Evaluation of Sciencehorizons

Final report

Diane Warburton
December 2008

Shared Practice
11 Clifton Street, Brighton BN1 3PH
01273 774557
www,sharedpractice.org.uk

Contents

1 Introduction

In May 2006, the Sciencewise programme (part of the Department for Innovation, Universities and Skills - DIUS) commissioned a project to explore the public's views on the wider implications of the themes in science and technology that had emerged from the strategic horizon scanning work led by the UK Government's Horizon Scanning Centre. Following stakeholder consultation and extensive planning and preparation, the Sciencehorizons public dialogue project was launched to the public in January 2007, and closed in June 2007.

The Sciencehorizons project was designed to use a variety of methods to bring together the public and scientists to discuss some of the key issues identified by the Horizon Scanning Centre. The issues were presented to the public within four main themes: minds and bodies, homes and communities, work and leisure, and people and planet. There were three strands of activities within the Sciencehorizons project: a small deliberative panel that met twice, facilitated group events and small self-managed groups.

These events were all supported by the same information, provided as printed information packs (including an interactive CD-ROM) and a website. The information pack was designed to stimulate and support discussion in the group events, and provide a framework within which group organisers and participants could send their responses to the overall Sciencehorizons project. The project was open to public input from January to June 2007 and all the responses from individuals and groups were posted on the Sciencehorizons website from August 2007.

The results from respondents to all three strands were collated and presented in an overall final report which identified the key issues for policy makers. This final report was presented at the BA Festival of Science in September 2007. The Sciencehorizons results were then collated with the results of the WIST (Wider Implications of Science and Technology) stakeholder consultation and presented to a seminar of national policy makers from across Government on 20 November 2007.

This was a uniquely broad public dialogue project, undertaken at a very early stage in the policy making process: the Horizon Scanning Centre had identified a series of potential themes for future policy on which public views were sought, rather than public views being sought on specific policy proposals or specific policy concerns. In order to capture the lessons from this unique project, and assess its effectiveness and value, the project included an independent evaluation study which worked alongside the project throughout.

This report presents the findings from the evaluation of the Sciencehorizons project, focusing on the three strands of events, as well as the information materials produced, as these were the elements of the process that potentially had the most lessons for future engagement work in this area. The report summarises the methodology of the evaluation, the purpose and objectives of the process, feedback on the main activities within each strand, considers the extent to which the objectives of the project and principles of good practice have been achieved, considers relationships between the project and the policy making process, summarises what worked well and less well overall, and identifies some issues and key questions raised by the project. The final section identifies some brief lessons for future practice in the light of these findings and presents final conclusions.

2 The evaluation study

2.1 Introduction

The Sciencehorizons project was a unique project among the initiatives funded by the Sciencewise programme as it was directly commissioned. The Sciencewise programme was therefore closely involved in the design and monitoring of the project. In addition, the secondary objectives of the project included increasing understanding of the value of public dialogue in shaping policy and decision–making in science and other policy areas, and improving understanding of how to engage large numbers of people in discussions and dialogue on these issues.

In order to ensure the experience was captured and analysed to contribute to increasing understanding of public dialogue in science and technology, it was important to capture the lessons from this project through a detailed independent evaluation.

The evaluation was designed to focus particularly on the three strands of events, as well as the information materials that were used in all three strands, as these were the elements of the process that potentially had the most lessons for future dialogue activities in the field of science and technology, and for the Sciencewise programme.

The evaluation does not assess the policy outputs or implications from the Sciencehorizons project in any detail; it focuses on the engagement processes and assesses the extent to which the activities met the objectives set, and complied with principles of good practice. Policy issues are touched on in this report, but only where relevant to assessing the effectiveness of the engagement process.

The evaluation was commissioned in May 2006, and was completed in January 2008. Details on the methodology are given in section 2.4 below.

2.2 Aims and objectives of the evaluation

A set of objectives for the evaluation was agreed in October 2006. These were:

- Determine the success of the Sciencehorizons project in meeting the objectives specified at the outset.
- Contribute to the body of knowledge about public engagement in science and technology, and to the development of evaluation of these processes
- Contribute to understanding among policy-makers, government etc about the value of public engagement
- Identify specific lessons for future public engagement in science and technology
- Involve participants from all parts of the process in providing data for the evaluation, to ensure that all perspectives are included in the final assessment.
- Provide data and analysis that can be incorporated into the overall final report of the Sciencehorizons project.

In addition, the evaluation was intended to consider the extent to which the Sciencehorizons project has met the Government's Sciencewise Guiding Principles for Public Dialogue on Science and Technology[1]. The full Sciencewise principles are given in Appendix 5.

[1] Office of Science and Innovation. The Government's Approach to Public Dialogue on Science and Technology. *Guiding Principles for Public Dialogue*. September 2006.

This report is designed to meet these evaluation objectives by describing the Sciencewise project activities in some detail, and assessing the extent to which the project met its own objectives and the Sciencewise principles for public dialogue on science and technology. This description and assessment is designed to contribute to the body of knowledge about public engagement in science and technology, and contribute to understanding among policy-makers, government etc about the value of public engagement. The report also specifically identifies lessons for future public engagement in science and technology. Participants from all three strands of the process have provided feedback in writing (through questionnaires at all three strands of events and questions within the general Sciencehorizons process), and through allowing evaluators to observe and undertake informal interviews at Strand 1 and Strand 2 events. In addition, data from the evaluation research was made available to be incorporated into various Sciencewise project reports.

Various additional questions were raised by members of the Oversight Group during the planning stages of the project (in January 2007) as potentially of importance to the evaluation. In particular, the Group raised questions around which of the themes identified in the Sciencehorizons project worked best to engage people, and similar matters of detail. Feedback on the materials in the following sections of this report answers some of these questions of detail but it has not been possible to come to definitive conclusions about broad issues such as which theme worked best because not all participants addressed all four themes in their responses and it is not therefore possible to compare responses across the themes.

Beyond these issues of detail, the questions raised by the Oversight Group were largely focused on three main issues:

- the extent to which the people who participated in the Sciencehorizons project could be seen to be representative of wider public opinion and therefore the extent to which this approach to public engagement is as 'valid' as representative survey work in terms of producing 'valid' data
- whether the data from the different strands of the project were qualitatively different
- what impact the project has had on policy, policy makers and policy making processes, and therefore what value public engagement has in supporting evidence-based policy.

These questions are addressed to some extent in section 10. However, it is important to stress that this evaluation was not designed to be a detailed social research study designed to fully address these complex questions, but to be a practical review and assessment of the project against objectives and standards of good practice in order to identify lessons for the future. However, the report does provide some suggestions for future evaluations that may provide more complete answers to some of these questions over time.

2.3 Approach to the evaluation

Evaluations of engagement can range in approach from a mechanistic 'audit' approach, focusing on quantitative assessment of achievement against formal targets or goals (largely statistics), to approaches that focus much more on 'learning' from the experience, focusing on qualitative description and interpretation of more 'subjective' data (e.g. open questions on questionnaires, interviews) to explain **why** and **how** certain outcomes were achieved.

