

Policy through dialogue: informing policies based on science and technology

A report from the Council for Science and Technology, March 2005

Summary and recommendations

The returns on the government's ten-year investment framework for science and innovation will be at risk if there is not broad public support for its policies in areas related to science and technology. Some developments in science and technology have attracted considerable public controversy that governments have been poorly equipped to respond to in ways that command public and stakeholder confidence.

Although government has recognised that engaging experts, stakeholders and the public in the development of science-based policies can inform its thinking and help to develop policies that carry greater support, the standard methods of engagement are limited in what they can offer. The time is ripe for government to engage earlier and more deeply with the public in the development of policies and priorities, so that they are informed by public aspirations and concerns from the outset.

The government has taken the first, welcome steps in this regard. It now needs to generate a change in culture across government to ensure that non-expert and non-partisan perspectives are used effectively to inform the development of policies that are based on science and technology.

This change in culture will require mechanisms for:

- identifying issues where an investment in public dialogue is likely to bring benefit;
- ministerial buy-in to the purpose of any dialogue process and commitment to explain how the dialogue has informed government policy or thinking;
- appropriate means of governance and resourcing;
- a capacity within government to learn from experience and improve the process.

The Council for Science and Technology recommends to government:

1. Government at the highest level should adopt an explicit framework for the use of public dialogue to inform science and technology related policies (paragraphs 16 - 43).
2. The purpose of dialogue is not to determine but to inform policy. It does this by challenging the thinking of policymakers and scientists who contribute to policy making, as well as that of the public, stakeholders and special interest groups. Government must retain responsibility for decision-making (paragraphs 12 – 15).
3. Government should establish clear criteria for identifying and prioritising areas that could usefully be explored through dialogue processes. These will range from longstanding areas of controversy to new, emerging issues. This role could be taken on by the new Centre of Excellence in science and technology horizon scanning (paragraphs 17-21 and box 2).

4. Each instance of dialogue should have clear governance arrangements with three specific roles: sponsor (responsible for setting objectives and using the outcomes of the dialogue process); directors (to oversee the process) and contractors (to manage the process) (paragraphs 26 - 31).
5. The sponsor of any dialogue process should state publicly:
 - the purpose of the process;
 - when and how they will publish a report of the process;
 - how the results of the process have informed government thinking and been taken into account in any resultant policy decisions (paragraphs 22-25).
6. The revised *Guidelines 2000: scientific advice and policy making* should reflect OST's guiding principles for the government's approach to public dialogue on science and technology (paragraphs 26 - 31)
7. Sufficient resources (funding, staff expertise and time) must be in place before government commits to any dialogue process (paragraphs 32 - 39).
8. Government should work with others, including research councils, universities, professional bodies and industry, to build a wider capacity to engage with the public through dialogue (paragraphs 33 - 36).
9. Government should create a mechanism that enables:
 - development of a corporate memory based on formal and informal evaluations of dialogue processes that have been used to inform science and technology policy;
 - sharing of this information across government and its non-departmental public bodies;
 - generation of a change in culture where dialogue is seen as a normal part of government's policy development processes on science and technology related issues (paragraphs 40 - 43).

Science as a driver of change

1. New scientific knowledge is being created at an unprecedented rate. It offers opportunities for new technologies and new understanding about the nature, health and welfare of individuals, society and the environment.
2. Governments worldwide recognise the potential of these developments to contribute to their national economies and quality of life. For this reason, EU governments have committed themselves to an increase in investment in research to 3% of GDP within the decade and the UK government has developed a ten-year investment framework for science and innovation¹.
3. Science is not only a driver of technological innovations, which strongly shape societal change. It has also become an increasingly important resource for public policy, where it contributes to responses to challenges as diverse as climate change, the ageing population and national security.

