Putting science and engineering at the heart of government policy

Institute of Physics response to a House of Commons Innovation, Universities, Science and Skills Committee inquiry

A full list of the Institute’s submissions to consultations and inquiries can be viewed at www.iop.org

9 January 2009
9 January 2009

Dear Sir/Madam

Putting science and engineering at the heart of government policy

The Institute of Physics is a scientific charity devoted to increasing the practice, understanding and application of physics. It has a worldwide membership of over 36,000 and is a leading communicator of physics-related science to all audiences, from specialists through to government and the general public. Its publishing company, IOP Publishing, is a world leader in scientific publishing and the electronic dissemination of physics.

The Institute welcomes the opportunity to respond to the House of Commons Innovation, Universities, Science and Skills Committee’s inquiry into ‘Putting science and engineering at the heart of government policy’.

The attached annex highlights the key points of concern to the Institute which have been linked to the issues raised in the call for evidence.

If you need any further information on the points raised, please do not hesitate to contact me.

Yours faithfully

Dr Robert Kirby-Harris
Chief Executive
Putting science and engineering at the heart of government policy

Summary of key points

- It is difficult to ascertain the effectiveness of the CST, partly because its work is not clearly visible to the science and engineering community. The Cabinet Sub-Committee is a relatively new body, so it is too early to offer comment on it.
- A disadvantage of creating a Department for Science would be the potential loss of the CSAs which would have the effect of decoupling science policy from decisions made in other departments which risks making science a distinct and self-contained activity within policy.
- Instead of a Department for Science, to strengthen science in government, the departmental CSA principle should be built on.
- There are low levels of science-trained people employed in higher levels of government, and this has an impact on the government’s ability to formulate science policy.
- It is imperative that the government engages with the learned societies and professional bodies when seeking advice on science and engineering issues.
- The Institute supports the Haldane Principle that decisions should be taken on scientific merit free from political and administrative pressures. There is a strong case for expanding on the Haldane Principle in light of the money and authority now held by the devolved governments and the RDAs.
- The learned societies and professional bodies have an important role to play in countering the lack of public trust and confidence in science and engineering by providing scientific advice which is clearly independent and objective.
- Regarding the RDAs, scientific expertise is increasing at the centre of regional decision-making bodies but further progress could be made – there remains a perception that some RDAs are not as engaged with science as they should be.

Whether the Cabinet Sub-Committee on Science and Innovation and the Council for Science and Technology put science and engineering at the heart of policy-making and whether there should be a Department for Science

1. Regarding the Council for Science and Technology (CST), it is often difficult to ascertain its effectiveness, partly because its work is not clearly visible to the science and engineering community. Because the CST has low visibility externally, its actual role, as distinct from its remit, is often unclear. It is also not clear how it avoids duplication with what other bodies are doing. Indeed there is overlap, but the CST is in the unique position of providing information directly to the Prime Minister. The CST needs to foster closer links with other bodies, which will certainly support it in the provision of information and avoid duplication of effort.
2. The Cabinet Sub-Committee is a relatively new body, so it is too early to offer comment on it. However, it is odd that on its website\(^1\) it is stated that the Government Chief Scientific Advisor (GCSA) may be invited to attend meetings. The GCSA heads the Government Office for Science (GO-Science) which “co-ordinates and develops good practice on how Government should seek and use scientific advice in policy making…” and is a champion of ‘Science in Government’, which is an initiative working to improve the quality and use of science and technology across government. Therefore, it is imperative that the GCSA is expected to attend the meetings, particularly as the GCSA’s role is independent to the ministers of the various departments.

3. The introduction of departmental Chief Scientific Advisers (CSAs) a few years ago was very welcome and has proved effective in some areas at bringing science to the forefront of policy development. The CSAs reflect the reach of science, and keep it in the minds of all ministers and departments, rather than just one. It is evident that in some departments the CSA has direct involvement and influence in policy formulation and oversight of execution; this is not yet the case for all departments.