The audit approach can be summarised as asking questions such as:

- have we done what we said we were going to do?
- have we met our targets (e.g. numbers of participants; reaching a representative sample of the population)?

The learning approach is more likely to ask questions such as:

- were the objectives we set ourselves the right ones?
- what have the impacts been on the participants, policy outcomes, our decision-making processes, etc?
- what have we learnt for the future?

The approach to this evaluation has used elements of both approaches. It focuses on a learning approach, while ensuring that the quantitative and audit elements required are also delivered (e.g. objectives met).

Therefore both qualitative and quantitative data were collected and analysed against a range of frameworks (i.e. the stated objectives of the engagement process, agreed principles of good practice). In this way, lessons for the future could be distilled from the evaluation research, as well as the evaluation analysis measuring the effectiveness and the overall achievements of the process.

The style Shared Practice adopts for evaluation is collaborative, so that key questions for the evaluation and emerging findings could be developed jointly with other members of the team. However, the evaluator also has responsibility for ensuring the independence and rigour of the evaluation process, and to reporting findings openly and honestly to appropriate audiences at appropriate times.

2.4 Methodology for the evaluation

The evaluation methodology was made up of the following elements:

- **Detailed design and planning of the evaluation**. This involved work with the Sciencehorizons project team and the Sciencewise programme to agree the detailed parameters of the evaluation and the programme of work, especially the main themes and questions for the evaluation.

- **Evaluation research**. This included the following:

    - **Review and analysis of all data** on the nature and quality of the process collected in participant responses to the project. The printed and online feedback forms that were used by participant groups to send in their views on the four themes of the project included a general question on the materials and process. The 222 responses to these questions were re-analysed for the evaluation.

    - **Development and use of questionnaires**. Evaluation questionnaires were distributed to all participants at the Strand 1 events (at the end of the second session), and to all organisers of Strand 2 and Strand 3 events. Detailed analyses of all these questionnaires has been undertaken; summaries of findings are in sections 4, 5 and 6 below, and detailed analysis are in the annexes to this report.

      There was a 93% response rate to questionnaires distributed to Strand 1 public participants, 78% from Strand 2 organisers, and 41% of groups participating in Strand 3. This response rate provides a good robust sample for analysis.

    - **Observation** of a sample of events, including informal interviews with a range of participants. Evaluators attended, observed and conducted informal interviews with the public at both days of the Strand 1 events, and four Strand 2 events. Evaluators also attended the final policy makers seminar on 20 November 2007, to observe the impact of the process on future policy plans.

- **Interviews**. The Shared Practice approach to evaluation usually involves interviews with all those involved in the process, to supplement data obtained from questionnaires, observation and informal interviews at events. In the initial planning stages of the project, it was expected that interviews would be undertaken with participants, organisers, policy makers and those commissioning and delivering the project.

  In practice, interviews were undertaken with four key policy makers in March 2008 to gain their feedback on the quality of the process and on the value of the exercise for them. In addition, informal interviews were undertaken with organisers and participants at events attended for observation purposes. However, there was such extensive data available from the various written sources (including questionnaires, written and online responses), requiring significant time for analysis, that it was not possible to interview public participants and group organisers in this case.

- **Analysis of data**. Quantitative and qualitative analysis of questionnaires and other data has been undertaken to provide statistics, overall qualitative feedback and some illustrative quotes from those involved. It was agreed that the final analysis for this report should focus on achievement of the agreed aims and objectives, and adherence to principles of good practice.

- **Final reports**. Initial findings from the evaluation were produced for a presentation on the project at the BA Festival of Science in September 2007, alongside the findings from the project in terms of policy implications. A first draft of the full final report was completed in January 2008 and was finalised in August 2008.

2.5 Background and context

The Sciencehorizons project was designed to bring together citizens, scientists and other experts, policy makers and other stakeholders to consider the issues raised by possible future directions for science and technology.

The issues considered by the Sciencehorizons project were based on an analysis of the topics emerging from two key scans published in 2006 by the Government's Foresight Programme's Horizon Scanning Centre[2]: the Sigma Scan, which covers future issues and trends across the full public policy agenda, and the Delta Scan, which is an overview of future science and technology issues and trends. The aim of the Horizon Scanning Centre's work is to inform Government decision-making, to provide the strategic context to horizon scanning activity in Government departments, and to identify the implications of emerging science and technology to enable others to act on them.

The Horizon Scanning Centre's work includes the Wider Implications of Science and Technology (WIST) programme[3], which is an expert and stakeholder appraisal designed to explore the wider implications of new and emerging areas of science and technology. The Sciencehorizons project was designed to provide a public-facing engagement process to add a different dimension to the continuing work of the WIST programme.

There were close connections between the Sciencehorizons project and the WIST programme throughout, including attendance of the Horizon Scanning Centre's science writer at various Sciencehorizons events, and reports on the progress of the Sciencehorizons project were made to various WIST stakeholder workshops during the course of the project. There were also individuals on the Sciencehorizons Oversight Group and Project Board who were involved in the WIST programme. All these connections helped ensure that the emerging findings from the Sciencehorizons project were fully integrated into the WIST programme activities.

[2] www.foresight.gov.uk/Horizon%20Scanning%20Centre/index.asp

[3] www.foresight.gov.uk/Horizon%20Scanning%20Centre/WIST.asp

The WIST programme informs the Government's strategy for public engagement with science to identify at the earliest possible stage where potential safety, health, environmental, ethical, regulatory and social (SHEERS) issues may arise, and advises on how these might be addressed. The SHEERS issues informed the work by the Sciencehorizons project to 'cluster' the issues emerging from the Sigma and Delta scans and guide the production of the information and discussion guidance that would enable the public to engage in a useful dialogue.

There were initially eight clusters of issues emerging from the scans, which were seen to have the potential, as enhancers or disruptors, to transform the delivery of public services, challenge society and / or affect wealth creation and the nation's security and vital interests over the period to approximately 2015 - 2020.

This timescale and set of questions formed the context for the issues considered in the Sciencehorizons project. The eight clusters of issues were, in summary:

- Advanced materials and robotics
- Body and mind sciences
- Energy technologies
- Information handling and knowledge management
- Nanotechnologies
- Network interactions
- Security
- Sensors and tracking.

The eight clusters of issues included a total of 61 different areas of science and technology, which was felt to be too many to use for a public engagement exercise. The Sciencehorizons project team therefore ran a workshop early in the project planning stage (in August 2006) to work with a group of stakeholders (especially those from the field of science communications) to develop a set of scenarios that would cover as many of the issues in the scan clusters as possible, but that would also be manageable in terms of public engagement activities.

As a result of those discussions, the Sciencehorizons project developed a public engagement programme around four themes, and within a timescale that focused around 2025. These four themes were used as the basis for all the information materials across all three strands of Sciencehorizons engagement activities:

- minds and bodies
- homes and communities
- work and leisure, and
- people and planet.

