

Building 21st century sustainable infrastructure (part 2): institutional reform

Dimitri Zenghelis

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Grantham Research Institute on
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the Environment



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Executive summary

This is an accompaniment to a policy brief on ‘Building 21st century sustainable infrastructure: time to invest’ (Zenghelis, 2016), which argued that the UK Government risks missing a significant opportunity to boost economic growth by investing public funds in productive infrastructure. It argued that the current global economic environment provides an opportunity and rationale to borrow at below-zero real interest rates in order to invest in infrastructure. An enhanced infrastructure programme could:

- deliver increased returns to savers;
- reduce the risk of destabilising asset price bubbles;
- counter widening income inequality;
- boost growth without stimulating inflation;
- help secure fiscal sustainability; and
- bridge any potential shortfall in investment brought about by responses to the vote to leave the European Union (EU).

This unusually wide array of potential benefits is derived from the historic oversupply of global desired net saving. The simplest way to alleviate these tensions, as well as to promote long-term public deficit and debt reduction, is for the Government to boost productive UK infrastructure spending on well-managed, carefully selected public investment projects. There is no shortage of private money looking for returns and the returns on such capital expenditure are likely to exceed significantly their financing costs at negative real interest rates.

Some in the Government worry that ‘unsustainable’ borrowing might deter investors, but the collapse in UK government bond yields tells us that the markets are signalling for more, and not less, public investment, with little concern for the risk of debt default or inflation. At the same time, the vote to leave the EU has, at least in the short term, diminished the appetite of many investors and undermined UK growth prospects.

While all this is going on, the UK has committed to investing in a profound transformation of its economy to meet our decarbonisation targets. In the context of the recently approved fifth carbon budget and the Paris Agreement on climate change, any Government investment in large infrastructure needs to be ‘fit for the future’ and allow the UK to stay competitive by shifting resources to fast-growing low-carbon markets. Infrastructure investments will last 20 years or more and so must be designed to avoid locking in to, stranding and possibly scrapping, carbon-intensive assets, networks and behaviours.

Tapping a global reservoir of free capital would help the Government to deliver these objectives and strengthen the sustainability of the public finances. Targeted infrastructure investment would boost the value and resilience of public assets. It would also offer private investors, in particular pension, insurance and sovereign wealth funds, a much sought-after reliable source of long-term income.

The short-term imperatives of managing the UK’s exit from the EU threaten to tie up institutional resources and shift the focus of policy away from boosting UK economic performance. This could hamper the ability of the National Infrastructure Commission to focus on long-term and sustainable benefits. Careful institutional design is required to limit political short-termism and take advantage of this unique opportunity to boost the UK’s productive capacity, rebalance the economy and secure a smart, efficient, low-carbon future.

Having determined that money is available for investment in sustainable infrastructure in the UK, this policy brief sets out the institutional reforms that the Government should implement to facilitate its delivery. These centre on five key recommendations:

Reforming Whitehall

- Design institutional frameworks to promote stable policies that are free from short-term political interference by devolving responsibility for complex decisions to independent technocrats who operate transparently and are accountable to Parliament.
- Develop fiscal rules in line with the principles of full resource-based balance sheet accounting, which distinguish between borrowing to invest and borrowing to consume.
- Prioritise investments with a positive financial return to the public finances over more expensive off-balance-sheet investments.

Effecting Devolution

- Devolve decision-making and financing to the local level, providing increased fiscal autonomy for cities, and reform planning laws.
- Build upon existing city governance mechanisms and planning systems to enhance civic autonomy.

Enabling the National Infrastructure Commission

- Give the Government the ability to issue infrastructure bonds through the National Infrastructure Commission.
- Provide risk guarantees and define a long-term vision of coherent policies to keep the infrastructure project pipeline full.
- Commission an independent assessment to consider bringing Private Finance Initiative contracts on-balance sheet and devolving responsibility to the National Infrastructure Commission to carry out a rigorous business case assessment for investments that are believed capable of generating positive returns.

Natural Capital Accounting

- Adopt the recommendation from the Natural Capital Committee that the National Infrastructure Commission should have a natural capital investment plan.
- Ensure the National Infrastructure Commission encourages infrastructure investment in capital assets that are compatible with ambitious decarbonisation.

Empowering the Green Investment Bank

- Capitalise the Green Investment Bank and provide risk guarantees to reassure private investors that the Government's reduced minority share in the bank constitutes a sufficiently large stake to mitigate against sudden and adverse policy changes.
- Consider the National Infrastructure Commission taking on all Green Investment Bank infrastructure-related projects.

Introduction

Infrastructure investments are a unique set of capital assets with durations of 20 years or more. They are often large scale and characterised by high barriers to entry which limit competition. They can help resolve network externalities, where private investors will tend to under-invest, and unlock profitable new market opportunities. Infrastructure is an obvious cost-effective target for UK investment with strong productivity benefits. An accompanying policy brief (Zenghelis, 2016) presented evidence to show that the UK has for some time been investing below the level consistent with a high performance dynamic economy. It also argued that far from worrying about a lack of available public finance, now is the most profitable and cost-effective time to boost infrastructure investment and support the long run health of the public finances. The benefits would include:

- boosting UK productivity growth by encouraging productive investment in the UK's aging infrastructure;
- restoring macroeconomic balance, including debt sustainability, and limiting the negative impacts of the flood of liquidity¹ that underpins the Bank of England's attempt to support domestic demand;
- providing investment demand to offset the postponement of private investment following the referendum vote to leave the European Union (EU); and
- investing in decarbonising energy, transport and buildings at a time of high public indebtedness, consistent with meeting the Government's emissions targets.

At first sight, this might seem ambitious. The comptroller and auditor general of the National Audit Office, Sir Amyas Morse, recently warned that the UK's decision to leave the EU would mean government resources, including civil servants, IT professionals and legal advisers, would be tied up managing Brexit and therefore directed away from delivering major infrastructure projects (see Syal, 2016). He suggested this might mean billions of pounds' worth of public projects will have to be scrapped. An accompanying policy brief (Zenghelis, 2016) argued that that would be precisely the wrong decision to make. From an economic perspective, this is an opportune time to step up infrastructure projects. Yet the issue of institutional capacity must be addressed and this policy brief suggests practical steps to achieve ambitious goals at a time of economic and institutional challenges.

