commission in particular represents a major opportunity to reverse decades of underinvestment, and to make good on the commitments in the National Infrastructure Plan and Pipeline. The IFoA believes that the Commission will help to reduce uncertainty for investors and thus increase investment in infrastructure. To make a significant impact, however, we think the Commission will need to establish a reputation for setting clear priorities that the Government acts on - and that will take time.

The IFoA believes that the Government and the Commission need to attack some of the deep-set issues that underlie the investment gap, such as the 'true' cost of capital between the public and private sectors, building investor confidence and

competence in what is a new sector to many, and matching policy initiatives to the specific circumstances of each subsector of the infrastructure market. We have examined how some of these issues affect three of those subsectors: renewable energy, transport and housing.

We have highlighted some of the contributions that actuaries can make in this area. Actuaries are risk management specialists whose work typically demands a long term perspective. We have the skills to innovate new tools and techniques that address the infrastructure investment gap. Actuaries also work for or advise many of the biggest potential infrastructure investors, such as life insurers and pension funds. In short, the actuarial profession is willing and able to play a growing role in helping to solve the problems we have discussed in this paper.

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