The issue

4. In the UK, public confidence in the way that science is used by government has been rocked by its handling of science-related issues such as BSE, GM and MMR. For some important and difficult issues, this decline in confidence, which may be part of a wider trend of disengagement from government and a decline in deference to authority, has begun to inhibit decision making. (The government's push for greater collaboration between universities and business may inadvertently serve to increase this problem, given the public's greater distrust of industry-funded scientists compared to academic scientists².) Unless this trend can be stemmed or reversed, there is a risk that many of the economic and social benefits that might otherwise flow from the government's ten-year investment framework for science and innovation will be jeopardised.
5. Three issues lie close to the heart of the problem. Firstly, government, and some scientists, are inclined to misrepresent science as certainty. This is far from the case for much of the new science that drives innovative technologies and underlies many policy initiatives. Secondly, public concerns have often been assumed to focus around the risks that arise from scientific uncertainty. Thirdly, scientific inputs to the policy making process often hide un-stated assumptions, for example based on personal values, that need to be questioned and openly discussed in debates about policy.
6. Public concerns can rarely be reduced simply to scientific issues. They are often a complex combination of: judgements about the way that scientific uncertainties have been handled and presented; questions about the assumptions that underlie judgements that are presented as purely scientific; valuations of costs and benefits; questions about controlling interests; and views on the kind of world we want to live in. By presenting issues such as the disposal of nuclear waste (see box 1) as primarily scientific, governments, industry and scientists have failed to engage with the diverse nature of much public concern, and have consequently failed to create acceptable public policy.

¹ *Science and innovation investment framework 2004-2014*. July 2004. HM Treasury/DTI/DfES.

² *Science in society: findings from qualitative and quantitative research*. March 2005. OST/ MORI.

Box 1: Radioactive Waste Management

In 1976 the Royal Commission on Environmental Pollution first drew attention to the need for the UK to find a long term solution for the storage of its civil and military nuclear waste³. Thirty years later, our radioactive waste remains in temporary surface stores.

The intervening years have seen several policies abandoned: sea dumping was halted in 1982; investigations into near-surface storage options were terminated in 1987; and a policy of deep disposal was frozen in 1997 when planning permission to construct an underground test laboratory at Sellafield was refused. Each of these decisions has been at least in part driven by high levels of public concern and significant activity from interest groups.

Nirex, the nuclear industry body established in 1982 and charged with identifying a long-term solution, did engage with the public during the 1980s. However, the engagement was focussed narrowly on issues around risk. Since 1997, there has been a change in approach and the issue has been redefined: from a technical challenge to be solved by engineers; to a social challenge that science and technology can help to solve. Further, in recognition of the importance of institutional arrangements to public confidence, Nirex was made independent in 2004.

UK national consensus conference on nuclear waste management (1999)

Nirex, OST and NERC jointly sponsored a consensus conference, which was overseen by an independent panel. Fifteen members of the general public were invited to take part. They spent time familiarising themselves with the subject before cross-examining experts from industry, government and environmental groups, and writing a report of their findings. Considerable effort was made to stimulate wider debate through the media, but coverage was limited, perhaps because of the pragmatic nature of the panel's conclusions and the challenge of persuading the media that this conference was different from other public meetings. The need for greater openness and transparency was a key theme throughout. Developments in government policy since 1999 do chime with the recommendations of the panel, including the establishment of CoRWM (see below), although there is insufficient evidence to demonstrate a direct link.

Committee on Radioactive Waste Management (CoRWM)

CoRWM, established by government in 2003, is tasked with reviewing the options for long term waste management in dialogue with the public and stakeholders, and recommending a publicly and technically acceptable solution. This is a major test for the value of extended engagement processes in resolving difficult, long-term issues and we will watch its progress with interest. CoRWM faces a number of particular challenges:

- Its advice must be credible with expert scientists and engineers as well as with the public. CoRWM's technical competence has already been challenged.⁴
- Public interest in nuclear waste has been most strongly expressed locally to possible storage sites. CoRWM needs to generate public interest in more abstract discussions.
- There are no plans at present to build new nuclear power stations in the UK, but there is ongoing speculation around whether government intends to start to exploring this option more seriously. A change in policy on nuclear new-build could mean that CoRWM has to operate in a very different public arena.
- CoRWM is under pressure from government to report more quickly than it would like to. Government initially asked CoRWM to report before the end of 2005. CoRWM judged that this timescale would not allow them to deliver a sound report; they proposed reporting in November 2006. It has now been agreed that they should report by July 2006.
- Two government departments have an interest in CoRWM's work: Defra, who have responsibility for nuclear waste; and DTI, who have responsibility for energy supplies. CoRWM has commented to us that its relationships with the two departments are rather different, we hope that this will not prevent government from making best use of their advice.