The Sciencehorizons project closed to public input in June 2007, and the full set of responses was published on the website in August 2007. The findings from the project in terms of policy implications were published as a final project report in September 2007, at the BA Festival of Science in York. This report has been published and remains available on the Sciencehorizons website. The findings in the Sciencehorizons final report were then amalgamated with the conclusions from the WIST process over the same period, to provide a consolidated set of findings that were presented to a workshop of policy makers from across Government held in November 2007.

This timing and policy background provided the overall context for the Sciencehorizons project. The policy process is described in more detail in section 8 below.

3 Aims, objectives and summary of activities

3.1 Introduction

This section provides a brief overview of the aims and objectives of the Sciencehorizons project, and an overall picture of the activities that took place. It also summarises the ways in which scientists and other stakeholders were involved in the planning and development of the project. Subsequent sections analyse each of the three Sciencehorizons strands of activities in more detail.

3.2 Aims and objectives of Sciencehorizons

The Sciencehorizons project aimed to comprise informed, deliberative dialogue processes bringing together citizens, scientists, policy makers and other stakeholders, working in partnership with the broader science engagement community.

The project's **primary objectives** were:

- to discover views about the issues raised by possible future directions for science and technology, from a broad set of participants;
- to inform policy and decision-making on the direction of research and the regulation of science and technology; and
- to help identify priorities for further public engagement on areas of science and technology.

Its **secondary objectives** were to:

- widen public awareness of the role of science and technology in shaping the future of the UK;
- improve public confidence in the Government's approach to considering the wider implications of science and technology;
- increase understanding of the value of public dialogue in shaping policy and decision–making in science and other policy areas;
- improve understanding of how to engage large numbers of people in discussions and dialogue on science and technology-related issues, particularly issues arising from new and emerging areas of science and technology;
- strengthen coherence and collaboration among science engagement practitioners.

This evaluation focuses on assessing the project's achievements of the primary aims, but does also comment on the extent to which the secondary aims can be shown to have been met (see section 7).

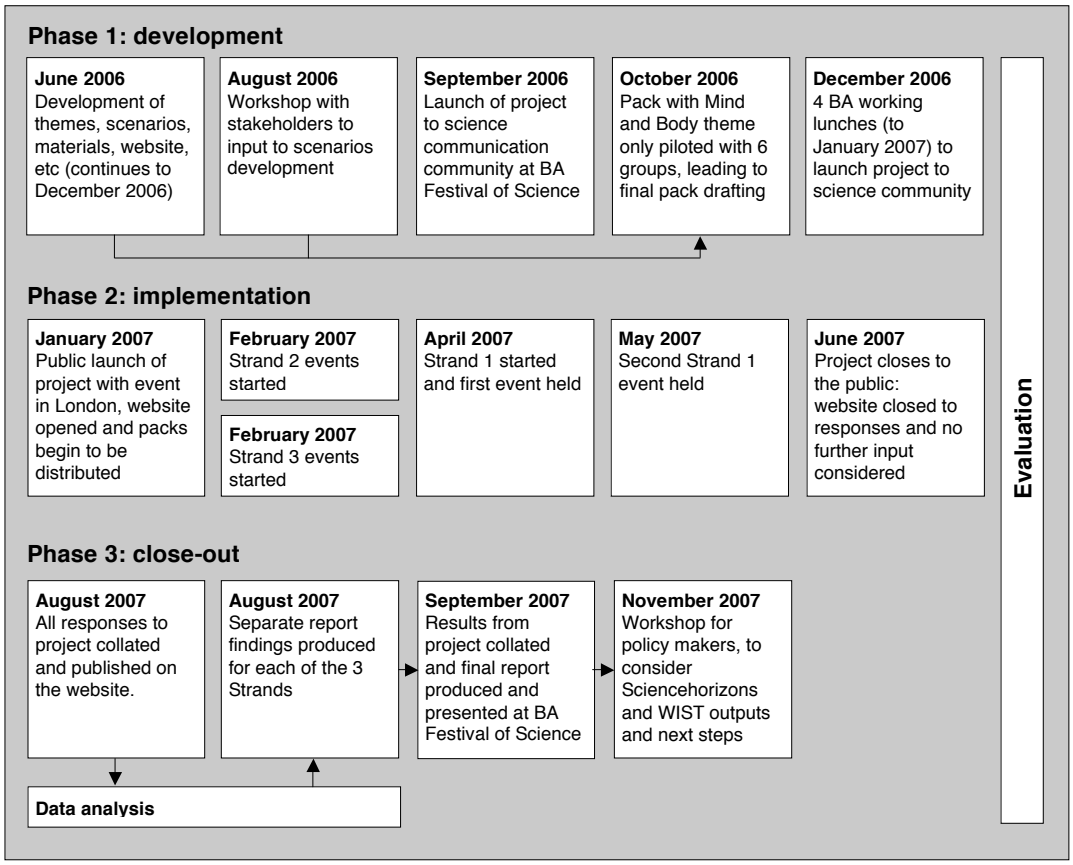
3.3 The main Sciencehorizons activities

The Sciencehorizons project was focused around a national series of public conversations about new technologies, the future and society. A series of events were held between January and July 2007. These were, in summary:

- Strand 1: A Deliberative Panel with a diverse group of some 30 members of the public and invited expert speakers, which met twice in Bristol.
- Strand 2: Facilitated Public Events in science centres and other community spaces, held throughout the UK.

- Strand 3: Self-managed Small Group Discussions run by community bodies throughout the UK such as schools, Women's Institutes, environmental and faith groups.

The main Sciencehorizons activities were as shown in the following diagram:



The events were supported by written materials, a website, funding for Strand 2 events, outreach, advice and other support.

All the events considered the same stimulus materials and addressed the same set of questions. The materials took the form of a set of 16 stories looking at how science and technology being developed now could affect our lives in the future. The 16 stories were clustered within the four themes of minds and bodies, homes and communities, work and leisure, and people and planet. The stories covered robotics, genetics, energy generation, communications, smart materials, stem cells, sensors and surveillance.

The Sciencehorizons project was run by a consortium led by Dialogue by Design, and comprising: Graphic Science, BBC Worldwide Interactive Learning, Think-lab and Ian Christie, plus Shared Practice as independent evaluator. Demos were also part of the consortium during the design and set-up phase (May 2006 to February 2007).

The main elements of the Sciencehorizons project were as outlined below.

3.3.1 Stakeholder involvement

There were four main opportunities for stakeholder engagement with the project from the very beginning of planning the project: through the Oversight Group and Project Board, the membership of both of which were by invitation only, through an initial stakeholder workshop and through conference presentations. These are all described in more detail below.

- **The Oversight Group**. The Oversight Group included scientists, representatives of stakeholder groups and science engagement practitioners. The purpose of the Group was to provide strategic advice on the development and delivery of the project, to share expertise and to identify opportunities for collaboration.