¹ The term 'liquidity' here is used to refer to cash, or assets that can be converted into cash quickly and without any price discount, which is available to fund investment.

1. Long-term investment: 'fit for purpose' means low-carbon

There are numerous infrastructure opportunities that can and should be profitably seized by public and private investors at this time. The choice is not between green and non-green investment. It is about making sure the entire infrastructural network that the UK is locking into — from energy and transport to school and hospital buildings — is consistent with the Government's decarbonisation commitments. This would allow the UK to manage cost-effectively the transition to a low-carbon economy, working with the depreciation cycle and avoiding stranded assets. This follows the agreement by the world's governments in Paris in late 2015 to a collective process of ambitious decarbonisation (UNFCCC, 2015). This combination offers a unique opportunity to invest in a productive and future-proof Britain.

The alternative is infrastructure the value of which would be at risk of rapidly diminishing as the Government strives to meet its own carbon targets. Some infrastructure capital will need retrofitting or replacing.² The returns to the investment would be poor and may not exceed the cost of capital even at current low rates. Much of this investment—in onshore and offshore wind farms, solar plants, biomass, hydropower and associated transmission grids as well as transport networks and buildings—can be expected to generate modest but predictable commercial returns over the medium term and therefore offers an attractive prospect to many institutional investors.

1.1 The size of the task and the opportunities

The scale of investment in low-carbon energy, transport and buildings which is required is already shifting investor expectations, leading to predictions of further cost reductions as global markets expand and as technological innovation is induced.³ To the extent that low-carbon capital costs more than conventional technologies, the returns to green investment might be pared back. On the other hand, to the extent that many of the gains in terms of lowering carbon emissions stem from enhancing efficiency and making more out of the resources we have (OECD, 2015), ultimate social and economic costs might be lower. The resulting innovation can generate further productivity-enhancing spill-overs across all sectors (see Baptist and Hepburn, 2013; Hepburn and Bowen, 2012).⁴ It is not clear how these two effects net out: with time the longer-term positive effect might be expected to dominate the shorter-term negative effect.

Yet, the short-term benefits from effectively managing a transition to low-carbon growth, in terms of improving energy efficiency, energy security, urban pollution, congestion and generating innovation, make ambitious decarbonisation a commercial opportunity. A study from the Global Commission on the Economy and Climate (2014) found that more than half of the reduction in global emissions required to meet an ambitious climate target could have other benefits to the economy. Air pollution alone costs thousands of lives every year and costs between 5 per cent and 15 per cent of GDP for major emitters – as much as many of these countries spend on healthcare. The European Environment Agency estimates that premature deaths in the UK resulting from PM2.5 air pollution totalled approximately 38,000 in 2012 and

2 Investment is also required to make UK infrastructure more resilient to the impacts of climate change: The Committee on Climate Change (2015b) estimates that 10-35 per cent of infrastructure disruptions in the UK are already caused by extreme weather events.

3 For an account of the challenges this poses to the market economy, see Jacobs and Mazzucato, 2016.

4 Using data on 1 million patents and 3 million citations, Dechezleprêtre *et al.* (2013) suggest that spill-overs from low-carbon innovation in the energy production and transportation sectors are over 40 per cent greater on average than from conventional technologies.

around 14,000 people die each year as a result of prolonged exposure to NO₂ air pollution.⁵ Policy can create markets to address these costs.

Lots of private investors want to see a successful low-carbon economy. This explains growing business sector support for the Paris Agreement on climate change. The commercial opportunities associated with leading the global transition to low-carbon goods and services is substantial (Bassi and Zenghelis, 2014). Since the financial crisis, world trade in environmental goods and services has grown at twice the rate of merchandise trade (Sauvage, 2014). Experience of environmental and low-carbon policy over the last two decades provides strong evidence that a coordinated policy mix to address a variety of market failures, if well directed by stable and strong institutions, can deliver significant investment in environmental improvement and induce investment in new technologies (see for example Aghion *et al.*, 2009; Fischer and Newell, 2008).

At the same time, huge opportunities are emerging for innovators in renewable energy and energy efficiency technologies, offering the potential to significantly boost the global economy's long-run productive potential. The cost of solar photovoltaic modules fell by a factor of five between 2008 and 2013. As planning institutions are updated and new networks are built or transfigured, it is possible that the costs of new energy systems will fall further, and close (or exceed) the gaps with conventional high-carbon energy sources (Bloomberg New Energy Finance, 2011; EPIA, 2011).

In the longer term, the scientific assessment of the risks from climate change is clear and responding to it will require a near zero-carbon world by the second half of this century. Many business leaders accept this.⁶ However, because green energy, buildings and transport are heavily regulated policy-driven sectors, enabling this investment requires a supportive policy environment to raise risk-adjusted returns to private investment in low-carbon infrastructure. Over the short term, investors rely on policy-makers to define the size, profitability and scope of the low-carbon infrastructure market. This requires a mix of direct public low-carbon procurement and policies to leverage private investment. The credibility of policy is a key determinant of private investment, and this is discussed in the context of institutional design in the next section. But a prerequisite for credibility is an internally consistent and stable policy framework.

Pfeiffer *et al.* (2016) analyse concentrations of greenhouse gases in the atmosphere and conclude that in order to meet the target of avoiding global warming of more than 2°C (with 50 per cent probability), no new emitting electricity infrastructure can be built globally after 2017, unless other electricity infrastructure is retired early or retrofitted with carbon capture and storage technologies. This highlights the challenge associated with implementing the agreement politicians reached in Paris. It also gives an indication of the likely scale of the global energy transition, as well as what is required for the UK economy to remain competitive and productive in a rapidly changing global market. For example, fossil fuel use would have to fall by 75-95 per cent by mid-century, making supply infrastructure, such as wells, pipelines and ports, redundant (Mabey and Dimsdale, 2016; HM Treasury, 2013). As a result, the value of high-carbon assets, such as the stocks of coal-mining companies, is in decline and investors are increasingly analysing the risks to such assets which further climate policy may bring.