³ *Nuclear Power and the Environment*. 1976. Royal Commission on Environmental Pollution.

⁴ *Radioactive Waste Management*. 2004. House of Lords Select Committee on Science and Technology.

The need for deeper public engagement

7. The government routinely engages with experts and stakeholders to inform its thinking. Early in the development of policy, government may approach scientific advisory bodies for their input and meet both formally and informally with stakeholders from the public and private sectors. Later in the process, government may seek views on its proposals through written consultations⁵, which are publicly available but tend to attract responses only from stakeholders and those with a pre-existing strong interest in the area.
8. This engagement is necessary, but often not sufficient. The policies that emerge from it have sometimes been difficult or impossible to implement because they fail to take account of broader public concerns. They thereby feed an atmosphere of distrust that has, arguably, made policy development in some areas progressively more difficult. Policy makers and scientists need to be ready to reflect on and question the thinking that underpin their work.
9. A mood for change has been developing for several years, particularly since the publication of the House of Lords Science and Technology Committee report on Science and Society in 2000⁶. The government should now capitalise on this mood by ensuring that alongside input from an appropriate range of experts, meaningful engagement with the public is routinely used to inform the development of science- and technology-based policies
10. There have been a number of innovations by government that respond to this change of mood. There is a cross-government agenda to improve the quality and range of engagement activities carried out by government, supported by a network of 'consultation champions'. The Cabinet Office has published guidance on public involvement⁷; an Active Citizenship Centre has been established by the Home Office Civil Renewal Centre, which is promoting engagement at a local level; and the Office of Science and Technology has recently published a set of guiding principles for the government's approach to public dialogue on science and technology⁸.
11. We welcome these changes and endorse the principles published by the Office of Science and Technology, which should now be widely adopted across government and embedded within the government's wider efforts to broaden citizen participation. We suggest that it is now timely to create a cultural change in which more systematic approaches to public engagement and dialogue are adopted for science-driven issues. We believe that they will prove to be more efficient means of developing broadly acceptable policies for issues where the problem of public consent is real, and which cannot readily be sidestepped by a quick fix or political sleight of hand.

⁵ Since March 2004, government departments and their agencies have issued over 1200 written consultations. See www.consultations.gov.uk

⁶ *Science and society*. 2000. House of Lords Select Committee on Science and Technology

⁷ *Viewfinder: policy maker's guide to public involvement*. Cabinet Office. 2002.

⁸ *Annex B. Response to the Royal Society and Royal Academy of Engineering report: nanoscience and nanotechnologies: opportunities and uncertainties*. 2005. DTI.

Deliberative public engagement

12. We are interested here in how engagement with the public on science and technology based issues is to help government develop and shape policies that carry broad public consent. *Engagement* is widely used as an umbrella term to encompass a great diversity of activities and processes, from visits to science centres to lay membership of advisory panels. We are concerned with those processes that: on the one hand enable the public to act as better informed citizens and thereby inform democratic decision making; and on the other enable those charged with decision making to be more aware public interests.
13. What is needed are structured processes that create a space in which the public, policy makers, stakeholders and experts can engage in deliberative dialogue. These processes of dialogue should⁹:
- provide a forum for reflective, considered and informed discussion between people with a range of views and values. Structured conversations between experts, non-experts and policy-makers can permit all to re-evaluate their perspectives and assumptions in the light of those of others, evolve their thinking, and explore areas of mutual and convergent understanding.
 - engage a diverse range of people. In particular, to engage with people who have no strong pre-existing interest in the area and so enter the discussion with a fresh perspective that helps to open up debate, and avoids capture by any special interest groups.
 - stimulate exploration of the interconnections between scientific, economic, social, ethical and environmental issues, and identify the point at which an issue (for example on economic priorities or acceptable levels or risk) becomes essentially political.
14. Dialogue processes may not produce a consensus view but, by creating a space for discussion, they enable a constructive exploration of ideas and assumptions, and identify where progress can be made. This should ease the process of policy development and enable better policy to be made more quickly. Dialogue processes must not be used as an excuse to hold up decision-making where government has a responsibility to act. **The purpose of dialogue is not to determine but to inform policy. It does this by challenging the thinking of policymakers and scientists who contribute to policy making, as well as that of the public stakeholders and special interest groups. Government must retain responsibility for decision-making.**
15. While many may be sceptical of government's desire for genuine, deliberative engagement, the more that dialogue processes are used, the more will their credibility grow. We believe that a presumption by government for dialogue will have two effects. It will have a **foreground** effect of increasing the probability of public acceptance of specific policy decisions, and a **background** effect of changing the culture within which policies are developed. This will help to create an environment of greater trust in the processes of science-based decision making, which in turn may diffuse some of the tensions and suspicions surrounding individual issues.

