

# National Policy Statements for Energy Infrastructure

## Response from:

- The Institution of Chemical Engineers
- The Institution of Civil Engineers
- The Institution of Engineering and Technology
- The Institution of Mechanical Engineers
- The Royal Academy of Engineering

## To the House of Commons Energy and Climate Change Committee

January 2010

The Royal Academy of Engineering, the Institution of Chemical Engineers, the Institution of Civil Engineers, the Institution of Mechanical Engineers and the IET are pleased to submit a joint response to the House of Commons Energy and Climate Change Committee on the National Policy Statements for Energy Infrastructure.

The response was formulated by consulting with experts in the field from all the organisations listed above. It deals mainly with the general engineering aspects of the consultation from a multidisciplinary perspective



## **1. Introduction**

- 1.1. Our organisations welcome the opportunity to respond to the Energy and Climate Change Committee's inquiry into the proposals for energy national policy statements (NPSs). If the UK is to meet the emissions reductions targets set out in the Climate Change Act while maintaining a secure and affordable energy supply, significant amounts of new energy infrastructure will need to be built in the coming decade and beyond. Clearly, if this is to be achieved in a timely and efficient manner, the planning regime will play a crucial role. The current system has been shown to have some major failings, resulting in lengthy delays for a number of applications for planning consent. The urgency of the issue means that this situation cannot be allowed to continue and we support the efforts being made by Government to overhaul the system following on from the Planning Act (2008).
- 1.2. The urgent need to reform the planning system should not, however, be used as an excuse to create shortcuts around democratic processes. The wholesale changes expected in the energy system will require difficult and complex decisions to be made, many of which are liable to be unpopular to sections of the public at both the local and national level. It is therefore of the utmost importance that the consultation process for the NPSs is seen to be sufficiently comprehensive in order for the new framework to gain public legitimacy. Without this, the Infrastructure Planning Commission (IPC) will be unable to function effectively and the NPSs themselves could face judicial review.
- 1.3. This response will focus on the general features of the proposals and any issues that have a specific engineering aspect. A more detailed response will be submitted in response to the current Department of Energy and Climate Change consultation. Our aim will be to ensure that the draft NPSs are technically sound and fit for purpose.
- 1.4. The scale of the documentation in itself poses a problem. Organisations with experience of engaging in Government policy consultations will be well placed to engage as they will already be aware of many of the issues and already hold views on the related documents such as the Planning Act and the Low Carbon Transition Plan. Smaller organisations and individual members of the public will not be so well placed to comment even though the issues under consideration, especially in the areas of renewable energy and nuclear power, are of national concern.

## **2. The need for new energy infrastructure**

- 2.1. The challenges ahead for UK energy policy require a coordinated national strategy and clear implementation plan if they are to be met. We support the basic premises of this policy as described in the NPS, namely that the future energy system must:
  - increase efficiency and reduce demand wherever possible;
  - be made up from as diverse a range of primary fuels as possible; and
  - increase the proportion of low carbon energy.
- 2.2. This strategy must be implemented quickly and efficiently for a number of reasons, as laid out in the consultation document, and while it is vital to retain the democratic rights of people to have their views heard on any developments that will affect them, it is

important that the general principles of the energy strategy are not repeatedly debated for each individual application, resulting in serious delays the planning process. This does, however, mean that the current consultation process for the NPSs is particularly important as it represents the last chance the public have to influence the national policy the IPC will be acting upon.

- 2.3. In engineering terms, there are a number of areas of the energy strategy that raise concerns. Consider, for example, paragraph 3.3.23 of EN-1:

*“Government believes that although increased energy efficiency, smart demand management and opportunities for increased storage and interconnection are being actively pursued, their effect on the need for new large scale energy infrastructure will be limited, particularly given the prospect of increased need for electricity for heating and transport.”*

- 2.4. While we accept the basic premises of this statement, there are a large number of uncertainties implicit in it. Smart grids could have a significant effect on the energy system. Indeed, if large proportions of energy demand from transport and heat are to be met by the electricity supply, the extent to which that demand can be managed will have a major effect on the level of large scale energy infrastructure required. Also, the fact that this electricity supply will need to be low carbon, and therefore include large amounts of renewable energy, will require major upgrades in the transmission and distribution systems in very particular areas.
- 2.5. The increased demand, met by large amounts of intermittent renewable energy and networks of localised and distributed energy sources will, in fact, only be achievable through increased storage and interconnection in a ‘smart grid’. And the infrastructure required to build such an energy system will not only need to be built in the right place but also at the right time so that assets are not left stranded. In the absence of a fully coordinated build programme, as seems likely in the liberalised energy market, it needs to be accepted that transmission and distribution infrastructure will need to be built ahead of need.
- 2.6. What these issues highlight is the need for a coordinated, strategic and planned approach to building the UK’s future energy system. But, as it is laid out in the overarching NPS (EN-1), the IPC is simply expected to start its assessment from the basis that there is a significant need for all types of electricity generation, gas infrastructure and oil pipelines<sup>1</sup>. There are no provisions for the IPC to keep track of what applications have been approved, how the overall system is evolving or what the carbon intensity of the grid could be expected to be as the approved applications come on line. The role of the NPSs in supporting national energy strategy is thus inherently limited despite the critical role they will play and their potential to shape a future energy system. The market, in conjunction with the EU ETS is expected to provide the optimum mix of energy supplies. But with doubts over the ETS’s ability to set a sufficiently high or robust price for carbon and high uncertainty over future primary fuel prices, relying on the market and carbon trading schemes to deliver the optimum energy system poses a significant risk.

