THE ROYAL SOCIETY
CELEBRATING 350 YEARS

Putting science and engineering at the heart of government policy – response to the IUSS Select Committee Inquiry

Summary

- When appointing his scientific advisory team, Barack Obama said:

  "The truth is that promoting science isn't just about providing resources—it's about protecting free and open inquiry. It's about ensuring that facts and evidence are never twisted or obscured by politics or ideology. It's about listening to what our scientists have to say, even when it's inconvenient—especially when it's inconvenient".

  The provision of independent advice to Government has always been an important function of the Royal Society. We therefore welcome the Committee's inquiry into the relationship between science, engineering and policymaking in the UK.

- A number of initiatives in recent years, such as the appointment of Chief Scientific Advisers from outside Government and the creation of independent departmental scientific advisory committees, have improved the quality of science and engineering advice at the heart of policymaking. It is important that this Committee and others keep this situation under review, particularly in light of any changes in the wider political and economic environment.

- It is surprising that DIUS is one of the few departments with science spending not to have an independent advisory group to guide and comment on its policy in this area. We believe that when allocating the science budget, the Director General of Science and Research (DGSR) should be advised by an independent group of experts, who can identify emerging areas of science or initiatives that might require funding, as well as advising on the wider consequences of particular funding decisions.

- We do not support sections of the science budget being earmarked for particular regions, except where this allocation reflects scientific excellence. The key to a region's success is less its ability to create or develop its own science and technology base, and more about its capacity to absorb and capitalise on the best science and technology, drawn from a variety of national and international sources. Rather than a debate about what Haldane meant in 1918, we need a better understanding about the way in which the Government now interprets the Haldane Principle.

- We believe that independent advice from the scientific community facilitated by the Academies and Learned Societies should play a greater role in the scientific advisory process. Government Departments should consider commissioning advice more often from the Academies and Learned Societies.

- Following the recent removal of Grant in Aid support for our policy work, the Royal Society is the only UK Academy that does not receive Government funding for its policy work. This will eventually compromise our ability to provide authoritative, independent advice to Government and others.

Overview

1. The provision of independent advice to Government has always been an important function of the Royal Society. We therefore welcome the Committee's inquiry into the relationship between science, engineering and policymaking in the UK. In our response we address the two different types of input to policy-making from the scientific community. First the scientific community's collective view on issues which affect how science is done (policy for science), and second the expert view on the interpretation of scientific evidence which is needed for effective policy making (science for public policy). This submission has been approved by Lord Rees of Ludlow OM, President of the Royal Society, on behalf of the Council of the Society.

1) 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

2. Irrespective of whether there is a Department for Science, all Government departments need to deal with science and engineering. It is essential that the Government has access to the very best scientific advice in relevant areas of policy-making. Having a Government department with the word 'science' in its title would convey the importance of science to the UK but there is a danger that it would also indicate that science is being 'taken care of' and that other Departments need not concern themselves with it. As we outline below, many Departments have made significant progress in putting science at the heart of policy, although there are inconsistencies in some Departments. For example we welcome the fact that the Foreign and Commonwealth Office is now appointing its first Chief Scientist, which in part compensates for the loss of expertise that resulted from its Science and Innovation Network being moved to GO-Science.

3. We welcome the establishment of the Cabinet Sub-Committee on Science and Innovation. This sends an important signal about the importance of science and innovation, although it is too soon to judge its long term impact. We hope that the Sub-Committee will strike a careful balance between science and innovation issues in its agenda. As an independent group of eminent scientists and engineers, the Council of Science and Technology (CST) should also play a key role in putting science and engineering at the heart of policy-making. We have welcomed the role that CST has played in reviewing the Government's progress against the recommendations of the report on nanotechnologies that we produced with the Royal Academy of Engineering. However we question whether the CST's advisory potential is being fully realised.

2) how Government formulates science and engineering policy (strengths and weaknesses of the current system)

4. UK government has made great strides in recent years towards ensuring that the scientific evidence and the maintenance of a strong science and engineering base are at the heart of policy. It is important that this Committee and others keep this situation under review, particularly in light of changes in the wider political and economic environment. We comment first on the situation as regards the use of scientific evidence in public policy, and then move on to the formulation of policy for science where we believe that there is scope for improvement.

5. There has been a substantial improvement in the use of scientific evidence by Government departments. The appointment of departmental Chief Scientific Advisers at a senior level from

outside Government has been instrumental in this. It is vital that the CSAs are involved, from an early stage, in the key strategic decisions within a Department and that they be adequately resourced.