5 European Environment Agency (2015), for summary statistics see: <http://www.eea.europa.eu/media/newsreleases/many-europeans-still-exposed-to-air-pollution-2015/premature-deaths-attributable-to-air-pollution>

6 See for example evidence collected by We Mean Business, available at: <http://www.wemeanbusinesscoalition.org/media>

Infrastructure planning needs to take account of such assessments in order to be 'fit for the future' and allow the UK to meet climate and resource targets and stay competitive by shifting resources to fast-growing low-carbon global markets. Failure to do so risks leaving the UK open to costly mass-scraping and stranding of productive assets if the transition is not well managed (see Carbon Tracker Initiative and Grantham Research Institute on Climate Change and the Environment, 2013).

1.2 Climate policy in a time of austerity

The need for a clear policy signal to induce private investment has been compromised by a rapidly changing vision for the sector at a time of imposed fiscal austerity. Frequent changes to the subsidy regime for renewables and energy efficiency, the abolition of rules for zero-carbon homes, the end of the Climate Change Levy exemption for renewable energy generators, the freezing of the carbon price floor after only two years of operation and cancellation of funding for the carbon capture and storage commercialisation programme have helped undermine confidence in the policy environment and discouraged investors. Following recent changes to green subsidies, the UK has dropped out of the top 10 for the first time in the Renewable Energy Country Attractiveness Index (RECAI), published annually by Ernst & Young (EY, 2015). The OECD notes that:

“the key challenge for the National Infrastructure Plan is to encourage private infrastructure investment, which up to now has been held back by unclear signals regarding the country’s long-term infrastructure needs and strategy.”⁷

Surprisingly, given the stated stance of fiscal policy, the Government has also been reluctant to level up carbon prices.⁸ Further support to incentivise low-carbon investment is required to plug the gap left by the Government’s climate and energy ‘reset’ and remains necessary to meet its stated carbon budgets.⁹

Carbon pricing will be necessary to stimulate private low-carbon investment in buildings, energy and transport on the requisite scale. The private sector is likely to invest in the expectation of reliable risk-adjusted revenue streams if the Government can shoulder some policy and regulatory risk through a commitment to clearly identified market-based policy instruments, involving long-term carbon pricing, standards and regulations, together with carefully-designed technology support.¹⁰ Many well-designed low-carbon policies also provide an opportunity to crowd-in private investments without increasing public deficits. Carbon pricing is one of these policies and low oil prices provide an opportunity to do this more easily.

7 Page 34 of OECD Economic Surveys: United Kingdom 2015, Overview. February 2015. Available at: <http://www.oecd.org/eco/surveys/economic-survey-united-kingdom.htm>

8 Bassi *et al.* (2015) argue that the UK could fall short of its climate change targets if taxes focus on the amount of energy used, rather than on the amount of greenhouse gases emitted. They argue that the instrument of choice to achieve the Government’s policy objectives should be a price on the carbon content of energy, rather than on the amount of energy consumed, in order to address the greenhouse gas externality.

9 This is highlighted in the letter sent from Lord Deben, Chairman of Committee on Climate Change, to The Rt. Hon. Amber Rudd MP, then Secretary of State for Energy and Climate Change, on clarifying the direction for low-carbon policy: <https://www.theccc.org.uk/publication/letter-clarifying-the-direction-for-low-carbon-policy/>

10 Risk can be hedged directly through the issuance of government bonds to raise capital for low-carbon investment, or the issuance of bonds linked to an index that is related to climate mitigation policy, such as achievement of a carbon target, the carbon price, or fossil fuel energy price. The investor would receive a higher return if the climate target were missed (see Grantham Research Institute on Climate Change and the Environment, 2009). Risk can be taken on indirectly through policy frameworks, institutions and implementation mechanisms, as with the establishment of the UK’s five-year statutory carbon budgets and independent Committee on Climate Change.

1.3 Lobbying, capture and policy failure

Any interventions would need to be carefully designed in order to avoid replacing market failure with policy failure, for example by encouraging rent-seeking among the providers of new technologies. Policies should be as neutral as possible, to allow a broad range of technologies to emerge and compete, and to avoid the problem of the Government trying to 'pick winners' (Helm, 2010). For example, price signals limit scope for rent-seeking by avoiding discrimination between technologies and processes, while encouraging competition within sectors. However, pricing alone will not deliver the efficient level of energy efficiency investment or research and innovation (see Romani *et al.*, 2011). Pricing must be supported by additional measures often in the form of subsidies (Advani *et al.*, 2013).

Helm warns that government subsidies require industrial choices which make governments open to lobbying and capture by the rent-seeking companies. Low-carbon projects, he argues, are especially vulnerable to capture. He points to the "staggering" scale of the wind lobbies and suggests that their "great success in propaganda and capture" has resulted in some of the most expensive ways of reducing carbon emissions (even if not always successful).¹¹

Pricing policies, however, can be equally vulnerable to lobbying when key interests are threatened. Lobbying from European businesses in favour of emissions trading (and against a carbon tax) was primarily motivated to limit costs and secure rents in the form of grandfathered or other permit allocations. A similar pattern of capture was evident in aborted attempts elsewhere, such as the 2009 Waxman-Markey Bill to introduce a cap-and-trade scheme in the United States. The passage of the Bill through the House of Representatives was subject to ultimately successful resistance from American industry.

Moreover, even though lobbying can capture government decisions, it is unlikely governments can avoid making some strategic choices (Mazzucato, 2011), given that there are a range of technological options that will be available over the coming decades with specific barriers and opportunities that may require targeted assistance. The extended planning and capital lifespan associated with infrastructure means decisions cannot be entirely technology-neutral. The future cannot be predicted with certainty so some risks have to be taken, for example whether it be building a nuclear plant to provide baseload electricity, investing in carbon capture and storage or designing long-term contracts for the capacity market to support natural gas (the associated sunk costs of which could squeeze out viable renewable alternatives; see Aghion *et al.*, 2014). Other examples include decisions on supporting solar photovoltaics, onshore wind, electric vehicle networks and battery storage. Such choices should be well-informed, open and transparent, made in collaboration with civil society and the private sector.