4. It is worth noting that there are no CSAs in Northern Ireland or Wales. In Wales, we understand that the First Minister is considering a report on the role of a CSA for Wales. It is crucial that an appointment of a CSA is made in particular to bring science and engineering to the forefront of government policy in Wales. In Northern Ireland, we urge that an appointment of a CSA is made in particular to drive forward the implementation of the recommendations of the STEM Review, which we understand is still being undertaken\(^2\).

5. As for the question of whether there should be a Department for Science, such a proposal was mooted before the creation of DIUS and there was much discussion amongst the science and engineering community on this issue. DIUS is itself a relatively new department, and the transition from the amalgamation of the relevant functions of the former DTI and DfES has been smooth; the Institute is of the view that it is highly unlikely for there to be another reorganisation, particularly as the recent Cabinet Office Capability Review\(^3\) reported that DIUS has made a strong start to its first 18 months in operation and is “…well placed to realise the benefit of bringing together government investment in skills, innovation and publicly sponsored science and research in support of better economic and social well-being.”

6. A disadvantage of creating a Department for Science would be the potential loss of the CSAs which would have the effect of decoupling science policy from decisions made in other departments which risks making science a distinct and self-contained activity within policy. This could result in science becoming isolated, even neglected, in policy decisions, particularly from education and the innovation and business support mechanisms within DIUS, which could result in an unnecessary competition for resources. Instead of a Department for Science, to strengthen science in government, the departmental CSA principle should be built on. More people with science backgrounds should be found in the policy units of government departments, either through an expansion of the offices of the CSAs, or preferably, the incorporation of science-trained workers in each departmental policy unit.

---

\(^1\) www.cabinetoffice.gov.uk/secretariats/committees/edsi.aspx
\(^2\) www.delni.gov.uk/index/successthroughskills/stem-rev.htm
\(^3\) http://nds.coi.gov.uk/environment/fullDetail.asp?ReleaseID=387228&NewsAreaID=2&NavigatedFromDepartment=False
How Government formulates science and engineering policy (strengths and weaknesses of the current system)

7. A weakness of the current system is that there are low levels of science-trained people employed in higher levels of government, and this has an impact on the government’s ability to formulate science policy.

8. In part due to this, and to the decline of the National Laboratories, academics and commercial consultants are increasingly used as advisers to government on areas of science, and are considered as independent advisers. In the absence of an opportunity to strengthen and expand the government’s science facilities, the funding streams for scientists used by government should be acknowledged to prevent accusations of bias. The American DARPA model incorporates a secondment programme for increasing the number of science-trained people in government. A similar programme could be considered in the UK.

9. In addition, the introduction of a STEM stream within the Civil Service could be considered. Within this, it would be very important that the entry requirements for graduates entering the stream were high to ensure quality (as with other specialist streams). The training for staff in the stream would include a significant element of economics, statistics and the social sciences – these are the core skills for evidence-based policy-making in government, and staff would build on their existing high levels of scientific training.

10. We note that the Chief Scientific Adviser's Committee (CSAC) is the principal committee at official level dealing with issues relating to science, engineering and technology. Its membership consists of the GCSA, and the CSAs or their equivalent from all government departments and devolved administrations. Once again, looking from the outside in, it is difficult for us to make quantifiable statements as to the effectiveness of the CSAC in formulating government policy, particularly as we have little or no interaction with the GCSA and/or the departmental CSAs, unless we actively approach them on an issue of concern/interest. The former House of Commons Science and Technology Committee in its inquiry report, 'Scientific Advice, Risk and Evidence Base Policy Making', made several recommendations on how the work and effectiveness of the GCSA and the departmental CSAs could be improved, particularly their interactions with civil servants, scientists and learned societies and professional bodies. On the latter, the Committee reported that it “…found scope for greater involvement of the learned societies and professional bodies in the UK scientific advisory system, not least in order to reduce dependence upon external consultants.” To date we have not experienced any change (i.e. greater level of engagement) in our interactions with the government on matters of science policy.