6. Particular challenges are presented by policy issues requiring the input of scientific evidence and expertise that fall at the boundaries between, or cut across, Government departments. Here cross-cutting groups to ensure that scientific evidence is considered are essential. The Government's CSA has done an excellent job at supporting this and in strengthening the role of the CSAs as a group. As we note in Section 7, the change in remit of the IUSS committee (compared to the former Science and Technology Committee) has meant that there is no longer the same level of Parliamentary scrutiny of these cross cutting issues.

7. We believe that there has also been a favourable cultural shift within the civil service: for example, the introduction of the analysis and use of evidence strand in the competency framework for senior civil servants; and the enthusiastic welcome that was given to our pilot civil servant-scientist pairing scheme in 2007. The Department of Innovation University and Skills (DIUS) is working in partnership with us to roll out this scheme in autumn 2009.

8. Another positive development has been the establishment by most departments of independent scientific advisory groups. They should have a remit to provide advice on current policy development, identify gaps in the Department's research portfolio and have a horizon scanning function. We welcome the opportunity to identify suitable individuals for membership of these committees. Many Departments have programmes of commissioned scientific research that underpin and evaluate the Department's policies. We welcome the establishment in the Department for Environment Food and Rural Affairs (Defra) of the Science Quality and Priorities Team, which is playing a key role in developing quality assessment within Defra, for example in peer reviewing completed research. We commend this approach to other Departments.

9. We welcome the increase in funding for science in recent years. However we believe that a new structure is needed to provide advice on the allocation of this funding. It is surprising that DIUS is one of the few departments with science spending not to have an independent advisory group to guide and comment on its policy in this area. We have previously recommended to this Committee (RS, 2007) that the Director General for Science and Research (DGSR) should be advised by an independent group of experts from all disciplines and from a range of institutions: a Science Budget Advisory Group (SBAG). This would be a group trusted by the community and close enough to it to identify emerging areas of science or initiatives that might require funding, as well as identifying the wider consequences of particular funding decisions. This mechanism for advice was proposed in the 1993 White Paper 'Realising our Potential' (Cabinet Office, 1993), although never implemented. We are aware that the Committee had concerns that this might be too bureaucratic (House of Commons Select Committee for Innovation, Universities, Science and Skills, 2008). However the SBAG would meet infrequently, with a tightly defined agenda, and could thus operate in a light-touch way. Another option would be extend the remit of an existing committee, such as the CST, to provide this independent advice, subject to the range of expertise of its members being appropriate. The DGSR has recently invited us to be one of six organisations providing him with advice during the next Spending Review. We welcome the wider engagement with the community that this initiative will bring but it does not go far enough. Whatever structure is put in place, there should be transparency about the way in which decisions have been made.

10. To ensure that science is at the heart of policymaking, Departments must be in constant contact with the scientific community. The appointment of CSAs, independent departmental advisory groups and the commissioning of scientific research play an important role in this. However, in formulating scientific aspects of public policy and policy for science, we believe that the Government could make better use of organisations such as the national academies and Learned Societies as a source of authoritative and independent advice. We address this in more detail in under Section 6.

3) 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

11. There are two different types of input to policy-making from the scientific community, each important. These are firstly the scientific community's collective view on issues which affect how science is done (policy for science), and secondly the expert view on the interpretation of scientific evidence which is needed for effective policy making (science for public policy).

12. The collective experience of the scientific community on issues which affect science and the way it is carried out (such as funding structures, the manner in which scientific advice is used by policy makers, intellectual property laws, etc) is powerful because they are the voices from the coal-face – i.e. the people who are living the effects of policy decisions. Academies and Learned Societies have a key role to play in drawing together the perspectives from their area of science and synthesising them for structured communication. The Royal Society is unique in that it draws on perspectives from right across the scientific, engineering and medical community. In addition, evidence from social science research into the effects of various funding structures or initiatives over time or in different countries can also provide valuable evidence.

13. The evidence generated by scientists and the views of experts about the implications of research for policy-making are vital. The Royal Society's policy reports and statements are good examples of how experts can provide in-depth analysis of a body of evidence - as relevant to a particular policy question - and can formulate specific recommendations for policy-makers charged with delivering solutions, as well as highlighting areas of uncertainty and priorities for further research. Scientific evidence must be treated as central to policy, although it is only one factor that Ministers have to take into account. For example, science might indicate the level of risk associated with a particular course of action or inaction, but politicians have to decide what level of risk to accept. There should be transparency around these decisions.