11 Helm's personal critique of the UK Energy Market Reform can be found at: <http://www.dieterhelm.co.uk/assets/secure/documents/EMR-and-the-energy-bill.pdf>

1.4 Securing early investment to restore growth

The uncertainty following the referendum vote leave the EU is set to drive a marked slowdown in UK investment, at least in the short term, perhaps tipping the economy into recession. Policies that facilitate infrastructural investment that is fast and well-targeted can help stimulate the economy and quickly put unemployed or under-utilised resources to effective use. It is often argued that the short-term macroeconomic merit of a stimulus depends on whether the investment is timely, temporary and targeted. The criterion of timeliness reflects the need for fiscal policy to be counter-cyclical: if spending is delayed, then it may inadvertently have the opposite effect, fuelling an unsustainable cyclical upturn.

For infrastructure spending in particular, timeliness may be difficult to achieve due to the occasional long lead times in project development and multi-year construction schedules. Nevertheless, important considerations include how long a project takes to get off the ground, including development and approval time. Consequently, it is important that policy-makers move quickly.

The next key criterion for stimulus is that a measure is temporary. Many green infrastructure investments involve large up-front capital costs and lower running costs than conventional alternatives; they are precisely designed to be more resource-efficient in operation. For example, operating costs for offshore wind projects are relatively low. The wind is free, leaving only the operation and management services from wind suppliers, labour costs, vessel hire and other operation and management support, grid charges and insurance, which are low by comparison with other energy generation costs.

The final criterion is that the stimulus investment is targeted in a sector with the largest impact on jobs and activity. A full examination of multipliers associated with resource efficiency investment is given in Zenghelis (2014). However, as Romer and Bernstein (2009) identified, some industries, such as construction and manufacturing, are likely to experience particularly strong job growth under a recovery package that includes an emphasis on infrastructure, energy, and repair. Smaller network investments such as simultaneous low-carbon heat and insulation projects have the greatest potential to create jobs in the short run.

It is important to emphasise that concerns about timeliness, temporariness and targeting can be overstated. Most current estimates of UK output gaps suggest that resources will continue to be under-utilised for a number of years.¹² Moreover, the confidence impact associated with a clear strategy to encourage investment is likely to outweigh concerns about the stimulus contribution of every individual project. In other words, the sum of an ambitious investment programme is greater than the individual parts. Had commentators worried less over the last eight years about 'shovel-readiness', and spent more time actively driving investment, economic prospects today would look brighter than they do, even if a minority of infrastructure programmes prove less valuable than expected. Saving would have been put to productive use and real returns might not be languishing below zero. The message is that the Government should not waste time.

12 The Office for Budget Responsibility estimated in its most recent (March 2016) forecast that the UK output gap would stay negative for the next year at least, while the International Monetary Fund predicted in its January 2016 World Economic Outlook update that the output gap would be negative until 2019. These estimates were before the referendum vote that, all else being equal, may have extended the number of years the UK operates below capacity (see: <http://cdn.budgetresponsibility.org.uk/March2016EFO.pdf>).

1.5 Policy credibility and private investment

The accompanying policy brief (Zenghelis, 2016) described a saving glut in which private long-term financing is potentially available in substantial quantity. To mobilise such finance, particularly from pension funds and insurance companies, requires an appropriate institutional structure and public support to overcome externalities associated with infrastructure finance, and the application of consistent policies which underpin demand. The most effective policies to expand the UK's capital asset base will be those which 'crowd in' private investment. In the aftermath of the financial crisis, and despite the supply of desired saving, there was a decline in bank and bond finance available to invest in either public-private or private infrastructure projects. The resulting increase in the effective cost of infrastructure finance, compared with pre-crisis levels, has pushed the Government to seek new ways to support investment into infrastructure.¹³ Since then, investors' appetite for infrastructure investment has recovered as investors seek returns for savers. But there is scope for better policy design to reduce financing costs further.

Because private investment in sectors such as transport and energy markets is driven by policy and regulation, the cheapest way to achieve this is through credible policy design and a reduction in policy and regulatory risk. Indeed, targeting large-scale transformational activities might be just what is needed to whet investor appetites and spark animal spirits (which current low real rates suggest remain in short supply).

The support of HM Treasury for the new Green Finance Initiative, launched by the City of London with the aim of promoting London "as a leading global centre for green financial services", is welcome.¹⁴ Harriet Baldwin, former Economic Secretary to the Treasury showed early leadership in helping make the UK as a hub for innovations in green finance.¹⁵ But unless environmental policies are clearly described as not being in opposition to economic growth and competitiveness, investor uncertainty as to the ultimate direction of policies is likely to increase. The costs to investors of regulatory and policy risk can be high.¹⁶

It is true that climate policy design needs to evolve and some policies will inevitably fail and need to be reversed. However, investor confidence requires that such reversals occur infrequently and are made on the basis of clear evidence and subject to widely understood pre-announced rules, rather than short-term political convenience. Put simply, investors need to understand and trust the process through which policies are set, otherwise they will demand a higher investment cost to cover underlying policy risk.

13 After the financial crisis, there was a lowering in the perceived risk appetite of investors. Correspondingly, raising new finance has been a challenge as financial institutions have sought to repair their balance sheets in response to regulatory requirements to increase their capital reserves and to improve liquidity. For extensive coverage of the difficulties in raising infrastructure finance, see IFS (2016; Chapter 7. Infrastructure funding: an ICAEW assessment).

14 Details of UK Global Hub for Green Finance available at: <http://unep.org/newscentre/Default.aspx?DocumentID=26862&ArticleID=35822&l=en>.

15 Harriett Baldwin MP, Economic Secretary, 2016.

16 Lüthi and Wüstenhagen (2012) examined 63 European solar photovoltaic project developers and investors and found that risk matters in photovoltaic policy design. They demonstrated that a "price tag" could be attached to specific policy risks, such as the duration of administrative processes or uncertainty induced by an approaching capacity cap.