⁹ There are a number of techniques, some more established than others, that are designed to facilitate such dialogue. They include consensus conferences, citizen's juries and deliberative mapping, each of which will prove appropriate in different situations, according to the objectives and context of the process. For a description of techniques see *Viewfinder: policy maker's guide to public involvement*. Cabinet Office. 2002.

A framework for effective dialogue

16. We recommend that **government at the highest level should adopt an explicit framework for the use of public dialogue to inform science and technology related policies.** We suggest a framework that has five parts, with mechanisms for:
- early identification of emerging issues where an investment in public dialogue is likely to bring significant benefit;
 - buy-in by the relevant minister to a process of dialogue on that issue together with a clear statement of its purpose, and commitment to a reasoned explanation of the way in which dialogue has informed any resultant policy;
 - identifying a structure of governance that is appropriate to the issue;
 - allocating appropriate resources;
 - learning from the experience of successive dialogue processes and thereby improving them.

Identifying issues

17. Government needs mechanisms for identifying those science and technology related issues where an investment in public dialogue is likely to bring most benefit. In box 2 we suggest some criteria for identifying issues appropriate for dialogue.
18. There is a spectrum of issues where government is most likely to find public dialogue a useful process, ranging from unresolved “legacy” areas with a long history of controversy about appropriate policies (such as the disposal of radioactive waste, box 1, and GM, box 3) to issues in new, emerging areas of science and technology (such as nanotechnology and brain science) where the trajectories of development and application are not yet clear. One purpose of dialogue that anticipates emerging issues is to ensure that, as far as possible, these do not become legacy issues for the future. At the same time, greater upstream engagement with the public about the implications of new science and technologies must avoid impeding the creativity of UK science.

Box 2: Proposed criteria for consideration in selecting priorities for public dialogue in science and technology.

Core criteria

- The envisaged development in science or technology is feasible OR there is a significant societal issue that could be addressed using potentially controversial existing technology.
- Potentially controversial ethical issues arise around the conduct of the scientific research, the use of the technology and/or the wider impacts on society. For example: the benefits and risks to different parties (e.g. individuals, society, government, industry) are inequitable; the benefits to individuals are unclear; individuals may have limited or no choice over their use of the technology; risks fall to particularly vulnerable groups.
- The timetable for the development of policy allows for a dialogue process to inform developments.

Additional criteria

- There is significant uncertainty over the risks to human health or the environment.
- Interested parties from science, industry and civil society hold polarised, and apparently fixed, views in the area.
- New regulatory or governance procedures may be needed.
- There are questions over the desirability of the new technology.

Box 3: GM food

In early 1996 two UK supermarkets introduced a GM tomato paste, the first GM product to be sold in the UK: it was clearly labelled; was offered as an additional and slightly cheaper choice alongside non-GM products; and sold briskly. Some would have interpreted this as a sign that GM foods would be broadly accepted in the UK.

Two years earlier, in 1994, the Biotechnology and Biological Sciences Research Council had funded the first UK consensus conference on plant biotechnology. Following a similar structure to the conference described in box 1, the panel's report recognised potential benefits of GM crops but also raised concerns, which included: the need for clear labelling of GM products to enable consumer choice; concerns over possible risks to human health and the environment; questions over whether the needs of developing countries were being adequately considered; and the need for effective regulation.