14. These two forms of input overlap where an in-depth understanding of scientific developments is needed for making decisions about issues such as identifying priority research areas, or choosing between scientific facilities to support, or indeed identifying appropriate subjects and methods for inclusion in school curricula. It is in these cases where it is most important that the decision-making criteria are most clearly set out.

15. The success of any consultation can be assessed as part of the scrutiny outlined under Question 7.

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

16. The Regional Development Agencies (RDAs), advised by their Science and Industry Councils, play an increasingly important role in regional science policy. We welcome this and the fact that the RDAs

have agreed to meet regularly with the Technology Strategy Board to facilitate better co-ordination of policy. The RDAs should utilise the economic and social benefits that science and technology can bring to their regions but this does not necessarily require there to be a centre of excellence or large facility in every region. The key to a region's success is less its ability to create or develop its own science and technology base, and more about its capacity to absorb and capitalise on the best science and technology, drawn from a variety of national and international sources. We do not support sections of the science budget being earmarked for particular regions, except where this allocation reflects scientific excellence. We also question what signals any greater focus on policy at the regional level within the UK might send to our international partners, given the increasingly global nature of science and innovation.

17. A range of interpretations and definitions of the Haldane Principle are being used to justify or criticise the involvement of the Government in science funding decisions, particularly those relating to the Research Councils (RC). Recent areas of conflict include the allocation of funding between responsive mode funding and the cross-Council themes that are based on the Treasury's priorities, the increasing focus on translational research and the regional location of large facilities. One person's definition of an overarching strategy (acceptable for Government to outline for the RCs) might be regarded by another as compromising the independence of the scientific community in setting detailed priorities for science. We do not need a debate about what Haldane meant in 1918, but a shared (or at least improved) understanding between the Government and the scientific community about the way in which the Government now interprets the Haldane Principle would be welcome.

5) engaging the public and increasing public confidence in science and engineering policy

18. In the past decade, considerable expertise has developed amongst many stakeholders in ways of strengthening relations between science and society including at the Royal Society.

19. The Royal Society supports the sentiment of DIUS' draft vision for science and society (published last year) and is committed to achieving it. For example, the Society has a significant public programme to *inspire an interest in the joy, wonder and excitement of scientific discovery* (Royal Society, 2008). Involving over 9000 people in 2007, this programme includes lectures, panel discussions, seminars on the history of science and a Summer Science Exhibition. The Society's lectures are also webcast live and made available online as video on demand (history of science seminars are available as a podcasts) to allow the widest number of people to access the public programme. The Society's Press Office works to engage wider publics with science through media coverage of the Society's activities, and by drawing attention to research published in the Society's peer review journals.

20. The Society regards its 350th anniversary in 2010 as a unique opportunity to increase the public's engagement with science and to inspire young people. More specifically, we also view the anniversary as a platform for raising the public profile of science and emphasising its centrality to our shared culture. To this end, our 2010 anniversary programme will include events and activities with over 100 partner organisations drawn from across the arts and sciences, taking place in over 75 museums and galleries across the UK's nations and regions. The centrepiece of the anniversary year will be a major festival of science at the Southbank Centre in which the Society's Summer Science Exhibition, talks and discussions, music, film and the arts will be brought together in a confluence of ideas, issues and debate about science.

21. As well as communicating science, the Royal Society is looking to deepen public engagement. In certain respects, the Government's draft vision for science and society goes only part way to our own. We see two main limitations: the draft treats science as a homogenous activity and underplays its rich diversity; and it leaves little room for more reflective or critical forms of public engagement with science. These points need to be addressed in the development of a final version of the strategy.

22. We see gaining a richer understanding of these complex relations between science and society, and between publics and science, as serving an important function in our goal to *influence policy-making with the best scientific advice*. Historically, decision makers have viewed science issues principally from a scientific perspective, but there is now an acceptance that social and ethical perspectives are also fundamental. Recognising this, the Society has led the scientific community in undertaking effective public and stakeholder dialogue so that policy makers and the science community are able to take account of a diversity of views. Such dialogue exercises have informed the Society's policy work, as well as that of Government. The Government's Sciencewise Expert Resource Centre for Public Dialogue in Science and Innovation (Sciencewise ERC) is another important step in this direction, and needs Government's full support as well as the resources to expand its work.