11. In addition, the government has published its ‘Guidelines on Scientific Analysis in Policy Making’ which address how “…evidence should be sought and applied to enhance the ability of government decision makers to make better-informed decisions.” The guidelines are regularly issued for public consultation by the GCSA, something which is to be lauded.

12. Reflecting on the guidelines which were last updated in 2005 following consultation, we note, on the same theme, that government departments are encouraged to engage with a wide variety of scientific learned societies and professional bodies when seeking specialist advice. We feel that this is imperative as the learned societies and professional bodies, such as the Institute, have access to a significant number of members who have a wealth of experience on a variety of scientific-based issues. Their input will undoubtedly supplement advice received from...
other, more traditional sources. An obvious benefit in using ‘independent’ scientific learned societies and professional bodies to offer their opinions on important issues is that the general public may be more inclined to believe them than the government.

13. Overall, the guidelines appear to be predicated on the assumption that it is straightforward to define the 'issues' that need scientific advice, to determine the 'best source' for finding that advice and what is likely to impact upon policy making. Such decisions themselves involve expertise. There is often no consensus on where the 'best' advice may reside and which policies may be affected. Very often, these decisions are taken by civil servants within government departments. Although they have a responsibility to be neutral and unbiased, they may still have pressures that could affect the judgments that they are making.

**Whether the views of the science and engineering community are, or should be, central to the formulation of government policy, and how the success of any consultation is assessed**

14. The views of the science and engineering community should be included at the centre of policy formulation, as they will have the necessary technical expertise to judge the full depth and impact of decisions. As stated in the previous section, this is something the government’s own guidelines recommend and it is something that the scientific and engineering learned societies and professional bodies are keen to be involved in as part of their remit of representing the views of their members.

15. As a learned society and professional body, the Institute’s main input in determining the UK’s science and engineering policy is via responding to consultation documents that are issued by government departments. Representing over 36,000 members, the Institute is in a strong position to provide advice on matters relating to science and engineering policy, obviously with a strong emphasis on physics.

16. However, the main concern we have regarding consultations is that quite often we feel that policy makers are simply going through the motions and that consultations sometimes take place at a relatively advanced stage of the decision making process.

17. A good example of this was the government’s ‘Science and innovation investment framework 2004-2014: next steps’ consultation which proposed amongst other things, to merge the Council for the Central Laboratory of the Research Councils (CCLRC) with the Particle Physics and Astronomy Research Council (PPARC) to form the Science and Technology Facilities Council (STFC). Another example was the former DfES's consultation on the ‘Reform of Higher Education Research Assessment and Funding’ which proposed to replace the peer-reviewed Research Assessment Exercise (RAE) with a metrics-based measure of research assessment. In response to both of these consultations, the Institute engaged its membership and submitted responses; but the feeling throughout the process was that decisions had already been taken. We would have liked to have been involved in the decision-making process that informed both of these important step changes in the research base at an earlier stage, where our concerns and comments would have had more impact and relevance.

18. In addition to consultations, which are still the best and most considered approach to requesting input to inform policy making, the Institute would welcome more public meetings, such as those that were organised by BERR for the ‘Future of Nuclear Power: The role of nuclear power in a low carbon economy’ consultation.
Most importantly, these meetings (often regional) enable the general public, in addition to the usual stakeholders, to discuss pertinent issues. The aforementioned consultation is an example of an issue of wider public and national importance, whereas issues such as those affecting the science or research base will be of more limited interest. Nonetheless, the Institute would welcome the opportunity to attend either public or private meetings to offer its expertise on relevant issues. Indeed, it may be appropriate to hold private meetings at an earlier stage in the development process, when the objective/remit of a consultation is still being defined.

The case for a regional science policy (versus national science policy) and whether the Haldane principle needs updating

19. The Haldane Principle has recently come to the fore as a result of the STFC financial situation, where there were doubts as to whether decisions, such as those pertaining to the future of the Daresbury Laboratory, were made by research council officials based on independent scientific advice or were influenced by ministerial intervention.