The findings from the consensus conference were highly prescient, but there was no mechanism for them to be fed to policy makers. The nature and scale of public opposition (which grew steadily from late 1996 when the first shipments containing an unlabelled mix of GM and conventional soya arrived in Europe from the US, and the link between BSE and variant CJD was established) caught government and industry by surprise. By 2001, when the Agriculture and Environment Biotechnology Commission (AEBC) recommended that the government hold a public debate to consider the role of GM crops in UK agriculture in the future, GM was firmly on public, media and political agendas and positions were highly polarised.

The *GM Nation?* public debate took place in 2003 under the direction of an independent steering board and in parallel with a science review and economic cost-benefit analysis. It generated unprecedented interest: nearly 700 local meetings were organised across the UK and over 35,000 feedback forms were completed, far exceeding the expectations of the steering board. However, while the process largely met the objectives set out by the steering board it is not generally regarded as a 'success': there was widespread suspicion from the outset that government had already decided to proceed with the commercialisation of GM crops and that the debate was no more than a smokescreen. This was exacerbated by a lack of clarity from ministers on what they wanted to achieve from the debate and a reluctance to commit to responding to the report of the debate. Further, there was a perception that the open meetings were attended primarily by those with strong, pre-existing views that were unrepresentative of the broader population. With the benefit of hindsight, it could have been more useful to government if the debate had occurred 10 or even 20 years earlier, providing that government had allowed the outcomes to influence its actions.

Both the steering board and the government have published reflections on the lessons learned from the process. These included:

- The relationship between the steering board and government was strained throughout, and made the process difficult for both parties.
- The steering board judged that the budget of £500k (doubled from an original £250k) was insufficient to provide the level of engagement and associated publicity envisaged by government. This is not accepted by government.
- The time from appointing the steering board members to publishing the report was 12 months; the steering board believe that 2 years would have been more realistic, allowing time to clarify objectives and run a full procurement process to appoint a skilled and experienced managing agent.
- The steering board suggest that the 'narrow but deep' element, which ran in parallel with the open debate, should have been expanded. This involved 80 people, chosen to broadly represent a typical cross-section of the wider population, in more in-depth discussion of the issues. This element was designed to act as a control to the wider debate, where the participants were self-selecting. The small discussion groups elicited a broader spectrum of views and allowed a more sophisticated analysis.

Box 4: Human fertilisation technologies

In 1978 Louise Brown, the UK's first 'test tube baby', was born. This stimulated debate about assisted reproduction and the acceptable uses of embryos created outside the body. In recognition of the complex social, ethical and legal implications of potential developments in the field of human assisted reproduction, a Committee of Enquiry into Human Fertilisation and Embryology was established in 1982, chaired by the philosopher Dame Mary Warnock.

The Warnock Committee took written and oral evidence from hundreds of interested individuals and organisations and its recommendations, published in 1984, were implemented more-or-less in their entirety through the Human Fertilisation and Embryology Act 1990. The Act established the Human Fertilisation and Embryo Authority to regulate IVF treatment and research on human embryos. While it has faced some challenges in this fast moving area of science, most notably when the technique used to clone Dolly the sheep was developed, the principles it set out remain in place and appear to have broad public support. Particularly notable is the acceptance of the cloning of human embryos for therapeutic research, in marked contrast to the policies in some other countries such as the US and Germany.

The work of the Warnock Committee, and the acceptance of its recommendations by government, is frequently cited as an example of how the creation of public policy in difficult areas of science and technology can be eased by starting early. However, while the Committee addressed some difficult issues, there are some factors that may have made their task easier, including:

- There is a clear potential benefit to individuals offered by developments in IVF and through medical research on embryos and embryonic stem cells.
- Individual members of the public have a choice over whether to use IVF treatment.
- There are a range of single interest groups, arguing from different perspectives. For example, some religious groups believe strongly that it is unacceptable to research on embryos or embryonic stem cells, while some medical charities, such as the British Heart Foundation, Cancer Research UK and the Parkinson's Disease Society actively support such research.

