

A manifesto for UK infrastructure

January 2010



Introduction

The Institution of Civil Engineers (ICE) is made up of over 80,000 professional civil engineers. Most of them work in the UK, but ICE members also operate in 164 countries worldwide. ICE's Royal Charter obliges it always to have regard to the public benefit, and always to act in a manner which is consistent with the public good. True to these obligations, ICE is not a lobby group, but a professional body which aims to harness engineering knowledge and expertise for the benefit of society.

Overview

This general election takes place against the back-drop of recession. Financial issues will inevitably feature highly on the agenda of all political parties.

Without civil engineers it is impossible to build or maintain the infrastructure upon which a modern economy depends. Our quality of life depends on infrastructure. There would be little economic activity without energy generation and distribution, water supply and disposal, transportation by rail, road, sea and air, and waste management.

As the 'voice of infrastructure' ICE is making the case for continued investment in infrastructure not just for the benefit of industry and the economy, but for the benefit of society as a whole. Ongoing investment will protect the current service levels of infrastructure, ensure that the UK is well-placed to take advantage of the global up-turn when it occurs, and help us meet our climate change obligations.

It is essential that infrastructure investment is well-directed and efficiently delivered. Strategic investment must be well co-ordinated, recognising the interdependency between infrastructure areas, and the impact which they have on each other. ICE has always been involved in that process, and stands ready to play its part in the future.

ICE is aware of the restrictions which the current financial situation places on government initiatives. It believes that despite this, current infrastructure projects have enormous long term social, economic and environmental benefits. Existing projects such as Crossrail, Thames Tideway Tunnels, the new nuclear energy programme, upgrading of waste networks, improved flood defences, and a new Forth Bridge should be proceeded with. At the same time, feasibility studies for the proposed Severn tidal project and high speed rail links to Scotland should be completed. There is general agreement across the political spectrum that investment must be maintained. However, there are debates to be had over priorities, and over how the necessary funds can be raised.

Funding infrastructure

It has been estimated that the UK may need to invest in excess of £400 billion¹ on new and refurbished infrastructure by 2020 to address historic underinvestment and speed the transition to a low carbon economy. The financial crisis has however placed enormous pressure on public finances, reduced the availability and increased the cost of private capital. Where funds are available, lenders are often unwilling to lend for periods longer than seven years, a much shorter period than the life of a typical infrastructure project or operating concession. While this problem affects all infrastructure sectors, it poses an even greater challenge for some emerging low carbon technologies, where the risk for investors is perceived to be greater.

ICE believes that a National Infrastructure Investment Bank (NIIB) would help increase the availability of infrastructure funding and reduce its costs. The creation of a NIIB would also enhance the effectiveness of recent initiatives such as Infrastructure UK, National Policy Statements, and the appointment of a Chief Construction Advisor.

A NIIB would not change the need for the vast majority of capital for UK infrastructure investment to come from the private sector. However a NIIB can help by:

- Providing capital or guarantees where private financial markets are unwilling or unable to provide all the funds required for projects which have high social, environmental and economic benefits
- Working with the private sector to put together workable financial structures for infrastructure projects
- Developing thinking on innovative new ways to finance major projects
- Providing financial support (loans, equity or venture capital) for companies looking to bring near market, low carbon technologies or services to full commercialisation

Capacity and skills

During any economic down-turn training budgets invariably come under pressure. The government has been very positive in its efforts to maintain its own training programmes and to encourage British industry to do the same. We hope that this support will continue after the general election, and that there will be continuity in this vital policy area.

However, training budgets could come under threat once again as the effects of the credit crunch start to dissipate, and as government begins to examine ways to reduce the debt accumulated during the process of mitigating its effects. 'Stop/start' investment in capital programmes could damage efforts to boost skills growth in the industry, and this problem needs to be addressed.

¹ Helm, D, Wardlaw J and Caldecott, B (2009), *Delivering a 21st Century Infrastructure for Britain*, Policy Exchange: London

ICE also supports the policy promoted by Construction Skills, whereby one apprentice is taken on for every £1m of public money invested, and we advise that this scheme be taken up.

It has been estimated that the UK will need to recruit over half a million new workers into engineering and manufacturing in the period 2007-17². This is partly because of the projected increased demands in these sectors, and partly because many of the baby boomer generation are due to retire in the next decade. A steady supply of science, technology, engineering and mathematics students will be needed to replace them. However, recent events have led to a reduction in the number of university places on offer, and this needs to be reversed.