  The membership of the Oversight Group was as follows:

  Chair: Martin Earwicker, Director of NMSI

  Mr David Boyd, Director Global Public Affairs, GE Healthcare UK Ltd

  Dr Gail Cardew, Head of Programmes, The Royal Institution

  Ms Lindsey Colbourne, Dialogue Practitioner and Sustainable Development Commissioner

  Professor Ian Diamond, Chief Executive, ESRC

  Mr Philip Greenish / Ms Lesley Paterson, Chief Executive, Royal Academy of Engineering

  Sir Roland Jackson, Chief Executive, The British Association

  Professor Richard Jones, Joint Director of Research Engineering and Science, University of Sheffield

  Dr Clare Matterson, Director of Medicine, Society and History, Wellcome Trust

  Ms Kat Nilsson, Events Programme Manager, Dana Centre

  Dr Melanie Quin, Chief Executive, Ecsite UK (left after first meeting)

  Dr Nick Russell, Director of Humanities Programme, Imperial College

  Dr Angela Wilkinson, Director of Scenario Planning and Futures Research, James Martin Institute

  Oversight Group meetings were designed as facilitated sessions in order to maximise input from this group at key stages. Meetings were held at the Dana Centre in London.

  The first formal meeting of the Oversight Group took place on 22 November 2006. The purpose of that meeting was to enable to Oversight group members to:

  - contribute to the detailed process design
  - offer support and guidance on delivery of particular elements
  - provide input on the content of materials
  - offer advice on how the results of the project could influence policy making processes
  - offer advice on how the outcomes of the project could influence future engagement processes.

  The second meeting of the Group took place on 19 March 2007 and considered project progress to date, how the project fitted with the OSI's broader public engagement work, the plan for engaging policy makers, collation and reporting plans, media plans, and initial options for disseminating the findings from the project at the BA Festival in September 2007.

  It had been planned to hold further meetings of the Oversight Group, but too few Group members were available to enable the meetings to take place (only six members of the Group were able to attend the second meeting in March 2007).

  The Group was able to provide useful guidance to the preliminary stages to the project. However, the lack of availability of Group members to attend further meetings meant that this guidance was very limited in later stages.

- **Project Board**. The Project Board was the formal governance structure for the project, linking the Sciencehorizons project, the Sciencewise programme and the Government Department responsible (OSI through DTI at the beginning; DIUS at the end of the project). The role of the Project Board was to:

  - Monitor the overall progress of the project
  - Set the strategic direction of the project, ensuring its application to government as a whole
  - Contribute to the presentation and dissemination of the project outputs.

  The Project Board met twice yearly for the duration of the project, with communications via email between meetings. There was the potential to call extraordinary meetings, but these were not considered necessary. The Sciencewise programme provided the secretariat for the Board.

  The members of the Project Board were:

  Harry Woodroof (OSI Horizon Scanning Centre)

  Gary Kass (Head of Public Engagement, OSI)

  Tony Bandle (Head of Risk Policy, Cabinet Office)

  Siobhan Campbell (Office of the Government Chief Social Researcher)

  Ian Johnson (Head of Democratic Engagement Branch, Department of Constitutional Affairs).

- **Stakeholder workshop**. A national stakeholder workshop was held on 11 August 2006. The purpose of this full day workshop was to seek advice on the main content of the Sciencehorizons project, and particularly to generate ideas for potential scenarios arising from the technologies in the clusters from the Horizon Scanning Centre's scans. 30 stakeholder organisations took part, from the fields of science communication and public engagement.

  The workshop ran from 9am to 4.30pm and started with a short presentation on the Sciencehorizons project and the work of the Horizon Scanning Centre (HSC). The bulk of the day was divided into two: small group working by participants to consider potential future scenarios or narratives that could cover the issues from the HSC scans (with report backs into plenary); and plenary discussions about how individuals and organisations could get involved in the project.

  All stakeholders invited to the workshop were sent the transcript of the flip chart notes taken at the event. At the same time, these stakeholders were invited to the launch of the Sciencehorizons project at the BA Festival of Science, and were invited to run Strand 2 events (which some did). All stakeholders involved here were also added to the general Sciencehorizons mailing list so they could be updated on developments throughout the project.

- **Conference presentations**. In addition to the formal structures of the Project Board and Oversight Group, and the stakeholder workshop, the project team did take other opportunities to engage with stakeholders including the initial launch at the BA Festival of Science in Norwich in 2006, the formal launch at the Royal College of Art in January 2007, the presentation of the final results of the project at the BA Festival of Science in York in 2007, and the policy makers workshop (with WIST and Sciencewise) in November 2007.

There were therefore numerous opportunities for stakeholders to input views and ideas to the development and running of the Sciencehorizons project throughout the project's life.

3.3.2 Initial launch of the project

The project was formally launched to the science communications community. academics and others at the BA Festival of Science at Norwich in September 2006. Participants from diverse fields within science and technology heard about the project and were invited to register interest on the initial website.

3.3.3 Development of materials

The materials were developed between June 2006 to December 2006. The stories, information packs and website continued to be developed following the initial stakeholder workshop in August 2006 which helped identify the key issues under four themes: minds and bodies, homes and communities, work and leisure, and people and planet. In October 2006, a pack based on the single theme of Mind and Body was piloted with six groups.
The packs were then refined, and other themes completed. The pack was printed in December 2006, ready for the launch in January 2007.

The discussion pack was colourfully designed and illustrated and contained 16 scenarios, four for each of the four themes, designed to stimulate discussions among groups participating in the project. In addition to the printed pack, the same information was available on an interactive DVD.

The scenarios showed how personal individual situations could be affected by new scientific and technological developments. For example, under Mind and Body, the four scenarios were George and the Jogging Cap (a man with Alzheimer's Disease, whose clothes are electronically tagged and his cap directs him so he never gets lost); Ruth and the Tests (computer software for health checks); Roy and the New Heart (a new heart is grown so Roy can have a heart transplant); and Katie and the Doctors (a single mother with a daughter who is a wheelchair user but who could consider premium or standard 'enhancement' therapies with different costs attached). The stories were illustrated with pictures and quotes from the main characters and, on the back of each scenario, background information was given on the current state of the technology ('where are we now'), and where developments were happening.

Each theme also had a four-page question sheet asking participants to respond for the things they 'like' or 'dislike' about the technology in the story, and why, and which was most important.

The pack also included a brief step-by-step guide to using the information and completing the question sheets, plus an introduction to the project and letting participants know that the results of the project would be presented to Government in 2007 to help Government understand how people feel about how science and technology could be used in future. Participants were directed to the project website to see what others had said in answer to the questions.

3.3.4 BA working lunches

These events were held in December 2006 and January 2007 to launch and publicise the Sciencehorizons project to science communicators and to provide some initial capacity building on different ways of engaging the public. 59 participants attended four lunches in Cardiff, Manchester, Edinburgh and Oxford. The BA run these lunches for their networks regularly, and agreed to devote four sessions to the Sciencehorizons project.

There was strong support for the involvement of the public in the sorts of issues of future science and technology being addressed through the Sciencehorizons project, although that was to be expected given the audience of science communicators (96% were already

involved in working with the public). However, there was also strong willingness to work through the Sciencehorizons project: 75% agreed that they were more likely to organise a Sciencewise Strand 2 workshop as a result of having attended the lunch.