The Green Budget 2016 published by the Institute for Fiscal Studies stated:

“One of the concerns of investors is political risk arising from potential changes in government policies. Significant private sector investment in electricity, gas and water supply networks is based on long-term regulatory arrangements where investors have confidence around future revenues. While market incentives have also been used successfully to encourage investment in renewable electricity generation, recent changes in policy have called into question whether there is sufficient stability to encourage long-term investment in the UK.”

Establishing credibility takes time, so it is critical that policy-makers think carefully about institutional design. The primary aim of institutional reforms is to increase policy effectiveness by rebuilding trust in the decision-making process. This is essential to encourage investment and keep the risk premium associated with many low-carbon projects down, particularly given the long prospective lives of many projects in the energy, transport and building sectors. The UK’s Climate Change Act constitutes a framework that is considered ‘best-in-class’ globally, and yet even so, policy formulation can seem ad hoc, with unexpected, unpleasant and costly surprises for investors.

The use of long-term targets helps instil credibility, so long as these are achievable and legally enshrined. The Climate Change Act sets a framework of targets with a long-term trajectory; there are five-year budgets passed by Parliament 12 years in advance. Michael Jacobs, previously advisor to Gordon Brown as Chancellor and then prime Minister, had a long and insightful experience of working with HM Treasury. Jacobs describes from first-hand experience how HM Treasury officials opposed the Climate Change Act as a means to imposing carbon reduction through rolling budgets (Environmental Audit Committee, 2016). As an institution, it was nervous about long-term targets because they constrained activity. But Jacobs argued that constraints would drive innovative, efficient and dynamic behaviour, so long as investors have a clear sense of where policy is going.

In the end, he describes how the Chancellor over-ruled this institutional resistance and once a system of carbon budgets was adopted under the Climate Change Act, HM Treasury became a willing and active participant, with enthusiastic civil servants making it work. The 2009 Low-Carbon Transition Plan, which was the first attempt to implement a system of carbon budgets following the Act, was drafted with full support from HM Treasury. ‘If there is sufficient political will, the Treasury, in the end, will go along with even new conceptual frameworks’, Jacobs argues.

2. Institutional reform for long-term infrastructure

The Government headed by David Cameron rightly championed the importance of fiscal responsibility. They also took forward the agenda of macroeconomic institutional reform that began in 1997 with the announcement by the Government of Tony Blair of the operational independence of the Bank of England in setting monetary policy. This was followed, over a decade later (in 2010), with the establishment of the Office of Budget Responsibility to provide independent and authoritative analysis of the UK’s public finances. Both constituted important steps in dislodging HM Treasury’s perceived reputation for political interference and short-termism in the operation of fiscal policy, in particular in relation to long-term infrastructure.

Concerns about political manipulation are to be expected in a democratic system as infrastructure projects are by their nature political. The costs of financing projects, the long and politically sensitive planning process and the disruption associated with construction come up-front, whereas the benefits accrue in the future. By contrast, measures such as tax cuts or deficit reductions can be undertaken relatively quickly. As a result, governments have a strong political incentive to pare back long-term investment in favour of supporting current consumption. Addressing these unhelpful incentives, and serving the longer term national interest, without undermining the democratic legitimacy of government, is at the heart the recommendations which follow. These begin where the bulk of UK public policy and project decision-making currently takes place: Whitehall.

2.1 Reforming Whitehall

The creation of a new Department for Business, Energy and Industrial Strategy (BEIS) provides an opportunity to bring energy and climate policies into a more coherent framework of industrial strategy, making the UK well-placed to take advantage of the opportunities associated with becoming global leader in the low-carbon economy. Under the right leadership, it potentially forms a stronger basis from which to decarbonise the UK economy and promote productivity-driven prosperity.

Although BEIS is technically in charge of energy policy and climate policy, HM Treasury determines public expenditure often at a great level of detail. It has the ability, in its biannual statements, to shift policy very significantly. As Special Advisor to the Chancellor of the Exchequer, Michael Jacobs was directly responsible for some of the UK's most ambitious climate policies and institutions. In his evidence to the Environmental Audit Committee (2016), he described his first-hand experience of the application of policy to invest in carbon capture and storage (CCS) technologies and infrastructure, and the role played by HM Treasury:

“I was involved in those decisions—and it was continued by the coalition Government, and although it had changed its form over time, there had been a consistent set of statements by Government that they were committed to it... you have seven years—in fact, the original policy was longer—of consistent policy by three different kinds of Government just overturned in a unilateral Treasury decision for which was there no explanation other than that this was more money than could be spent at the time. It was the same amount of money that had been spent throughout the original period of austerity, so if there was a time to cancel it, it would have been in 2011... To treat business—a number of businesses had spent tens, possibly hundreds of millions of pounds, and put in a huge amount of effort—in that arbitrary way is deeply damaging, not just to CCS policy but to all kinds of policy, because businesses look at this and say, ‘Are the Government going to go through with anything they have committed to?’”

CCS is not the only example of policy reversal in this sphere. The dominant constraint in low-carbon energy policy is now the Levy Control Framework which is designed to regulate costs to consumer. This sets the total amount of money that consumers pay to subsidise renewables. Indecision over a Levy Control Framework level for beyond 2020 and whether it will be consistent with the carbon targets also risks putting off investors (Committee on Climate Change, 2016b).

Many infrastructure activities will require current public borrowing or contingent liabilities¹⁷ and could therefore increase debt.¹⁸ There will therefore be those who argue that it is impossible in current circumstances. However, the low (negative) real long-term interest rates at which the public sector can borrow heightens the case for additional infrastructure spending which could reduce public debt in the future while offering investors a better return. This means not all public borrowing is equal; it is necessary to distinguish between borrowing for productive purposes and borrowing for current expenditure.

Borrowing to expand the capital asset base of the economy is likely to yield returns directly to the Government or indirectly through higher revenues from faster growth. Making this distinction transparent requires comprehensive balance sheet accounting that appropriately scores any potential increase in public net worth, recognising that the only route to reducing public deficit and debt ratios is sustainable growth. Progress is needed to develop a resource-based accounting method to estimate the marketable value of infrastructure. Llewellyn and Combes (2014) argue that countries' national accounts should distinguish public debt that is backed by saleable assets from general public debt that is not. The focus solely on the debt side of the public balance sheet currently seems arbitrary at the best of times, and is particularly troubling when public debt is so cheap.

