

# Independent Armitage Review of Infrastructure

Submitted by The Royal Academy of Engineering to Sir John Armitage



## **Introduction:**

The Royal Academy of Engineering is very pleased that this review into long term infrastructure planning is taking place. The Academy recognises the need for long-term, stable planning for infrastructure, in order to get the best value for money for government, to deliver state-of-the-art infrastructure to support our economy, and to plan for the effects of a changing climate and the way it will affect our critical infrastructure. A systems approach to infrastructure planning will be essential, noting the interdependencies between infrastructure sectors, and the opportunities for creating dual use infrastructure and co-locating services where possible.

These points were made in the Engineering the Future publication *Infrastructure, Engineering and Climate Change Adaptation*<sup>1</sup> produced for Defra. In particular, the need for government to be able to take a holistic view and for regulators of different sectors to work together was noted.

The Academy supported the establishment of Infrastructure UK and works closely with its team. We hope that it grows in influence and is successful in bringing a coordinated approach to infrastructure planning across government departments.

The following response was developed with input from Academy Fellows. A detailed response to question three was submitted by Mott MacDonald via a Fellow of the Academy and that has been included in full as an annex. The Academy would welcome the opportunity to convene a roundtable session across the engineering profession, to provide further evidence to the review.

It was noted that none of the questions in the review referred to either sustainability, resilience or innovation. All of these need to be considered alongside investment, but none of them are properly recognised or valued by current national regulators.

### **1) Diagnosis of current issues and difficulties**

The fundamental issue affecting long term infrastructure planning is not only the need for political consensus, but the inability of governments to take long term decisions when beset by shorter term financial and political imperatives. The challenge would be to get political consensus not just about the longer term but also about the shorter term imperatives.

In terms of particular sectors that have been affected, investment in mobile communications is one example where progress has been held back by poor long term spectrum policy, in some cases by planning policy (such as base station sites), and prescriptive regulation (at both the UK and European levels). Another example is planning of a high-speed rail network. Our European partners have been building HS lines for 40 years while the UK has only recently engaged in strategic debate about the shape of a HS network – whether it should be radial from London, focused on inter-regional links, and so on.

A lack of cross-sector decision-making has been observed in other areas of innovation where two or more government departments are involved, such as smart metering and smart grids, intelligent transport systems (including eCall), and health telematics.

---

<sup>1</sup>[http://www.raeng.org.uk/news/publications/list/reports/Engineering\\_the\\_future\\_2011.pdf](http://www.raeng.org.uk/news/publications/list/reports/Engineering_the_future_2011.pdf)

Existing decision-making processes have been hampered by a lack of strategic vision and a focus on micro-regulation. An example of this is the electricity generation industry. Short term plans, often responding to EU targets and initiatives, have been developed, but there is no coherent strategy setting out how the Government plans to address the three objectives of affordability, security and environmental sustainability.

In the last 10 years, the impact of globalisation has grown such that investors have more international choice where to invest – this means that regulation needs to be enabling and empowering to attract investment to the UK. It would be valuable if UK regulators could be given pro-investment and pro-innovation duties and could be encouraged to work together better.

Existing decision making and planning mechanisms suffer from poor awareness of the strategic nature of investment and the importance of sustainability and its impact on employment or GDP multipliers. Failings in the current system have led to slower investment.

Investment planning needs a macro strategy and an international mindset. For the last three decades, governments of all parties have pursued a policy of privatisation of national infrastructure but the philosophy of planning has not kept up with this change. There are some aspects of infrastructure planning, such as maintaining a coherent strategic vision within and between sectors, which cannot be subcontracted to the private sector. For other aspects, governments need to be an enabler of private investment, not the detailed specifier of equipment or services. An example of this is in the rail industry where governments have not demonstrated the strategic vision of how different transport modes will achieve the mobility necessary for economic growth in parallel with environmental sustainability, yet have established a franchising system that specifies in fine detail the service to be provided.

The role of government public procurement in influencing total infrastructure spend is somewhat unclear, especially relative to other EU states. The planning and management of government procurement is crucial to supporting planned investment in infrastructure. The development of the government's procurement pipelines has helped in this regard.

## **2) Past / existing attempts to provide special regimes for infrastructure delivery**

Limitations of bodies such as the Infrastructure Planning Commission stem from the danger that the potentially protracted deliberations of a commission may put a freeze on investment, making things, at least in the short term, worse rather than better.

We welcomed and supported the establishment of Infrastructure UK within Treasury, although significant impact is yet to emerge. This appears to be because Treasury has little direct influence over European coordination of major projects (such as the Smart Grid for Europe). There has also been little apparent impact so far with the Infrastructure Planning Commission or the Hybrid Bill.

The Davies review of aviation seems to be a way of achieving resolution but could end up as a disputed process. The Davies review is not a complete transport strategy, and does not include full international or multimodal options in transport. It cannot therefore provide a definitive solution in the absence of a broader transport strategy.