In practice, evaluation analysis shows that seven of the organisations attending the lunches went on to run a total of 14 events, which is about 40% of the 18 organisations that did run the 36 Strand 2 events. This suggests that the working lunches were a very important element in encouraging the development of Strand 2 events. See section 5.3.1 and Annex 4 for more details of the working lunches.

3.3.5 Public launch

The formal public launch of the Sciencehorizons project took place at the Royal College of Art on 25 January 2007 with students from the RCA Interaction Design course demonstrating how the materials would work to stimulate and resource discussions. 10 students took part, plus the then Science Minister, Malcolm Wicks, and Chair of the Sciencehorizons project Oversight Group, Martin Earwicker, of the National Museum of Science and Industry (of which the Science Museum, London, is part).

A media campaign was launched at this time, aimed at the mass media including newspapers and radio, with the aim of directing people to the website to find out where and when events were planned (Strand 2), and how to get packs for Strand 3 events. In addition, the project undertook extensive grass roots and community marketing focusing on Strand 3 events, through the projects database of local organisations (e.g. University of the Third Age, Women's Institutes, parish councils, student organisations, faith groups and civic society groups, and through the electronic mailings and newsletters of umbrella groups.

Articles covering the launch appeared in The Guardian and BBC Online, as well as in several smaller and more specialist publications. A video and photographs taken at the launch were posted on the Sciencehorizons website to illustrate the short article on the site explaining about the launch. Also, a podcast with Professor Kathy Sykes, Professor of Public Understanding of Science at the University of Bristol, was posted on the website in which she discussed public engagement in science in general and the Sciencehorizons project in particular.

A launch paper was also produced and published at this time, written by Jack Stilgoe of Demos (with Diane Warburton), to provide background to some of the contentious issues and potential policy implications of the project overall.

3.3.6 Launch of website and materials

The Sciencehorizons website was also formally launched, and information packs, teachers notes etc started to be distributed, on 25 January 2007. Visitors to the website could sign up for more information (September 2006 to January 2007), view and comment on the blog containing short news updates, view the calendar of Strand 2 events which included details of how to join those events by contacting the organiser, request information packs and teachers' notes to be posted to them, download pdf versions of the pack and teachers' notes, see the guide to running Strand 2 events, use the interactive version of the pack, and enter the results of Strand 2 and Strand 3 events.

The website generated 113,150 page loads and 8,914 unique visits between 25 January and 25 June 2007 (the closing date for responses).

3.3.7 Enabling fund

Additional funding was obtained from the OSI to set up an enabling fund to contribute to the costs of running Strand 2 events (e.g. venue hire, marketing, catering, travel expenses). The enabling fund for Strand 2 events was confirmed in September 2006 and publicised to potential Strand 2 organisers during October and November (via email and telephone). Applications began to be received in October 2006 (see section 5.2 for details of the fund).

3.3.8 Strand 1 - Deliberative Panel

The Deliberative Panel had 31 public participants on the first day (Saturday 14 April 2007); 27 of these returned for the second day (Saturday 12 May 2007). In summary, Strand 1 provided narrow but deep engagement.

See section 4 for details, and table below for summary:

Type of event in Strand 1	**Number of participants**	**Type of participants**	**Qualities of the approach**
Deliberative workshop with same group of people over two separate full days (Saturdays): 14 April and 12 May 2007. Programme designed and delivered by core Sciencehorizons team.	31 public recruited: 31 attended the first day; 27 attended the second day. Plus two scientists from local universities and four other experts to answer specific issues identified by participants.	Recruited as a cross-section of the public, with no formal background in science; plus scientists who made input and joined in with some discussions.	• Narrow and deep engagement with Sciencehorizons. • Cross-section of public new to science and technology. • Role of scientists focused on input of expertise. • Generous amount of time for in depth discussions and thinking. • Opportunity for participants to identify where they needed extra information and that being provided through inviting specific experts in those areas to attend. • Used scenarios and questions in project packs as basis for discussion. • Responses collected on the themes and fed into the overall process.

3.3.9 Strand 2 - Facilitated events

18 organisers ran 36 Strand 2 events that reached 842 individuals. This generated 97 responses to Sciencehorizons. In summary, Strand 2 provided wider, less deep engagement with a larger group than Strand 1. See section 5 for details and table below for summary.

Type of event in Strand 2	Number of participants	Type of participants	Qualities of the approach
Facilitated workshops run by science centres, museums, schools, Women's Institutes etc. Promoted through four BA working lunches, email networks, Sciencehorizons website, general publicity etc.	18 different organisations ran 36 events (usually lasting approx two hours), reaching 842 individual participants overall. A total of 97 responses were made to Sciencehorizons. The group size varied from less than 10 participants, to at least eight groups that had over 30 participants.	Largely those with an existing interest and involvement in science discussions; participants often already part of science communications networks or school / college groups. Could be described as 'interested public'. Almost all events had at least one scientist; some had three or four. Scientists took a variety of roles including making input, facilitating and joining in discussions.	• Wider and less deep engagement with the Sciencehorizons project than Strand 1, although some discussions touched on deep ethical issues. • Limited time for discussions. • Focus on existing networks / organisations with varying degrees of existing science knowledge. • Mix of scientists and other experts with lay people in a variety of roles including all discussing issues together as part of the group. • Used scenarios and questions in Sciencehorizons packs as basis for discussion. • Responses collected on the themes and fed into overall process.

3.3.10 Strand 3 - Self-managed small group discussions

78 groups ran self-managed small group discussion events that reached approx 2,400 participants. This generated 392 responses to Sciencehorizons. In summary, Strand 3 provided the widest, shallowest engagement with the largest group of people.
See section 6 for details and table overleaf for summary.

Type of event in Strand 3	Number of participants	Type of participants	Qualities of the approach
Small discussion groups run informally and self-facilitated by a range of groups. Sessions usually lasted about two hours.	78 different groups ran events (there is no detailed data on how many events took place), which reached approx 2,400 individual participants.	By far the largest single category of responses from schools: 257 out of 392 responses.	• Widest and shallowest engagement with the Sciencehorizons project, although some discussions touched on deep ethical issues. • Limited time for discussions.

Type of event in Strand 3 (continued)	**Number of participants**	**Type of participants**	**Qualities of the approach**
Opportunity to run events widely publicised through Sciencehorizons direct publicity to range of groups, discussion lists / boards, blogs etc.	A total of 392 responses were made to Sciencehorizons (often several from the same group, especially schools). 747 requests for packs; 4,000 packs sent out in total, plus 1,320 sets of teachers notes.	The next largest group types were environmental interest groups, the WI, humanist groups and U3A. Could be described as 'active public' rather than general public as most were already involved in a local group. Almost all groups had at least one person with a science or technology background and usually these people were members of the group.	• Existing groups with less direct links to science and science communications networks than Strand 2. • Used scenarios and questions in Sciencehorizons packs as basis for discussion. • Responses collected on the themes and fed into overall process.