19. Dialogue processes are well-suited to exploring emerging issues. They stimulate debate, generate ideas and tease out the potential nature of public concern before polarised positions are taken up and before policy needs to be developed. They can also help inform the research agenda, and they give confidence that public concerns will be addressed. Government is then better placed to create policies and regulatory mechanisms for which they can be confident of broad support. Anticipation of the ethical and technical issues surrounding emergence of human fertilisation and embryo technologies by the Warnock Committee (see box 4) is frequently cited as an example of how early consideration and debate can ease policy development.

20. The recently established Centre of Excellence in science and technology horizon scanning, co-ordinated by the Office of Science and Technology, provides government with a ready-made mechanism for identifying emerging areas of science and technology for which dialogue might be appropriate. We are particularly pleased that the Centre has an explicit remit to inform the Government's strategy for public engagement with science.

21. We recommend that **government should establish clear criteria for identifying and prioritising areas that could usefully be explored through dialogue processes. These will range from longstanding areas of controversy to new,**

emerging issues. This role could be taken on by the new Centre of Excellence in science and technology horizon scanning.

Ministerial buy-in and commitment to dialogue

22. There must be a clear understanding, articulated and shared by relevant ministers and officials across government, of the purpose of any specific dialogue process. If this is not done, the entire process may be compromised and, rather than easing the process of policy development, could make it more difficult.
23. This need for clarity is particularly important in the case of long-standing, unresolved legacy issues where the dialogue process may simply open up a space for a more constructive discussion than had been possible previously. But successful dialogue does not necessarily require the final objectives to be stated at the outset, indeed this may not be possible for many emerging issues. However, there does need to be clarity about the purpose of each stage in the process.
24. Clarity about the objectives of a dialogue process will not only make the dialogue more productive, but will be helpful to government in communicating its objectives. Most dialogue processes involve small numbers of people and, depending on the approach, may not involve stakeholders and interest groups. If government wants to generate confidence in the processes that it uses to develop policy, it needs to be open and clear about its purpose. It is also vital that a reasoned statement of the role that dialogue has played in government thinking and any resultant policy development is made clear. A process of dialogue that appears to be ignored in the process of decision making will rapidly lose credibility and be ignored by the public.
25. We recommend that **the sponsor of any dialogue process should state publicly:**
 - **the purpose of the process;**
 - **when and how they will publish a report of the process;**
 - **how the results of the process have informed government thinking and been taken into account in any resultant policy decisions.**

Governance

26. Governance arrangements for any dialogue process must be designed in a way that gives the process credibility. There are three key governance roles (see box 5 for illustrations):
 - **Sponsor** – takes responsibility for setting the overall objectives for the process and uses its outputs in developing policy. The sponsor is likely to be one or more government ministers and their departments, but could also be a non-departmental public body (such as a research council or advisory committee) that has a remit to engage with the public in conducting their work.
 - **Directors** – oversee the dialogue process and ensure that it is credible. The directors may be a group convened specially for the purpose or be a pre-existing group. They could sit within the sponsor body or at arms length from it.
 - **Contractors** – run the dialogue activities. Likely to be one or more external contractors with expertise in the area of public dialogue.

Box 5: examples of governance models			
Dialogue process	Sponsor	Directors	Contractors
Plant Biotechnology 1994	BBSRC	BBSRC/Science Museum	Science Museum
Radioactive Waste Management 1999	OST, NERC, Nirex Ltd	Independent steering panel – none of the sponsors were represented	UK CEED
GM Nation? 2003	Defra	GM steering board (independent committee)	COI, Corr-Willbourn,
Sex selection 2003	Department of Health (DH)	Human Fertilisation and Embryo Authority	MORI , Counterpoint
Biobank 1999 - 2003	Wellcome Trust, MRC, DH	Wellcome Trust, MRC, DH	Cragg Ross Dawson, PSP, OLR
Energy 2003	Cross government: DTI, Defra, DfT, DTLR	Cross government: DTI, Defra, DfT, DTLR	IPPR, UK CEED, New Economics Foundation, Dialogue by Design
Research agendas in agricultural biotechnology	Agriculture and Environment Biotechnology Commission (AEBC)	Agriculture and Environment Biotechnology Commission (AEBC)	Opinion Leader Research
Radioactive Waste Management 2004 - 06	Defra	CoRWM (independent committee)	Various: to be appointed
Nanotechnology 2005 -	Nanotechnology Issues Dialogue Group (cross government officials' committee)	Nanotechnology Issues Dialogue Group (cross government officials' committee)	Various: including grants awarded through Sciencewise and an ESRC funded project.