23. We are committed to working with Government and others to engage the public in science and engineering policy and in increasing our understanding of the complex relations between science and society.

6) 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

24. We have dealt with the role of many of the bodies listed by the Committee in the previous sections. In this section we focus on the value of the independent authoritative voice of science provided by the National Academies, the Learned Societies and Research Charities.

25. The provision of independent advice to decision makers has been an important function of the Royal Society since the 17th Century. As we prepare for our 350th anniversary in 2010, the Society aims to extend the reach, impact and influence of its policy work through the establishment of a new Science Policy Centre.

26. To support the formulation of science policy in Government, the Royal Society provides:

    - authoritative independent advice on topical issues (eg foot and mouth, pandemic influenza) as well as an early warning of emerging issues/evidence that will challenge policymakers (eg Ocean acidification). It does this both in response to specific requests from the Government and proactively, often with the involvement of other UK academies;
    - a forum for discussion for policymakers, academics and other stakeholders (including the public) on topical issues – for example the synthetic biology co-ordination group that the Royal Society initiated to track and stimulate policy activities and processes to encourage the responsible and responsive development of this field;
    - an interface with the international scientific community (including international scientific organisations such as the InterAcademy Panel);

- links to scientific experts in the UK and overseas to act as formal and informal advisors;
- a focal point for scientific community in initiatives such as the two educational partnerships based at the Royal Society: the Advisory Committee on Mathematics Education and the Science Community Representing Education.

27. The Fellows and many other experts contribute to the delivery of our work and generously provide their time free of charge. However the activities listed above require considerable resources. Until recently, we received a contribution to this work from our Grant in Aid. But the Grant in Aid allocation for our policy work (less than 0.5% of our total Grant in Aid budget) was removed by DIUS in April 2008 and our request to vire money to our policy work from other parts of the budget for our programmes has been denied. We have had some success in raising money for science policy from alternative sources but, given the current economic climate, available funds are likely to be limited. Eventually our ability to provide authoritative, independent advice to Government and others will be compromised by the limits of our private resources. We ask DIUS to look again at the anomaly where by the Royal Society receives no Grant in Aid funding for its policy work while the British Academy and the Royal Academy of Engineering receive Grant in Aid for this activity and the Academy of Medical Sciences receives a small block grant from the Department of Health that can be used for its policy work.
28. Looking overseas, there are many examples of governments supporting policy work by their academies. The US National Academies, under the auspices of the National Research Council (NRC), is commissioned to provide much of the scientific advice required by the administration. The benefit of the advice being produced by the Academies (rather than from within Government) is that it is independent, authoritative and internationally credible. In contrast to the situation in the US, the UK Academies are only rarely commissioned to provide advice to the UK Government. Currently, much of the work that the Academies might be expected to undertake is carried out by bodies within Government, such as Foresight.
29. There is no question that the work produced by Foresight is of high quality but we believe that the independent advice of the scientific community (facilitated by the Academies and Learned Societies) should pay a greater role in the scientific advisory process. We are not recommending the creation of the type of infrastructure associated with the NRC, but rather that Government Departments should consider commissioning advice more often from the Academies (individually or where appropriate as a group) and on subject-specific issues from the Learned Societies. When such work has been commissioned in the past, for example the 2004 Royal Society/Royal Academy of Engineering study of nanotechnologies, it has proved highly successful. Commenting on the nanotechnologies study, Lord Sainsbury said '*I see this as a model for what we should do in the future when major advances in science and technology look like raising ethical, health, safety or environmental concerns*'.
30. We note that there is no mention of universities in the list of bodies determining UK science and engineering policy. Their role should not be underestimated, particularly given the number of universities that are establishing their own science policy centres.

7) how government science and engineering policy should be scrutinised

31. Within Government, the CSAs and the rolling reviews of the use of science in Government Departments carried out by GO-Science play an important role in scrutinising the Government's science and engineering policy. The former House of Commons Science and Technology Committee

played a vital scrutiny role, not least because it had a cross-departmental remit. We are concerned about the extent to which the current (IUSS) Committee can scrutinise policies that fall at the boundaries of, or cut across, Departments. The House of Lords Science and Technology Committee continues to have a cross departmental remit. The CST has responsibility for looking at issues that cut across government departments but it does not have scrutiny as part of its remit. Outside Government and Parliament many organisations have a role in providing independent scrutiny of policy, including ourselves and the wider scientific community. To enable this external scrutiny, Departments must be open and transparent about how decisions are being made and the evidence that they use.

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