Research and development

The UK has a world class science and engineering research base. This needs to be maintained if we are going to be serious about remaining a major player in high added value manufacturing and services, and the low carbon economy.

Despite these advantages the UK has consistently struggled to convert research breakthroughs into commercial products. The experience of recent decades suggests that focused support is necessary to help ideas through the difficult transition from academic research to commercial products.

While support is available to help business with the commercialisation of research ideas and the development of new products and services, it is a confused landscape from the industry point of view. There are currently over 3,000 publicly funded business support schemes available to UK businesses, among which are schemes specifically to support R&D and product development. The current government has commissioned a Business Support Simplification Programme and any new administration should continue with this initiative.

The planning system

The UK has seen many major infrastructure projects delayed or cancelled altogether due to difficulties in securing planning permission. The cumbersome planning system has resulted in some planning inquiries dragging on for years. This uncertainty has undoubtedly added to the costs of financing projects, as lenders charge a premium in order to take account of this risk.

This situation has put severe strains on the UK transport infrastructure network, and has also contributed to a potential shortfall in the UK's energy generation capacity over the next two decades – the so-called 'energy crunch'. The UK's economic competitiveness, and the quality of life of its citizens, are both threatened by these issues.

² *Engineering UK (2009) Engineering UK 2009/10*

ICE believes that the National Policy Statements (NPSs) and the special consent regime for infrastructure projects of strategic national importance created by the Planning Act 2008 are beneficial to the economy and to society. They should therefore both be preserved, in order to ensure that vital infrastructure projects proceed without undue delay.

However, ICE also believes that Parliament should be asked to approve the National Policy Statements to secure their legitimacy. It also feels that NPSs should be linked to the Comprehensive Spending Reviews, and existing strategic investment plans that exist or are being created in a number of sectors (eg the Environment Agency's Long Term Flood Risk Management Funding Strategy and Network Rail's Future Investment Programme).

The newly formed Infrastructure UK (I-UK) has a remit to assess the UK's long term infrastructure needs and facilitate their delivery. This provides an opportunity to create a framework which successive governments could adopt and develop, thereby creating a virtuous circle of increased industry confidence and an improvement to the public's quality of life.

In addition, developers must ensure that they effectively engage with communities affected by individual projects well in advance of the submission of any formal planning application.

Low carbon economy

There is widespread acceptance that climate change is a major global threat, and that decisive measures need to be taken in order to mitigate and adapt to its effects.

Answering the challenge of climate change will be expensive. A study by Ernst & Young puts the cost of de-carbonising the UK energy sector at £234 billion⁴. However, there is some measure of agreement that this "threat" also represents an opportunity for the UK economy. The UK has competitive advantages relating to off-shore wind and coastal/estuarial power. It also has a strong academic and skills base which can be harnessed. The development of renewable energy technologies, particularly in the fields of wind and marine power, could present major export opportunities.

ICE's recent State of the Nation: Low Carbon Infrastructure report identified a number of actions that government should take to create the conditions in which these advantages could be exploited. Our inquiry suggested that the most important of these actions were; commitment to a guaranteed floor on carbon price and the development of standard measures for measuring and counting carbon in the planning, procurement and operational phases of infrastructure projects.

⁴ Ernst and Young (2009), *Securing the UK's Energy Future – Meeting the Financing Challenge*

SPECIFIC POLICY AREAS

Transport

In ICE's State of the Nation report on Transport we highlighted what we regarded as the main issues affecting this area of policy.

One principal proposal was that the nation needs to invest in rail in order to increase rail capacity for both passengers and rail freight. This increase is essential in order to encourage a shift from road to rail, a shift which is required if congestion on roads is not to be replaced by congestion on rail, and in order to meet carbon reduction targets. The granting of rail franchises with longer timescales would undoubtedly help to boost investment.

The ICE report identified the need to develop a fully integrated transport system across the national network - across all modes - in order to reduce congestion and emissions. Some form of demand management will almost certainly become necessary at some stage in some areas. However, this will have to be supported by additional public transport capacity in order to meet demand and provide real choice.

The report demonstrated the clear advantages of developing a long-term national transport strategy when delivered locally. It identified the need for a clear understanding of the linkage between revenue and funding for transport infrastructure. ICE believes that there are advantages in the Transport for London model, where a single authority has responsibility for all transport modes and is able to define the public transport network – including bus routes.