By the time the project closed to public input, in June 2007, a total of 489 responses had been made in writing and online to the website from Strands 2 and 3 participants, from 114 groups or group events involving around 3,242 participants; adding the 31 Strand 1 participants gives an overall total of 3,273 public participants in the project as a whole.

3.3.11 Reports and reporting

The input from participants was recorded by the facilitators of the Strand 1 events and by the organisers of Strand 2 and 3 events. The facilitators of Strand 1 events were also the project team, so they could input the findings from those events directly. Organisers of Strand 2 and 3 events could send their record of public input by post to the Sciencehorizons project, or online via the Sciencehorizons website. Individual participants could also send in their own comments and answers. Full details of the methods of recording and reporting of the three strands are given in the separate sections below.

Overall, there were three main outputs from the national Sciencehorizons project in terms of reporting:

- **Website**. The complete set of responses from participants was published on the project website, grouped by the four topics. This included input from individuals, Strand 2 organisers and the summary and transcript reports from Strand 1 events. All these responses provided the basic data for the final report of findings.

- **Reports on each strand**. Reports were produced on the findings from each of the three strands of events. These were produced in August 2007. Each report summarised the activities within the strand, and the main findings from that strand.

- **The final report of findings**. The final Sciencehorizons report was presented at the BA Festival of Science in York in September 2007, and was published on the Sciencehorizons website.

  The launch of the report, and its key findings about public views on future science and technology issues, were publicised through the DIUS Press Office, and covered in the Sciencewise newsletter No 5, Autumn 2007, which had a wide distribution list across Government and public bodies.

The bulk of the report summarised the findings from the different strands within the process design used, following the structure of the process to present the findings from each element of the process. There was also an Executive Summary which presented headline findings from across the process as a whole. It also included a summary of the objectives and main activities of the project, and identified some cross-cutting themes and policy issues such as variations in findings between the strands, what participants brought to the strands, attitudes to science and technology across the three strands and where there was ambivalence or tensions around the issues.

The main findings from the project overall were shown to have been very similar from all three strands of the engagement activities, and across social class, gender, ethnicity and
age (although these were social distinctions that were only very broadly defined as there was not detailed information on the social background of Strand 2 and Strand 3 participants). However, there were some clear messages about the hopes (positive feedback) and fears (dislikes) among all participants. The issues that recurred throughout were that[4]:

- Participants broadly liked technologies that enhance:
    - harm prevention e.g. disease, crime
    - independence (e.g. for the elderly)
    - convenience
    - environmental gain
    - quality of life.

- Participants broadly disliked technologies that:
    - posed a safety risk
    - lead to loss of privacy and autonomy (e.g. through surveillance or data collection)
    - created over-dependence on ICT and robotics
    - threatened jobs and skills
    - lacked human interaction / undermined the human dimension and relationships
    - lead to social division (e.g. because of costs; fair access to technology was important to participants).

The report also concluded that the public had specific concerns around trust in expert authorities, and thus anxiety about the potential abuse of technologies, about the development of technology in order to make profits rather than in response to social needs, and about a lack of control over the direction in which science and technology was heading[5].

The findings from this final report were amalgamated with the findings from the wider WIST process including stakeholder engagement, and presented to the policy makers workshop in November 2007 (see 3.3.13).

[4] Taken from *Strands 1-3: Summary Report*, Dialogue by Design, September 2007 (pages 6-7); and Sciencewise newsletter No 5, Autumn 2007.
[5] Taken from *Strands 1-3: Summary Report*, Dialogue by Design, September 2007 (page 6).

3.3.12 Feedback to participants

The results from the project (the full set of responses from participants) were posted on the Sciencehorizons website in August 2007 (and see section 3.3.11 above on Reporting). This provided the opportunity for all participants to see the full record of the input that had been made by the public during the project.

The final report was made available on the Sciencehorizons website so that all participants could read it, and email alerts were sent to all participants so they knew the report had been published. Printed copies of the report were also produced, and distributed at the BA Festival in York in September 2007. They were also sent to key stakeholders (the Oversight Group, the Project Board and consortium partners), and were sent on request to others who asked for printed copies after they had been notified that results were available.

3.3.13 Final policy workshop

The issues around identifying appropriate ways that the findings from the Sciencehorizons project could be fed into Government policy making is described in section 8 below.

Eventually, the most appropriate focus for taking the findings from Sciencehorizons to policy makers was felt to be through a Sciencewise workshop held in November 2007, at which the results from the Sciencehorizons public engagement, and from the WIST stakeholder engagement, were amalgamated and presented to policy makers for discussion.

The seminar proved very popular, and was therefore held twice over the course of the day at the BERR Conference Centre in London. The two half-day workshops attracted a total of around 50 policy makers from across Government (from the 500+ invited). Each session lasted around three hours. The purpose of the workshop was:

- To share the results of the Sciencehorizons public dialogue work and place it in the wider context, demonstrating how it interacts with the WIST process
- To assess the issues resulting from the Sciencehorizons and WIST processes for appropriateness for public dialogue activity
- To help identify and frame and suggest timeframes for potential public dialogue on the emerging issues
- To introduce the online WIST mapping process which had recently started (see below for details).

The process for each workshop was as follows:

- Introductions and welcome from Sciencewise
- Overview of the Sciencehorizons process and how it fitted with the WIST process, by Pippa Hyam of Dialogue by Design
- Questions about public dialogue and the Sciencehorizons process to a panel of Karen Folkes, head of Sciencewise at DIUS; Harry Woodroof, leader of the WIST process; Pippa Hyam, Sciencehorizons process manager; Diane Warburton, Sciencehorizons evaluator; and Ian Christie, Sciencehorizons analyst and report writer.
- Discussions of the 16 key themes emerging from the joint Sciencewise / WIST findings, focusing on the potential activity around the issue, and the suitability of the issue for public dialogue. A background paper outlined the 16 themes.
- Prioritising the areas for public dialogue, and thoughts on phasing the work.
- Identifying how the priority dialogues could be taken forward
- Final observations (who else needed to be involved, next steps), thanks and close.

At the end of the workshop, the participants had identified the following clusters of issues that they felt were the highest priority for future public dialogue:

- **Data issues** (e.g. around DNA databases) including issues of security of data, privacy, sharing data around government, how data will be used.

- **Energy issues and tackling climate change**, including issues of shared responsibility between Government and citizens, leadership on the issues, energy security, energy efficiency etc.

- **Medical and health issues around an ageing population**, including issues of data collection and storage, use of robots for care, care practices using new technologies, advances in medicines, links with private suppliers of insurance, pensions and care, medical care, and individual responsibility for personal care, linked to issues of how to measure wellbeing.

- **Future uses of GM technology**. Although not as high a priority as the three issues above, participants felt this issue could be revisited through dialogue.

The workshops also produced a long list of all the issues, with details of which departments were (or may be) interested in taking dialogue further on these issues.

Finally, the workshop encouraged participants to take part in the online mapping exercise, and to encourage their colleagues to do so (see point 3.3.14 below).