20. The RCUK Review of UK Physics\(^4\) reported that at the highest level the Haldane Principle is working effectively but not so in terms of developing regional policy, where there are potential conflicts of issues with regards to the siting of large-scale facilities. The Review recommended that DIUS and BERR should consider a restatement of the Haldane Principle, but the RCUK response to the recommendation instead reiterated the existing remit of the Principle without adequately addressing the regional issue.

21. The Institute supports the Haldane Principle that decisions should be taken on scientific merit free from political and administrative pressures. There is a strong case for expanding on the Haldane Principle in light of the money and authority now held by the devolved governments and the Regional Development Agencies (RDAs). It is almost universally embraced that university research funding should be driven by the quality of the science and coordinated through the research councils. However, we believe that there is currently a question mark over the effectiveness of the Haldane Principle in insulating this funding from government directions, and particularly the role of the RDAs in this area.

22. At a recent meeting organised by the Foundation for Science and Technology\(^5\) on the RCUK Review of UK Physics, co-sponsored by the Institute, there was some discussion on this issue, where it was suggested by members of the audience that it should be left to politicians to resolve such conflicts and not scientists and that the research councils should think in national, not regional, terms. However, it was also suggested that the research councils should be aware of the resources in different regions that the RDAs have which can be allocated to sustain research activity. The Institute is of the view that this is an issue that clearly needs further investigation and would be keen to work with other science and engineering learned societies and professional bodies, and perhaps even the IUSS Committee, in organising an event to debate the Haldane Principle in greater depth.

23. In terms of the impact of the Principle on both large-scale facilities and regional and local research capabilities, we note that there is an apparent ‘social engineering’

\(^4\) www.rcuk.ac.uk/news/081001.htm
\(^5\) www.foundation.org.uk
agenda in some aspects of regional development policy. The aim of this is to bring all regions to the same level and encourage inter-regional competition, which ignores the realities of the larger and more relevant competitions between the UK and the rest of the world. There is clearly a lack of coherence in regional policy, which is exacerbated by the duplication of effort between the RDAs and the sub-regional and national bodies.

24. To be able to truly compete on a global scale, the science and enterprise strategies of the RDAs should build on existing regional strengths and capabilities rather than attempting to capitalise on the next big thing and try to create a successful sector from scratch. To this end the RDAs should leverage their funding to support programmes which have both regional and national importance and the Technology Strategy Board should drive this strategy in parallel with the research council-driven agenda.

Engaging the public and increasing public confidence in science and engineering policy

25. The learned societies and professional bodies have an important role to play in countering the lack of public trust and confidence in science and engineering by providing scientific advice which is clearly independent and objective.

26. DIUS recently undertook a public consultation on its vision for Science and Society and we hope that the input from the science and engineering community will help shape a vision that fosters greater public trust and engagement in ever more increasingly complex, but critical issues, such as energy security and climate change.

27. One of the questions in the consultation asked how policy makers can better engage with society about the development of science. The Institute is of the view that the best way to engage will depend on the individual objectives of the activity. Representation of policy makers on boards of Knowledge Transfer Networks and other research-industry networks would be one approach. Another would be ‘citizen' representatives on Scientific Advisory Committees, which can sometimes work well. In other instances proactive public consultation methods are needed. Many consultations are not accessible to non-specialists, so where their input is needed differentiation in consultation processes will be required, with appropriate publicity, to ensure that all parties can have a meaningful engagement. There are bodies with expertise in public dialogue methods, such as the Consultation Institute, and policy makers should make use of these. Policy makers also need to be explicit about the extent to which they will make use of contributions.

28. In terms of improving the trust in and respect for science and engineering, the Institute is of the view that the relationship between science and society requires the three communities – scientists, parliament and the wider public – to interact together on a basis of mutual understanding. Recent policy decisions concerning issues such as BSE, GM foods, mobile phones and nuclear waste, have illustrated shortcomings in this interaction.