State of the Nation - Transport also highlighted the need for the establishment of a consensus on long-term transport investment priorities in order to provide certainty, confidence and accelerated decision making. This consensus needs to be developed across all of the main political parties.

Energy

ICE believes that there is a real danger of demand outstripping supply in the years ahead, unless government takes prompt action to prevent future shortfalls.

Security of supply should be at the very top of the agenda. This means utilising all forms of generation – including nuclear, all renewables (including energy from waste), and coal (allied with carbon capture and storage and the application of clean coal technology).

There is also an obvious need to ensure that energy is affordable to the public, and also to British industry. Energy generation should be sustainable and low carbon wherever possible, while still taking the affordability criterion into account. To increase efficiency, full use should be made wherever possible of the heat produced by electricity generation plants through combined heat and power (CHP) schemes. ICE's recent paper "Why Waste Heat?", makes detailed recommendations in this area.

ICE believes that government policy should facilitate the nationwide roll-out of technologies proven in UK conditions. Government has rightly looked to support the development of wind power, but the UK also potentially has huge wave and tidal resources, and less attention has been paid to these sectors. The Severn tidal power feasibility study should continue, and support should be given to other technologies which are in an advanced stage of development.

The shortage of gas storage capacity in the UK is also a big concern. Whereas Germany and France have 99 days and 122 days respectively, the UK has storage capacity for just 14 days⁵. Given our increasing dependence on non-North Sea gas, this storage capacity shortfall must be urgently rectified.

Flooding

ICE published a major report on flood risk management in the summer of 2008. *Flooding: Engineering Resilience* was aligned with the publication of the official review into the major flooding events of 2007, and there was a broad measure of agreement between both publications.

In particular ICE welcomed the appointment of the Environment Agency (EA) as the body with overall strategic responsibility for managing all forms of flood risk. ICE also welcomed the commitment to long-term funding for flood risk management – although this commitment will need to be reinforced and reiterated in the light of current financial strictures. In addition, the role of the EA still needs to be crystallised, and the funding for local authorities relating to flood defences needs to be boosted.

ICE still has concerns over capacity, skills and recruitment issues for both the EA and local authorities in this highly specialised area. As with other areas, long-term investment in skills and capacity is vital if potentially disastrous shortfalls are to be avoided. We also have concerns at the level of funding available to local authorities to implement surface water management plans.

⁵ Hansard (2008) House of Commons Debate – 13 November 2008: Column 937

Climate change means that large areas of the country, and not just flood plains, will be at risk of surface water flooding linked to the increased incidence of torrential rain. On our coasts there will be an increased risk of a potentially catastrophic event combining a tidal surge with heavy rainfall.

In order to address these dangers, ICE is working with other professional bodies in an effort to ensure that flood risk management is placed at the heart of urban design.

Defending critical infrastructure

ICE's report, *State of the Nation: Defending Critical Infrastructure* found that the current lack of any sort of overview of the vulnerabilities of UK infrastructure networks has created dangerous gaps in our approach to defending critical infrastructure. Terrorism is comprehensively addressed by the Centre for the Protection of National Infrastructure (CPNI), and emergency planning is dealt with by the Civil Contingencies Secretariat. However the government is only just beginning to tackle the issues associated with climate change, while the risk of long-term system failure caused by problems such as underinvestment or lack of reserve capacity is effectively ignored.

As the floods of 2007 and 2009 demonstrated, critical infrastructure defence also lacks a joined-up approach. Agencies, local authorities, regulators, asset owners, and the emergency services all work separately in their individual regions and sectors. The interdependence of our infrastructure assets is not recognised, and there is very little scope for sharing information or joint forward-planning.

ICE recommends that the government creates a single point of authority for strategic level defence of critical infrastructure. This point of authority would coordinate CPNI, the Natural Hazards Team and the Civil Contingencies Secretariat, plus the sector based regulators. Taking a holistic view it would fill in the gaps and address the areas of infrastructure defence currently being overlooked. It would also work to achieve resilience across networks and an increase in reserve capacity.

Waste management

This is a crucial area, often neglected by policy makers. ICE estimates that to hit EU Landfill Directive obligations in 2010, 2013 and 2020, the UK will need over 250 new facilities for composting, recycling and recovering energy from waste.

ICE believes that we should take advantage of this necessary investment to deliver a fundamental shift in attitude from waste to resource management. This would in turn create new jobs, deliver reductions in CO₂ emissions, and unlock new sources of energy.