The policy workshop was very effective as a mechanism for engaging policy makers in considering the findings from the Sciencehorizons project and WIST programme, presented as 16 key themes. About 50 individual policy makers from around 25 different Government departments and agencies attended, which was a much higher turnout than had been expected. The design of the event worked very well to present the findings from the programmes, to engage participants fully and to provide useful data to the Sciencewise programme about future priorities.

The briefing paper was very effective in summarising what these 16 key themes (and 5 - 6 subsidiary issues for each theme) were overall, clearly showing where they had come from in the different Sciencehorizons and WIST processes, and providing background briefing on why the issues were seen by public and stakeholders as important.

A brief review of the issues in this briefing paper and in the Sciencehorizons final report confirms that the issues from Sciencehorizons were generally well covered, although the emphasis in the briefing paper had necessarily changed to be more closely related to specific scientific and technological developments than was evident in the Sciencehorizons reports, where the messages were more strongly about underlying values and attitudes than responses to specific potential technological developments.

As a conclusion to the Sciencehorizons project, this workshop provided a very valuable 'home' for the findings to be presented.

However, as explained in detail in section 8 below, it is not possible to fully assess the impact and influence of the Sciencehorizons findings on final policy development and decisions, partly because no policy development or decisions have yet been taken on the issues raised, and partly because the Sciencehorizons input will be one evidence source among many used by policy makers to come to their decisions.

This is always a difficulty with evaluating public dialogue on national policy issues, but it is particularly so in this case as the issues being discussed are so far 'upstream' in the policy development cycle, and thus so far away from specific policy decisions.

3.3.14 Online mapping exercise

The final step in the Sciencehorizons project was the establishment of an online mapping exercise across Government. This exercise was launched in November 2007 and publicised at the Sciencewise workshop described above.

The purpose of the mapping exercise was to identify which of the 16 themes identified in the WIST / Sciencehorizons report relate to Government departments' current areas of interest and activities. Access to a special website was made available to anyone in Government or a Government agency. For each of the 16 themes, five or six issues had been identified in the collated report and, for each of these issues, the mapping exercise asked two questions which required only a tick box response:

- Does this issue lie within your department's area of interest?
- Is your department currently addressing this issue?

The mapping exercise was open for input from November 2007 to February 2008. The results were then collated and used to produce a map showing overlaps and gaps in coverage of the issues. The expectation was that this map would provide opportunities to identify and agree areas of work within science and technology policy development that may require further public or stakeholder engagement in future.

4 Strand 1: The deliberative panel

4.1 The purpose of the Panel

The purpose of the Deliberative Panel was to work in depth with a small group of people who would be given the Sciencehorizons information pack, and also additional material from invited experts.

The Panel was designed to provide a deliberative strand to the Sciencehorizons work: fully facilitated in depth discussions among a specially recruited diverse group of public participants who would have the time and space to consider the issues in some detail. The meetings were designed to enable the public participants to spend as much time as possible working in small groups with each other, to explore their own and each other's views on the issues presented.

The aim of the Panel was explained to participants as being:

- To understand the group's attitudes to new science and technology; and
- To use the findings to inform government policy on science and technology.

4.2 The nature of the Panel

The Panel met twice, for a full day each time: on Saturday 14 April 2007 and then again on Saturday 12 May 2007. Both meetings were held in Bristol city centre, in the At-Bristol science centre. The process is outlined below.

- **Recruitment**. 31 participants were recruited to join the Panel: 31 attended the first day and 27 of the original group attended the second day.

  A diverse mix of individuals was recruited to ensure good coverage of both men and women (13 men and 18 women took part), different ages (from 16 to over 70), a range of socio-economic backgrounds, black and minority ethnic backgrounds (24 participants classed themselves as White, six Black, and one Asian), disabilities (five participants said they had a disability), and urban and rural locations (all from the Bristol area: two from the village of Chipping Sodbury, 13 from the town of Yate, and 16 from various parts of Bristol city.

  The sampling and recruitment was thorough and the group that attended did provide a good diverse mix of the general public.

- **Incentives**. As is usual with deliberative engagement seeking a demographic cross section of the public, the participants were each paid £60 per day to take part.

- **Scientists involved**. The event was advertised at the University of Bristol and University of the West of England, inviting scientists to attend as participants; two attended the first session. In addition, the facilitators asked the public participants at the end of the first event to identify the issues on which they wanted to have more scientific input. The participants asked for experts on climate change, security, genetics and robotics. As a result, four experts in those specific fields were invited to and attended the second day.

- **The process for the first day: Saturday 14 April 2007.** Before the first set of discussions began, there were warm-up plenary sessions to introduce the Sciencehorizons project and the format for the day; to allow people to introduce themselves; and to invite reflection on how far people had noticed science and technology issues arising in news broadcasts and other media in the previous week.

The Panel was divided into four equal-sized mixed groups to discuss the Sciencehorizons stories and issues arising from each theme (based on the generic information pack). These groups held 30 - 40 minute discussions, led by a facilitator, in a 'carousel' process, so that each group could cover each of the four themes.

After lunch, four new sub-groups were assembled to discuss one theme each in greater depth. Each group then identified what they felt to be the particularly important issues. Plenary discussions then reflected on the materials and on the views expressed the earlier carousel. Finally, there was a brief plenary review of the day.

The organisers took the list of issues, questions and suggestions from this final plenary and invited four experts to come to the next meeting and discuss particular topics with the Panel (as above).

- **The process for the second day: Saturday 12 May 12 2007.** The aims of the second day, which took place one month after the first, were:
  - To see what effect more reflection and information (from expert witnesses) would have on people's views about science and technology; and
  - To see whether there were issues that cut across different areas of science and technology for the participants.

  The event began with welcoming the group and reminding them of the aims of the Sciencehorizons project and the four themes discussed last time; discussion was invited about issues that had stuck in participants' minds from the last meeting.

  Expert speakers addressed the group as a whole on the four issues that had been considered especially problematic and interesting at the first meeting and on which participants wanted expert input. The speakers were:
  - Steve Crane of Hewlett-Packard on cyber-security
  - Simon Roberts of the Centre for Sustainable Energy on climate change and carbon credits
  - Hilary Newiss of the Human Genetics Commission on genetic testing and information, and
  - Alan Winfield of the University of the West of England on robotics.

  After each presentation and plenary question-and-answer session, participants split into small groups to discuss the in depth information provided. The questions they addressed were:
  - Having heard the speaker, how do you now feel about the technologies discussed?
  - What concerns you?
  - What do you feel positive about?
  - On balance would you support the government putting public money into developing and using this technology?

  In the afternoon, plenary discussion resumed, focusing on how far people's minds had been changed, how and why; on the question of trust in government and other authorities on science and technology; and on what people now found most worrying and most exciting. The event concluded with a debriefing session.

- **Reporting and recording**. Facilitators kept detailed notes on flip charts of key points made by participants during events. This approach to recording works very effectively to support public dialogue as it provides a permanent visual record of points made, so participants can refer to it as discussions continue. Flip chart recording also enables participants to check and if necessary correct notes made by facilitators. Participants

here were reminded to check the flip chart record to make sure they agreed with what was being recorded as their views. This is a particularly valuable method of recording in public dialogue processes on complex and contentious issues, to avoid misunderstandings and misrepresentations of participants' views.