Financial markets would be assisted in making decisions on the sustainability of public debt if the public sector accounting framework were more transparent. The Institute for Fiscal Studies and Institute of Chartered Accountants of England and Wales note:¹⁹

“A more commercially sustainable approach would also permit new borrowing for public infrastructure projects that are expected to generate positive financial returns (either directly or through higher tax receipts) – for example, qualifying housing and transport developments. This would allow the government to retain the flexibility to make targeted investments that pay for themselves.”

The design of institutional frameworks can help bestow credibility on policy and draw private sector investment and expertise. Over recent decades, UK central government has increasingly devolved responsibility for complex decisions to technocrats operating transparently and independently of the political arm of government. Examples include the creation of National Institute for Clinical Excellence, the Low Pay Commission and operational independence for monetary policy at the Bank of England. These bodies are charged with attaining democratically set objectives, often mandated by Parliament, free of short-term political interference. Strong leadership is required to institute such reform. HM Treasury acting as an institution has tended to oppose a loss of control – it was not until 1997 that monetary policy was relinquished to the Bank of England and for a while it resisted the establishment of an independent fiscal body to supervise its activities.²⁰ Yet both these reforms were implemented on the back of strong leadership by a Government charged with a fresh electoral mandate, confident enough to instigate reforms that were in the public interest. Further reform in the same direction is required.

17 A contingent liability is a potential obligation that may be incurred depending on the outcome of a future event; for example, a public guarantee which is only invoked if some aspect of a project fails.

18 Although statistics based on the National Accounts do not, by convention, include contingent obligations or provisions, some agencies do publish broader public sector balance sheets.

19 Institute for Fiscal Studies, Green Budget 2016, in association with ICAEW.

20 The operational independence of monetary policy was a key plank of the Liberal Democrats' economic policy since the 1992 general election. Conservative MP Nicholas Budgen also proposed handing over monetary policy to the Bank in a Private Member's Bill in 1996, but it did not gather sufficient votes to pass.

The Government is aware of the institutional impediments to boosting infrastructure spending in the UK. This underlies the setting up of Infrastructure UK in 2010,²¹ a body within HM Treasury charged with advising Government on the long-term infrastructure planning and, more recently, the establishment of the National Infrastructure Commission (NIC), a recommendation of the LSE Growth Commission (2013) (among others), announced by HM Treasury in October 2015.²² These moves are welcome, though legislation is still awaited to determine the precise role and influence of the NIC.

Some elements of reform to promote decisions in the public interest which are free from short-term political interference are outlined below, but it would be a mistake to conclude from this that ‘the system’ always fails to act beyond the five-year mandate of a Parliament. If this were so, as a society we would spend very little on education or standing armies, which rarely deliver much of a return over the period of an average Parliament but which are vital for long term prosperity and security. Once key public officials are persuaded of an idea, as Jacobs showed, the institutional machinery of Whitehall, including HM Treasury, is supportive. Reform therefore must focus on building on the successes of the current system, while identifying clear gaps and refining institutions rather than requiring a destabilising root-and-branch redesign of the UK’s executive functions.

2.2 Effecting devolution

A powerful way to incentivise government to undertake productive infrastructure investment and deliver value for money for taxpayers is to devolve decision-making and financing to the local level. In many cases, the local level is the optimal place to manage infrastructure as many of the benefits (from bridges, to irrigation, broadband networks to light rail services) accrue locally. As a result, action is often more effective at the regional or city level where policy-makers are closer, physically and culturally, to their citizens than national governments.

The consequences of policies on water, transport, and the urban environment are readily observable and local officials are more likely to be held to account for their success or failure than politicians in Westminster or administrators in Whitehall. Reform of local governance, in terms of public finance and planning (including increased fiscal autonomy for cities and planning laws that provide mechanisms for local communities to share in the overall gains) can increase the political desirability of infrastructure projects. Increased spending through local government and the city regions can be used to invest not just in physical infrastructure, but also social infrastructure and institutional capacity, such as education, skills and local public services, helping to build economic resilience in Britain’s poorest regions and reduce the sense of disaffection in such communities.

A community with a shared sense of purpose can be very fertile in innovation and ideas on how it can develop and improve. This can help stimulate the significant private sector financing required for smart urban infrastructure development. For example, taking advantage of the potential opportunities from digital smart technologies to connect infrastructure systems and deliver a range of services from integrated transportation, congestion management and security monitoring, through to home education and connected health care.

21 Infrastructure UK in January 2016 merged with the Major Projects Authority to form a new organisation, the Infrastructure and Projects Authority.

22 HM Treasury, 5 October 2015, ‘Chancellor announces major plan to get Britain building’, <https://www.gov.uk/government/news/chancellor-announces-major-plan-to-get-britain-building>.

Cities already have governance mechanisms and planning systems which, if they function well, can make the creation and delivery of resource efficient investment easier to implement (for example with the wide-ranging authority bestowed on Transport for London). These must be extended and built upon. Giving citizens more control over infrastructure choices through devolved government is the norm in Scandinavia and Germany. Mabey and Dimsdale (2016) advise the Government to set out a pathway for full devolution of infrastructure powers for English cities in order to overcome the “Catch 22” situation in which a perceived lack of capacity is the main argument against devolving new powers.

The austerity programme of the Governments headed by David Cameron marked a significant cut in central government spending on local economic growth. According to the National Audit Office, over the five-year period 2010-11 to 2014-15 the Government spent £6.2 billion on local growth programmes, a cut of 45 per cent from the £11.2 billion spent over the preceding five-year period 2005-06 to 2009-10 (National Audit Office, 2013). Yet George Osborne’s ‘Northern Powerhouse’ devolution policy provided a welcome means to give Manchester and other cities the chance to pool resources and pursue coordinated planning and policy-making. Offering local regions greater control of their finances through enhanced fiscal autonomy allows important decisions to be taken out of Whitehall’s hands, liberating institutional capacity to manage issues of national importance such as managing Brexit.