### **3) The role and remit of an independent Infrastructure Commission**

An independent infrastructure commission should have planning horizons of 15, 30 and 50 years. 30 years should be the core of the analysis but it needs to take in the 50 year context and consider the 15 year deliverables. The response by Mott MacDonald included as an appendix sets out why all three planning horizons are important. For energy and transport, a long term strategic approach is needed. Firm decisions over 30-40 year horizons are needed for major investments in both energy generation and transport infrastructure.

The remit of a commission should cover the transport, energy and communications sectors. These are the three sectors that need national-level planning, housing being dealt with on a more local level (except when new communities are established and strategic consideration of location and access to infrastructure is needed). Communications should be treated as a whole, not separating telecommunications and broadcasting. Similarly, energy must be considered in its entirety, including electricity generation, oil and gas extraction, fuel for transport and so on. A commission should consider all of the factors listed (mega trends, demographics, sustainability, economic growth, environmental legislation), but should focus primarily on sustainable long term investment and an understanding of what will assure this for each of these sectors.

A commission should maintain a clear focus on outcomes required (infrastructure capacity and overall performance), rather than being involved in detailed evaluation. The overarching objective of the commission should be sustainable economic growth.

A commission should take evidence from bodies such as Network Rail and the Highways Agency. There is a case for Infrastructure UK to evolve into the Infrastructure Commission.

In terms of considering funding or affordability constraints, any review has to be conducted in the real world where there are funding constraints. It should also involve considering the consequences and costs of not building the necessary infrastructure, by producing a cost benefit analysis ignoring shorter term funding constraints. Some form of prioritisation or ranking of projects would also be helpful – for example, is HS2 more important than a new Heathrow runway to the economy?

### **4) Establishing cross party consensus**

Members of the commission should be drawn from key professional institutions and with relevant sector backgrounds. It is important that engineering is represented, but there is unlikely to be sufficient technical expertise were members to be drawn solely from Parliament.

There were differing views among Fellows on how often the commission should report. It might report once per parliament per sector, continuing on a rolling schedule; or it might report once on all infrastructure sectors, covering all current issues, and only report again if it is proven to have value (this was to reduce the risk of difficult issues being deferred until the next cycle). The commission should take into account long planning cycles with an emphasis on investment and capacity planning, focusing on the macro picture.

It may be valuable to have the commission shadowed by a select committee and then followed up by a green policy paper which hopefully can achieve all party support.

## **5) Lessons learned**

There are many lessons to be learned from the London Olympic Games, but it is important to accept that they are not straightforwardly comparable to the three major sectors of transport, energy and communications. These sectors involve projects over a longer term than the Olympics and are at a much greater scale in their totality. The Olympics also had a fixed date, a generous budget and cross-party backing that ensured planning rules did not interfere. Most other infrastructure projects do not work that way. Too much focus on the London Games might make this exercise somewhat UK-centred when we do need to learn lessons from other countries, such as the long-term planning of the French TGV network from the 1960s to today.

Any UK infrastructure commission needs to ensure we are part of Europe and not isolated from thinking in this area. This is the best way to consider UK competitiveness in step with and not separated from our major trading partner and key regulator.

### **Annex: detailed response to question 3 sent by an Academy Fellow representing Mott MacDonald**

This response is limited to Question 3 of the call for evidence. It comprises comments from an Academy Fellow and other members of staff at Mott MacDonald for inclusion in the Royal Academy of Engineering's response to the call for evidence of the Independent Infrastructure Review led by Sir John Armitt.

#### **Response/Evidence**

##### **(i) What would be the appropriate planning horizon – 15, 30 or 50 years?**

It appears that there is only one government department that has a planning horizon for determining infrastructure requirements into the future. This is DECC which looks forward to 2050 and seeks the public's views on various scenarios.

If there is to be a common planning horizon for all infrastructure it will need to take account of factors which will be different for each element of infrastructure. There may be merit in:

- Having a long term horizon of 40-50 years for the more strategic elements of infrastructure such as climate change adaptation
- Having a shorter term horizon of say 15 years for more immediate but still strategic elements of infrastructure
- Intermediate plans to take account of the current commitments to new infrastructure, and the need for maintenance of ageing infrastructure considering:
  - The design life of the various elements of infrastructure
  - The time required to bring a project from concept to operation
  - The current and potential funding arrangements/constraints
  - The current condition of our existing infrastructure and the need for replacement/maintenance
  - Security of supply

An overall planning horizon of 40 - 50 years would provide a reasonably long term strategic background against which planning decisions can be made. The difficulty of a long term planning horizon is that new governments are elected to a term of five years with particular mandates which may not fit with such a long term horizon. The associated funding arrangements are of necessity linked to that term of government and also to the annual local and central government funding arrangements. This short term emphasis may not be fully compatible with a more strategic planning horizon.

For these reasons it will be necessary for any long term plan to be strategic and not specific allowing governments flexibility for their five year period.