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<sup>1</sup> EN-1, paragraphs 3.7.1, 3.9.8 and 3.10.8

- 2.7. Therefore, while the NPSs raise a number of engineering issues about energy infrastructure development, as long as the basic requirement for the IPC is to assume that there is a need for all types of generation and networks there is little point in these issues being raised as they would not affect how the IPC deal with applications at the fundamental level.
- 2.8. The thresholds set for the size of generating plant or electricity lines that the IPC will consider also raises a concern with regard to developing a coordinated energy system. The 50MW/100MW thresholds for the generating plant are reasonable levels to assign any smaller and there would be too many applications for the IPC to process and any larger would miss out some sizable installations. However if, as is intended, the new planning system is to provide a holistic planning regime for major projects, much of the attendant infrastructure – the access roads, water supply, etc. – will fall outside of the IPC's remit and require separate applications. Certain aspects of this are covered such as grid connection in section 4.9 of EN-1 but even in this case, the framework appears to be somewhat brief. Some clarification on how this would operate in practice would be helpful.
- 2.9. The 132kV limit on electricity lines also raises concerns as this will restrict the IPC to only considering major transmission lines. If widespread electrification for heat and/or transport is adopted, the distribution system will also need to be significantly upgraded. This is likely to represent an even greater undertaking than the necessary upgrading of the transmission system because the move towards smart grids will fundamentally change the distribution system, because of the significant system implications of electric vehicle and electric heating loads. It could be argued that, although this involves installations that fall well below the current NPS thresholds, it would require change at the national level and hence consideration within the national strategy. How this would work in practice is uncertain but the issue is raised here primarily to highlight the fact that a viable future energy system, particularly one with a much larger electrical capacity and integrated supply and demand management, will be required in a greater diversity of places on a wide range of scales. Coordinating appropriate aspects of this system at the national level (as well as regionally and locally) will be vital. It may be possible to address this issue by further clarification of the "Exceptions" already present in the draft NPS.

### **3. Carbon capture and storage**

- 3.1. Beyond these general strategic concerns there are a number of other issues that have a specific engineering aspect, particularly regarding carbon capture and storage (CCS).
- 3.2. Demonstration of "the economic feasibility within the combustion station's lifetime of the full CCS chain"<sup>2</sup> will be almost impossible at the moment. There is no certainty of costs, and any consideration of economic feasibility is critically dependent on carbon price and gas price in the future as these will drive prices in the electricity market and hence revenues. It is likely that some scenarios of these three variables will demonstrate feasibility and others not. Therefore, it seems likely that this will either act

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<sup>2</sup> EN-1, paragraph 4.7.1

as a barrier to proposals coming forward for new coal fired power plant, or become something of a fig leaf, where certain assumptions are taken as more reasonable than others because they produce a "correct" answer.

- 3.3. Although we understand the desire to get early CCS projects under way in order to learn and to demonstrate technology there is a strong argument that a separate NPS should be developed that addresses the carbon transport infrastructure and carbon storage infrastructure, to allow effective planning of these strategic resources, and for the right market signals to be sent for power plant siting decisions
- 3.4. With CCS at such an early stage of development it is clear that the guidelines on how to deal with the technology will continue to be upgraded (refer to paragraph 4.7.16 of EN-1). As such it is difficult to make any more detailed appraisal of the issues until the first demonstration plants provide evidence of the engineering realities of building and operating such plants and transporting and storing the CO<sub>2</sub>.

#### **4. Summary**

- 4.1. Overall, we welcome the introduction of the new planning regime, the NPSs and the IPC. Any attempt to introduce a strategic view of the key components of energy policy is to be supported. The general needs as laid out in the overarching NPS (and associated documents such as the Low Carbon Transition Plan) are broadly in line with our assessment of what is required from the UK's energy system. However, it must be remembered that the future energy system will be vastly different to the current system, especially in terms of energy flows, and the engineering realities of building the system will likely throw up some unexpected difficulties. The framework that is put in place now must have the flexibility inbuilt to deal with such eventualities as well as a sufficient overview of how the system is developing to identify problems as they arise.
- 4.2. One further note of caution; even a successful planning framework will be ineffectual if the IPC and local planning authorities are not adequately resourced, both financially and in terms of sufficiently experienced personnel. In this respect, the Academy is well placed through its networks to identify individuals with expertise in all areas of energy to provide advice where necessary, but staff of the right calibre will be needed across the whole planning system.