2.3 Enabling the National Infrastructure Commission

Some projects, however, have national impact, and are better planned and coordinated at the central level. These include international airports, motorways, energy grids and high speed rail links. The Government should ensure that the new NIC operates against a clear, transparent remit, with independent authority. To support long-term competitiveness, this remit must encourage investment in capital assets compatible with decarbonisation. The NIC has the potential to work collaboratively with the Green Investment Bank to deliver credible and consistent low-carbon support (Llewellyn Consulting, 2013).

However, the effectiveness of its operation and the degree of its influence over infrastructure decisions, free from political interference, remains to be determined. The ultimate test of the success of the NIC will be its ability to influence public policy and leverage private finance. The Commission needs to ensure that investment in long-lived capital assets is compatible with ambitious decarbonisation and corresponding new technologies and networks, while avoiding unnecessary and expensive stranding of assets. In order to limit the cost of capital, HM Treasury and other Government Departments need to maintain complementary policy support for such investment by adhering to the Climate Change Act and associated five-year carbon budgets.

Instead of prioritising investments which provide a positive financial return to the public finances, the key to long-term debt sustainability, the current approach prioritises more expensive off-balance-sheet investments.²³ This is wasteful and needs to change under the Government headed by Theresa May. The Government should implement the recommendation by IFS and ICEAW (2016) of an independent assessment of politically motivated inefficiency by bringing Public Finance Initiative PFI contracts on-balance-sheet and delegating responsibility to the NIC to carry out a rigorous assessment of the business case for investments capable of generating a positive financial return and boosting economic growth. The Commission needs to be given the authority to consider not just major infrastructure requirements but also, working with devolved authorities, smaller network investments such as simultaneous low-carbon heat and insulation projects, distributed energy systems, energy demand flexibility and smart urban planning.

23 See IFS (2016; Chapter 7. Infrastructure funding: an ICAEW assessment) for specific examples. The term ‘off-balance-sheet’ refers to financial obligations that do not count towards public sector net debt in the UK National Accounts and are therefore excluded from the public finance deficit or surplus for the year.

Others go further and argue for the piecemeal institutional changes highlighted above to be superseded by an operationally independent National Infrastructure Bank, modelled on the development bank owned by the German Government, KfW (Jones, 2016). This one-stop-shop of expertise would be able to provide risk guarantees and issue national infrastructure bonds.

At the very least, the NIC must work with the Government to issue bonds, provide risk guarantees and spell out a long-term vision of coherent policies necessary to keep the project pipeline full. Infrastructure bonds with maturities of 20 or 30 years are particularly attractive to pension funds, life insurance companies and sovereign wealth funds with long-term liabilities. They provide reliable long-term cash flows, and with yields a couple of percentage points above gilts, they remain a cheap source of finance as well as an attractive alternative to low-yielding government bonds. However, the supply of investable projects has for some years remained constrained.²⁴

Investment institutions are increasingly prepared and able to finance projects on their own through construction bonds and public bonds – as long as the underlying credit rating is investment grade (BBA, 2015). This can be achieved through public guarantees against policy risk and appropriate construction support from the contractor, combined with a level of equity and risk-sharing within the transaction. The current Thames Tideway project provides a good example of trying to use the bond markets to debt finance a significant project. The NIC has a key role to play to support private investors in taking on long-term debt as competition in the capital markets for infrastructure debt increases liquidity. One suggested complementary option is to harmonise the activities of HM Treasury and Bank of England, with the former issuing green infrastructure bonds and the latter buying them up through its quantitative easing programme.²⁵

A further option would be for the NIC to take on all long-term infrastructure-related projects from the Green Investment Bank, such as electric vehicle charging points. This would leave the Green Investment Bank to raise funds for other corporate investments in the narrower green economy field (for example energy efficiency and technology sectors). The NIC would adopt a simple mandate to ensure that all infrastructure is low-carbon and supportive of the UK's long-term competitiveness. Such an institution would, like the Bank of England, be accountable to Parliament and charged with providing long-term policy stability. All these options need to be discussed and developed within the new NIC.

2.4 Adopting Natural Capital Accounting

In 2013 the UK government set up The Natural Capital Committee (NCC), an independent body which advises the Government on the sustainable use of natural capital, such as forests, rivers, minerals and oceans. The Committee's broad remit also covers the benefits UK citizens derive from natural assets, such as food, recreation, clean water, hazard protection and clean air (Office for National Statistics, 2014; Natural Capital Committee, 2013).

24 See Flood, C., 2015. Infrastructure debt is hot property right now. [online] Financial Times, 6 September. Available at: <https://www.ft.com/content/b5b08f3c-2ae4-11e5-acfb-cbd2e1c81cca>

25 This is the subject of a planned conference by the Bank of England in November 2016 'Central Banking, Climate Change and Environmental Sustainability': <http://www.bankofengland.co.uk/research/Pages/conferences/1116.aspx>

A key recommendation from the Natural Capital Committee, which is proposing new ways of thinking about natural capital, is that the NIC should have a natural capital investment plan. This was rejected by the Government for fear of adding constraints which risk raising costs. There are clear parallels here with the initial response to the Climate Change Act which also faced opposition for fear that it might constrain future governments. But the experience of the Climate Change Act suggests that a long-term framework to protect natural capital could successfully galvanise innovation and investment.

This requires an elevated political discourse where politicians, the media, non-governmental organisations and others can create a sense that the country is losing valuable natural capital and that we should be accounting for it in different ways and making different decisions (Helm, 2015). Jacobs admitted:

“I can imagine Treasury opposing them, but if the right ministerial decisions are made, Treasury will be on side, because the decision will have been made, and will then help implement them. That will both protect our natural capital and our atmosphere and enable businesses to invest in creating value and wealth within those constraints.”

2.5 Empowering the Green Investment Bank

Since its establishment by the Government in 2012, the Green Investment Bank has successfully attracted additional investment into low-carbon projects by reducing policy risk (governments are less likely to change policy if a public long-term investment bank is involved) and taking a long-term view using flexible finance. It has acted as a one-stop-shop for banking, technology and sectoral expertise in new and important areas and can acquire special convening powers to put together networked sources of finance. It aims to support investment of £330bn in the UK's green economy by 2020.