27. Where it is important that the process is seen to be objective, for example on high-profile issues with well-established and vocal interest groups, the directors will need to be independent of the sponsors (see Box 1 on CoRWM and box 3 on GM Nation?). In less controversial areas, the sponsor and director could be the same body. This could have the advantage of enabling policy makers in the sponsor body to be more involved in the process and may allow a more productive dialogue to develop between policy makers, the public and experts.
28. Some government advisory bodies have a standing remit to engage with the public in developing policy advice to government (for example, the Human Genetics Commission, the Chemicals Stakeholder Forum and, for some aspects of their work, the Environment Agency). They could then become both sponsor and director of a

process. This approach embeds the use of dialogue within government's advisory structures and may be appropriate for a wider range of scientific advisory bodies as a way to enable experts to gain a broader understanding of the issue.

29. OST is currently reviewing the guidelines that set out the key principles that government departments should apply to the development and presentation of scientific advice for policy making. These should reflect the new mood for dialogue.
30. We recommend that **each instance of dialogue should have clear governance arrangements associated with it, which clarify the roles of the different parties: sponsor (responsible for setting objectives and using the outcomes of the dialogue process); directors (to oversee the process) and contractors (to manage the process).**
31. We recommend that **the revised *Guidelines 2000: scientific advice and policy making* should reflect OST's guiding principles for the government's approach to public dialogue on science and technology.**

Resources

32. The resources needed to run an effective dialogue process fall into three main categories: financial, staff skills and time.

Finance

33. The financial cost of dialogue depends largely on the governance arrangements, the scale of the activity and the method, all of which need to be decided on a case-by-case basis depending on the context and the objectives (see box 6).
34. In some cases, particularly for high profile legacy issues, the government may decide that a large-scale national process that is open to all and overseen by an independent body, is necessary if the process is to be credible. This is an expensive option that can be difficult to manage, as illustrated by GM Nation? and CoRWM, and must be resourced properly if it is to be productive. In other cases, where issues are less polarised, smaller scale processes that gather social intelligence from a smaller number of people, but could be publicised more widely, may be judged appropriate. It is worth noting that the steering board for GM Nation? found the smaller scale 'narrow but deep' part of their process to be particularly valuable (see box 3).
35. Government may want to seek co-sponsors who would contribute funding in return for being able to shape the objectives of the dialogue so that it could inform their own work. This would also help to build a wider capacity to engage in constructive public dialogue. OST's Sciencewise grants scheme is a first step in the right direction (see box 6). The involvement of a range of sponsors, particularly where they include industry, may raise additional public concerns about trust and there will be a greater need for a clear separation between the sponsors and the directors (for example, see consensus conference on radioactive waste management, box 1).
36. We recommend that **government should work with others, including research councils, professional bodies, universities and industry, to build a wider capacity to engage with the public through dialogue.**

Box 6: examples of the costs of engaging in public dialogue

The examples shown here have been chosen to illustrate the range of costs, from small scale one-off events to larger scale, longer term processes.

Research agendas in agricultural biotechnology

A three stage process based on deliberative workshops involving lay members of the public, scientists, farmers, and field advisory staff who would not usually have a voice in research decision making. Funded by the AEBC. Cost ~£60k.

Consensus conference on radioactive waste management (see box 1)

Funded by Nirex Ltd, OST and NERC. Cost £100k, excluding evaluation and management time.

Sciencewise

Sciencewise is a programme launched by OST in 2004. There is a budget of £1.2million over two years to provide match funding for projects that bring public dialogue on science and technology into policy. An independent steering panel has assessed bids and made recommendations to government on awarding grants. In the first round, Sciencewise awarded ~£500k to seven projects, with partnership funding from a wide range of organisations taking the total to ~£1.3m.