Where possible 'waste' should be reused or recycled, it should be treated as a resource rather than as rubbish. Material left over from these processes has a huge potential as a source of energy, much of which qualifies as renewable - thus contributing to the UK's targets in this area. Research conducted for ICE suggests that 10% or more of the UK's energy needs could in principle be met from this source⁶.

ICE and the Chartered Institution of Wastes Management have called for government to commission a study on waste on the scale of the Eddington Review of the transport sector. We believe that such a study is needed to shift policy from its current path and make clear the links between waste, resource use, economic growth, energy security and climate change mitigation.

Water and waste water

ICE supports calls for water metering. To make real inroads into reducing water wastage we believe legislation is needed to allow mandatory metering, even in areas not experiencing an immediate shortage. We accept that there will be some homes, especially in blocks of flats, where individual metering is either impractical or unreasonably expensive to install. However this should not deter legislators from making the shift to universal metering and wherever possible this should be combined with the opportunity for variable charging.

There are of course issues of affordability; any future sharp increase in costs must be taken into account. More discriminating methods of charging need to be developed. This could include universal metering with banded charging, so that basic needs for health are provided at an affordable cost. There should then be increasing cost levels for discretionary uses - such as garden watering, swimming pools etc.

While water metering will help reduce wastage, it will not address long-term issues such as security of supply. The strong growth in population numbers has put huge strain on water infrastructure. Since privatisation the trend is to 'sweat' assets rather than build new infrastructure. Addressing leaks certainly alleviates the issue, but we cannot continue to rely on the far-sightedness of our Victorian forebears. Only investment in new infrastructure will actually solve the problem.

⁶ ICE (2005), *Quantification of the potential energy from residuals in the UK*

PRINCIPAL RECOMMENDATIONS

These are the specific policy proposals from ICE designed to address some of the main issues facing the nation in terms of building and maintaining infrastructure. We hope that these proposals will be considered by the political parties, and taken up by individual candidates.

National Infrastructure Investment Bank

It has been estimated that the UK will need to spend in the region of £400 billion in new and refurbished infrastructure by 2020 in order to address historic underinvestment and speed the transition to a low carbon economy. The financial crisis has however placed enormous pressure on public finances and reduced the availability and increased the cost of private capital. A National Infrastructure Investment Bank could help to attract the large volumes of private capital which will be needed to fund essential infrastructure investment.

Currently, where funds are available, they are expensive and lenders are often unwilling to lend for periods longer than seven years. This is a much shorter period than the life of a typical infrastructure project or operating concession. While this problem affects all infrastructure sectors, it poses an even greater challenge for some emerging low carbon technologies, where the risk for investors is perceived to be greater.

A National Infrastructure Investment Bank could help by:

- Providing capital or guarantees where private financial markets are unwilling or unable to provide all the funds required for projects which have high social, environmental and economic benefits
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Energy

The UK faces two major challenges in the field of energy. These are the predicted gap in generation capacity from 2016 onwards, and the stringent CO₂ emission targets set out in legally binding carbon budgets for the periods 2008-12, 2013-17 and 2018-22.

Urgent action needs to be taken to reduce overall energy generation requirements through investment in domestic insulation, and the expansion of Combined Heat and Power Schemes.

At the same time reserve capacity needs to be developed through a substantial increase in gas storage capacity. The UK has just one eighth of the storage capacity of the USA, and one sixth of the storage capacity of France.

There also needs to be a boost in generation capability through the development and application of carbon capture and storage. There is no global shortage of coal, and if the pollution can be mitigated this would help keep this resource in the energy mix.

Planning

ICE believes that the National Policy Statements (NPSs) and the special consent regime for infrastructure projects of strategic national importance created by the Planning Act are beneficial to the economy and to society. They should therefore both be preserved, in order to ensure that vital infrastructure projects proceed without undue delay.

However, ICE also believes that Parliament should be asked to approve the National Policy Statements to secure their legitimacy. It also feels that NPSs should be linked to the Comprehensive Spending Reviews, and existing strategic investment plans. The newly announced Infrastructure UK provides a vehicle for making this happen.

In addition, developers must ensure that they effectively engage the communities affected by individual projects well in advance of the submission of any formal planning application.

**For further information on ICE's policies please go to:
ice.org.uk/knowledge/Policy_statements.asp**

**If you have any queries or comments please email us at:
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