However, the Government has announced its intention to sell at least a majority of its shares in the Green Investment Bank to private investors during the lifetime of this Parliament. This might free the Bank up to mobilise higher levels of investment in a wider range of low-carbon projects and allow it to avoid EU State Aid rules, which have prevented it from supporting some clean energy sectors, such as electric vehicle infrastructure or smart grid technologies. Such rules are likely to remain in place for a number of years, regardless of the referendum vote to leave the EU. It is also welcome that the Government has retained a special public share after privatisation to safeguard the environmental role of the Green Investment Bank.

But the risk remains that privatisation undermines the mandate of the Bank, which was to address a failure of other financial institutions to invest in low-carbon projects that were considered to be too risky. Private investors may feel that a reduced minority share in the Bank does not constitute a large enough stake to mitigate against sudden and adverse policy changes which could threaten returns, thereby increasing policy risk. The viability of longer term low-carbon infrastructure would also be subject to unnecessary, and potentially costly, doubt.

3. Conclusion and recommendations

The case for a new macroeconomic approach backed by institutional reform to promote UK productive infrastructure investment has been building for some time. HM Treasury, and to an extent the Bank of England, have been slow to adapt to today's new circumstances of sustained low growth and low inflation. This is why HM Treasury pushed for the traditional mix of fiscal austerity to reduce public debts/deficits. The fall-out from the referendum vote to leave the EU and the impact of uncertainty on investor sentiment over the short run has merely exaggerated the economic challenges. The Bank of England has no mandate to influence fiscal policy and operates a 'reaction function' to do whatever it thinks necessary to balance the economy and meet its inflation target. It will respond to increased 'fiscal austerity', all else being equal, with looser monetary conditions.

Yet the evidence presented in the accompanying policy brief suggests the need for the opposite mix (Zenghelis, 2016). This position is not born of normative ideological priors. It is informed by the evidence. Both a neo-classical and Keynesian economic perspective argue for public sector surpluses in good economic times, when the private sector is over-extending itself. By the same token, debt-financed public investment is most efficient when there is slack in the economy and resources are cheaper. The current opportunity to boost public investment is clear and yet the accompanying policy brief argued that conditions may not remain this accommodative forever. The time to act is therefore now.

Some reforms introduced by the Cameron government were welcome, but further institutional change is required to re-balance the economy, promote public and private investment and ensure future-proof sustainable investment which meets the Government's carbon targets. The money is available, but incentives need aligning and capacity needs streamlining. This policy brief presents a five-point institutional plan to build an effective and durable low-carbon infrastructure programme, designed to overcome political short-termism which has in the past undermined the UK's productive capacity. Such reforms would help unlock the huge amount of private capital seeking secure government contracts and allow savings to flow from pension, insurance and investment funds. The key conclusions and recommendations are:

1. Reforming Whitehall

- The creation of a new Department for Business, Energy and Industrial Strategy (BEIS) provides an opportunity to bring energy and climate policies into a more coherent framework of industrial strategy.
- Although BEIS is technically in charge of energy policy and climate policy, HM Treasury often determines public expenditure at a great level of detail and has the ability to shift policy significantly. Coordination between, and leadership within, government departments is required to drive coherent and credible policy.
- Some elements of reform to improve the design of institutional frameworks is required to promote decisions in the public interest, which are free from short-term political interference. Devolving responsibility for complex decisions to technocrats operating transparently and independently of the political arm of Government, but who remain fully accountable to Parliament, can help bestow credibility on policy and draw private sector investment and expertise.

- HM Treasury, with the support of the Office for Budget Responsibility, must adopt fiscal rules which allow for borrowing to invest over the economic cycle, subject to debt sustainability determined by full resource based balance sheet accounting. This will offer frameworks to distinguish between borrowing to invest in productive purposes and borrowing to consume, and appropriately score any potential increase in public net worth. The framework should permit new borrowing for public infrastructure projects that are expected to generate positive financial returns, allowing the Government to make targeted investments that pay for themselves.
- Prioritise investments with a positive financial return to the public finances rather than more expensive off-balance-sheet investments, thereby limiting the imbalance in macroeconomic policy which encourages household consumption over saving and investment.

2. Effecting devolution

- Devolve decision-making and financing to the local level. In many cases, the local level is the optimal place to manage infrastructure as many of the benefits are readily observable and local officials are more likely to be held accountable for their success or failure.
- Offer local regions and cities greater control of their finances through enhanced fiscal autonomy and reform of planning laws to provide mechanisms for local communities to share in the overall gains and increase the political desirability of infrastructure projects. This also liberates institutional capacity in Whitehall to manage issues of national importance, such as managing Brexit.
- Build upon existing city governance mechanisms and planning systems, which can make the creation and delivery of resource-efficient investment easier to implement.

3. Enabling the National Infrastructure Commission

- Give the Government the ability to issue infrastructure bonds through the National Infrastructure Commission, provide risk guarantees and spell out a long-term vision of coherent policies necessary to keep the infrastructure project pipeline full. Infrastructure bonds with maturities of 20 or 30 years are particularly attractive to pension funds, life insurance companies and sovereign wealth funds with long-term liabilities.
- Commission an independent assessment to consider bringing contracts for the Private Finance Initiative on-balance-sheet and devolve responsibility to the National Infrastructure Commission to carry out a rigorous process to assess the business case for investments that are believed capable of generating positive returns.
- Make the National Infrastructure Commission, like the Bank of England, directly accountable to Parliament and charged with providing long-term policy stability.

4. Adopting natural capital accounting

- Adopt the recommendation from the Natural Capital Committee that the National Infrastructure Commission should have a natural capital investment plan.
- Ensure the National Infrastructure Commission encourages infrastructure investment in capital assets that are compatible with ambitious decarbonisation.

5. Empowering the Green Investment Bank

- Help capitalise the Green Investment Bank and provide risk guarantees to reassure private investors that the Government's reduced minority share in the Bank constitutes a sufficiently large stake to mitigate against sudden and adverse policy changes.
- Consider the National Infrastructure Commission taking on all infrastructure-related projects from the Green Investment Bank, leaving the Bank to raise funds for other corporate investments, under a simple mandate to ensure that all infrastructure is compatible with the Government's decarbonisation targets.

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