29. In particular, the media has an important role to play here. For instance, the newspapers are currently awash with ‘climate disaster stories', where there is no dearth of opinion from all and sundry about future climate change scenarios and more worryingly whether the science that backs these scenarios is robust. Fewer, but

---

6 http://interactive.dius.gov.uk/scienceandsociety/site
official statements from reliable sources, such as government departments and agencies, would be of help. This is not a suggestion to stifle debate, which can continue through relevant avenues, but a request that bad science, or unproven theories are not provided the media coverage they do not warrant.

30. What we need to do is find ways of raising awareness among the public of what science is and how it is undertaken, the importance of risk and quantitative decision making, what refereeing means (i.e. the importance of exposing ideas to criticism), how to read media reports critically (e.g. sample sizes, etc.) so that the public have the tools to be able to identify good or bad science themselves.

31. Some arms of the media, particularly the scientific, technological and medical specialists, in the main deal professionally and competently with the majority of topics.

32. Even though the House of Lords Science and Technology Committee, in its report ‘Science and Society’ published in 2000, concluded against the adoption of a Code of Practice to ensure that the media reports scientific matters accurately where any breaches could be referred to the Press Complaints Commission, the IUSS Committee may wish to ascertain through the course of its inquiry whether the House of Lords Committee’s conclusion needs to be challenged and if so, how an appropriate Code could be developed and implemented.

The role of GO-Science, DIUS and other Government departments, charities, learned societies, Regional Development Agencies, industry and other stakeholders in determining UK science and engineering policy

33. These organisations must be equally involved in policy making, alongside expert scientists and engineers. As a learned society and professional body, our main input in determining the UK’s science and engineering policy is via responding to consultation documents that are issued by government departments. But there are other measures in place that can enable scientists and engineers better to interact with civil servants and policy makers.

34. Parliamentary bodies such as the Select Committees engage very effectively with the science community already, regularly visiting scientific establishments and inviting evidence from scientists. Learned societies and professional bodies have a role to play in providing briefing material for policy makers, or facilitating meetings between ministers and relevant leading scientists.

35. Regarding the RDAs, scientific expertise is increasing at the centre of regional decision-making bodies but further progress could be made – there remains a perception that some RDAs are not as engaged with science as they should be. The recent OECD analysis of innovation in the north of England highlighted a number of areas of concern, including duplication of effort, and also the lack of expertise in RDAs when it comes to setting enterprise strategies suited to science-based industries.

36. GO-Science needs to develop a clearer strategy and focus for its own work, which includes the need to become more proactive, and shaping the debate across Whitehall rather than simply responding reactively to a plethora of disparate issues.

---

7 www.parliament.the-stationery-office.co.uk/pa/ld199900/ldselect/ldsctech/38/3802.htm
How government science and engineering policy should be scrutinised

37. The Institute is of the view that the Select Committees of both Houses play a crucial role in scrutinising the work of government departments, which includes science and engineering policy. However, we are concerned that the creation of the House of Commons IUSS Committee as a replacement of the former Science and Technology Committee means that the key science and engineering policies of DIUS and other government departments may not be covered so thoroughly (even though the addition of ‘Science’ to ‘IUS’ has been a positive development). The remit of the new Committee is broader with the creation of DIUS, which includes higher education, etc., and it does not have a cross-cutting role to scrutinise other government departments, as it has a structure which more directly parallels DIUS. Although a significant proportion of the government’s science-related programmes are now concentrated in DIUS, there is no doubt that such programmes will also continue to be important elements of other departments’ responsibilities. In environment, energy, health, agriculture, and transport policies, science and engineering continue to play a key role.
The Institute of Physics is a scientific charity devoted to increasing the practice, understanding and application of physics. It has a worldwide membership of over 36,000 and is a leading communicator of physics-related science to all audiences, from specialists through to government and the general public. Its publishing company, IOP Publishing, is a world leader in scientific publishing and the electronic dissemination of physics.