GM Nation (see box 3)

The steering board estimated that the total figure for all costs related to GM Nation? was around £0.75m to £1m, which includes the costs to local authorities and others who organised local meetings and the cost of an independent evaluation that was carried out under the Understanding Risk Programme, funded by the Leverhulme Trust at around £75k. The costs to government included £500k programme costs, management fees paid to COI, identified support costs of £138k, and the cost of secretariat and others officials' time.

CoRWM (see box 1)

CoRWM has been allocated a budget of £4.8million over 4 years, of which £1.5m is for public engagement activities, £0.8m on programme management fees, £0.7m on specialist and technical reports and £1.3m on members fees and expenses. These figures exclude the cost of running the secretariat.

Skills

37. If money is to be spent effectively, officials need to understand firstly how public dialogue can inform policy and then to have the knowledge and skills to be able to commission appropriate and high quality dialogue processes. We discuss further how this capacity can be developed below (see paragraphs 40 - 43).

Time

38. The work of the Warnock Committee (see box 4) took place over two years and was followed by six years of discussion and debate involving government and parliament before a new Act was passed. This period of wider debate, which made a much larger number of people aware of the issues considered by the Committee, may have been crucial to the final outcome. In contrast, the GM Nation? steering board was given one year to deliver its report, which they judged to have compromised the process, and government decisions followed close behind. CoRWM are now being placed under similar pressure. By having a process for identifying emerging issues that would benefit from exploration through early dialogue, government should be able to plan a timetable whereby public dialogue sits comfortably alongside the policy development timetable.

39. We recommend that **sufficient resources (funding, staff expertise and time) must be in place before government commits to any dialogue process.**

Evaluation and learning

40. Government and other public bodies have started to experiment with using dialogue to inform science- and technology-based policy. Although these early experiences should be used to inform the approach to future dialogue exercises, enabling government to continually improve its practice, we have been struck in the cases that we have explored by the lack of learning from experiences between and even within organisations.

41. If government is to develop the capacity to use dialogue effectively it needs to develop a corporate memory of past experience that will enable collective learning. We suggest that the basic requirements for establishing this capacity, which should draw on experience from within and outside the science and technology arena, are:

- the evaluation of both the process and impact of any dialogue process. We regard informal evaluation and reflections on lessons learned, as published by the GM Nation? steering board and, separately, by Defra, to be as valuable as formal evaluation.
- a central resource that draws together evaluations and case studies, and makes this information easily available to others. The primary audience for this information would be government departments and non-departmental public bodies who are interested in using dialogue to inform science and technology policy development. But other bodies, including industry, are also likely to find such a resource helpful.
- proactive championing of the use of dialogue to inform science and technology based policy in government. A stronger knowledge base is not in itself sufficient to generate the culture shift needed in government if it is to use dialogue as a normal and effective part of its engagement processes.

42. These functions could be carried out by: a small unit within government, perhaps working alongside the Horizon Scanning Unit; an existing independent body; or an independent body established specifically for this purpose. Decisions about the most appropriate structure should be taken by government, but we observe that change is most likely to be achieved if the push comes from within.

43. **We recommend that Government creates a mechanism that enables:**

- **the development of a corporate memory based on formal and informal evaluations of dialogue processes that have been used to inform science and technology policy;**
- **the sharing of this information across government and its non-departmental public bodies;**
- **the generation of a change in culture where dialogue is seen as a normal part of government's policy development processes on science- and technology-based issues.**

This report was prepared for the Council for Science and Technology by a subgroup comprising: Professor Sir John Beringer, Professor Geoffrey Boulton (convenor), Professor Janet Finch, Sir Martin Holdgate (co-opted member), Sir Paul Nurse, Professor Kathy Sykes, Professor Brian Wynne (co-opted member). Secretariat support was provided by Dr Jacqui Russell. The subgroup are grateful to all those who took the time to share their thoughts with them.

A report commissioned by the subgroup to support their work is available from www.cst.gov.uk: *Talking policy: four cases studies examining public dialogue in science and technology policy*. 2005. RAND Europe.