Strategic planning for the various elements of infrastructure will allow connectivity within and across the sectors and the most efficient use of scarce financial resources through multiple sources of funding. The different government departments would need to be encouraged to work together and jointly fund infrastructure containing multiple elements e.g. a road containing district heating pipes would attract funding from two different sources. With collaborative planning at the delivery phase money could be saved.

**(ii) What factors should the Commission consider (mega trends, demographics, sustainability, economic growth, environmental legislation)?**

Using scenario planning techniques the Commission should consider:

- What infrastructure we need to be competitive in the global economy and when this needs to be in place
- What activities the UK is supporting financially in the EU and how to maximise value to the UK tax payer by integrating the UK's infrastructure plans with that of the EU e.g. the freight transport corridor
- Population and business growth which will generate demand
- How to meet demand and/or how to reduce demand: proportionate demand ie demand meeting supply, not simply providing more and more eg energy, challenging engineering design to drive reduction of use of scarce resources, and behavioural change to reduce demand for eg water, energy
- Geographical requirements for infrastructure i.e. where will demand be or needs to be stimulated
- Balanced approach to all regions in relation to their potential for improving our economy
- Working practices (e.g. internet connectivity allowing home working), where people live and work and the effectiveness of the infrastructure to meet demand in various scenarios
- Connectivity of cities e.g. in the north of England to enhance and encourage mobility
- What the UK will be selling to the world – finances, service industries, manufacturing (as in the current successful story of car manufacture and export at Sunderland)
- Infrastructure as a key enabler of the government's various industrial strategies (which also need cross-party support). As such the Commission will need to respond to those when they are published later this year. The debate as to whether economic development drives infrastructure or whether the

development of specific pieces of infrastructure drives economic development is relevant here. In terms of the former, the issue is the time it takes for infrastructure to respond to the need and thereby constrains it. In terms of the latter, there are both bad (eg Kielder reservoir, Humber Bridge) and good (CTRL/HS1) examples.

- Resilience. This is becoming a key issue - partly due to the impacts of climate change, but also due to short term thinking eg the strategic energy supply which will become more dependent on imported gas and will need measures (storage) to deal with disruptions (political or technical) to supplies in order to be resilient. Resilience needs to be thought about from several angles including:
  - Effects of climate change
  - Strategic dependence on critical resources (oil, gas, uranium, food) not under the UK's control
  - Single points of failure or vulnerability
  - Availability of substitutes/alternatives
- The aspects identified for (i) above:
  - The design life of the various elements of infrastructure
  - The time required to bring a project from concept to operation
  - The current and potential funding arrangements/constraints
  - The current condition of our existing infrastructure and the need for replacement/maintenance
  - Security of supply
- Sustainability, in respect of its true definition of the triple bottom line: wise use of natural resources, economics and social effects. Combined construction programmes across the various elements of infrastructure, for instance, would be more cost effective and cause less disruption than, for example the typical piecemeal approach, with a road being dug up to replace a sewer, followed by a power cable, followed by the construction of flood defence berms. A few years ago we saw the potential formation of multi-utility service companies whose remit was to co-ordinate such works in liaison with local councils. They no longer appear to exist although there is ongoing research into this subject at the University of Leeds. In order for the UK to make best use of its resources – both natural and financial there will need to be a change in behaviour of all users to reduce consumption.
- Climate change – managing the impact e.g. flood management
- Infrastructure interdependencies

**(iii) What sectors should it cover – transport, energy, housing, telecommunications?**

The sectors the Commission should cover should include:

- a. Transport
- b. Power
- c. Water
- d. Communications
- e. Waste

These all driven by and have an impact on housing (which is mentioned in the question) and on business.

**(iv) Should the remit be limited to the outcomes required (infrastructure capacity) or to evaluating/recommending potential schemes to deliver these outcomes?**

As noted above the remit should be limited to the outcomes required and to identifying and safeguarding critical infrastructure required to deliver those outcomes and not to evaluating/recommending potential schemes.

**(v) How should the Commission interact with existing bodies such as Network Rail, the Highways Agency and Infrastructure UK?**

As noted above in (i) collaborative planning across the sectors will drive common goals and may encourage multiple funding streams for more cost effective development. The actual development of the individual schemes should be left to bodies such as Network Rail and the Highways Agency.

**(vi) How should the Commission interact with devolved administrations, regional and local government?**

In order to achieve a useful 50 year strategic plan the visions for the various parts of the UK should be integrated with common goals being agreed. It will be important to make sure that plans and specific development of infrastructure for England for instance should facilitate the achievement of the agreed goals in, say, Scotland e.g. high speed rail through northern England to Scotland. The Commission could have a role to audit the delivery of schemes during development and after completion to validate that they meet the vision and address the outcomes required.

**(vii) How might funding/affordability constraints be factored into any review?**

A long term (40-50 years) planning horizon/strategy should not address funding. Funding would apply more properly to shorter term plans such as within the 15 year horizon. It may be appropriate to develop existing methodologies projected forward if they are sufficiently robust.