The delivery team used the flip chart notes to produce a report of the sessions which was circulated to Panel members soon after the events.

The results from the event fed into the final Sciencehorizons report. The report writer attended both Panel meetings, to observe first hand where the strongest feelings were on the issues being discussed. The reports from the sessions were then used to draft the final report.

4.3 The effectiveness and value of the Panel

The assessment that follows is based on observation of both days that the Deliberative Panel met, informal interviews at the events with participants, facilitators, experts and observers, and analysis of the questionnaire that was circulated to all participants.

Evaluation questionnaires were distributed to all public participants at the end of the second event only; it was considered most effective to ask participants for their feedback on their involvement overall, rather than after only one event. Separate questionnaires were used to gather information on the Panel's views on the content of their discussions. There was a 93% return rate of evaluation questionnaires (25 from 27 participants), which provides a good robust sample for analysis.

4.3.1 General feedback

The feedback from Panel participants was generally very positive indeed:

- **100% were satisfied** with the way the meetings had been run; of these, **64% were very satisfied.**
- **96% said they found the events enjoyable**; of these, 56% strongly agreed and no-one disagreed.
- **88% agreed that they were able to say everything** that they wanted; only one person disagreed.
- **92% agreed that all participants were treated equally and respectfully**; of these, 36% agreed strongly
- **88% agreed that no single view was allowed to dominate unfairly**; of these, too, 36% agreed strongly

From observation, these findings certainly reflect the enthusiasm and energy that participants invested in the discussions, and also the effectiveness of the facilitation (e.g. treating people equally and with respect). There was no sense that participants were going through the motions for their incentive fee.

There was a high quality of discussion, questioning and engagement with the issues as participants worked hard to understand and discuss the issues. There was a certain level of disagreement on some issues but all discussions were polite, people listened to each other's opinions and were able to respect those while disagreeing. The professionalism of the facilitation contributed to ensuring that the mood overall remained upbeat.

4.3.2 Recruitment and representation

Recruitment to the Panel was undertaken by a professional recruitment agency, and there is evidence that there was a good diverse mix of the general public in the participants in terms of age, gender, black and minority ethnic background, and socio-economic class.

There was also good coverage of people who had not been involved in a consultation like this before (88% of evaluation questionnaire respondents had not), and those who were not already involved in science and technology (again, 88% were not). For many observers, this lack of previous experience and knowledge is what they are looking for when they define the 'general public'. In this case, that criterion was clearly met.

One issue that was raised by one or two questionnaire respondents, and was mentioned in informal interviews at events, was that participants would have expected - and liked - more people, and a wider mix of people, to be involved. Comments included:

"… go to more groups of people to discuss and involve"

"A much wider cross-section of the public"

This is quite a common comment from public participants in dialogue events. They often seem to want to be part of a bigger group discussing these sorts of issues. Also, from observation, there can sometimes be a slightly greater sense of energy and excitement in a larger group of participants and an even more diverse group with a wider range of views.

In this case, the resources in terms of design, support and facilitation were high in relation to the number of people who took part. It may have been possible to include a larger number of participants with little extra cost in terms of venue, design and delivery, and follow-up (although obviously costs of facilitating more groups, incentive fees for individual participants and refreshments would have been higher). It may just be worth considering the costs and benefits of a slightly larger deliberative group (40 - 50 people) if a similar exercise was carried out in future.

4.3.3 Learning and impact on views

There was very positive feedback on the **information provided** in writing and by experts. The findings were, in summary:

- **100% were satisfied with the written information** provided; of these **52% were very satisfied** and no-one disagreed.
- **96% were satisfied with the information provided by experts** at the events; of these **56% were very satisfied** and no-one disagreed
- **96% said that the information provided was fair, balanced and helpful**; of these 28% strongly agreed and no-one disagreed.
- **84% of respondents agreed that they would have liked *more* information**; 32% of these agreed strongly.

This is also very positive feedback, with great satisfaction among respondents with the information provided in writing and by experts.

However, a large proportion did also say they would have liked more information. Given the positive feedback on information provision overall, this can be taken as a sign of awakened interest and curiosity rather than criticism of the processes of the Panel and of the information actually provided. It is worth noting that public participants in dialogue processes do often want (or say they want) more information than is provided. It may be worth testing in future evaluations of public dialogue the extent to which people read the

information they have been given, and exactly what sort of additional information they really want, so that future information provision can be more closely tailored to people's needs.

There was particularly positive feedback from respondents about the input from expert / scientist speakers. In informal conversation, several participants mentioned that they particularly liked hearing from scientists who were from local institutions. Other comments included:

"The speakers were 'hands on' and involved in the subject they were discussing and not just giving their thoughts and opinions"

"Being able to talk to people on subjects in their field [was the best aspect of the event]"

"The professionals coming in to talk to us"

"The fact that experts explained new developments in a way I could understand"

There was equally positive feedback on the extent to which participants felt they had learned from talking to each other, and several saw those discussions as the best aspect of the events: 10 people (40% of respondents) said that the small group discussions were the best aspect of the events for them.

Comments from questionnaires included:

"Learning how other people think"

"Finding out what others thought. Having chance to discuss with experts"

"Its nice to know what other people think"

"Enjoyed listening to others' views"

"Information on how others feel"

These opportunities to discuss the information provided amongst themselves are clearly very important to public participants. From observation, these discussions are where participants make sense of what they have heard in terms of their own values and in sharing reflections with others. Often, participants particularly value discussions that are with people they would not normally meet so they hear a diversity of views (and see section 4.3.2 above).

There was also very positive feedback on the extent to which **participants felt they had learnt something** as a result of taking part, and whether the events had helped them think more clearly about the issues. The findings were, in summary:

- **96% of questionnaire respondents said they had learnt something**; 56% strongly agreed and again no-one disagreed.
- **96% said the events had helped them think more clearly about the issues**; of these, **60% agreed strongly** and no-one disagreed.

Comments from questionnaire respondents on how the events had impacted on their knowledge and understanding included the following, mostly in answer to an open question about what they got out of the Panel personally: 11 people (44%) said the main thing they had gained personally from their involvement was greater knowledge and understanding.

Comments included:

"The opportunity to explore the future and put into perspective where the technology really is and not what the media tell me"

"I feel more involved, knowledgeable and informed on where to find information"

"Enabled me to understand what science has planned for the future"

"I can understand better things I knew very little about"

"Knowledge about what is possibly going to happen in the future"

"More knowledge of future developments planned"

"Made me think a lot more"

"Much more understanding"

"A great deal of understanding"

The feedback from questionnaire respondents was also very positive about the extent to which taking part had **made a difference to what they thought** about science and technology.

- **76% of respondents (19 out of 25) said being involved had made a difference to what they thought** about science and technology, and only 2 said that being involved had made no difference.
- **5 (20%) respondents specifically mentioned that they felt more positive, enthusiastic** and/or less worried about science and technology as a result of being involved. Comments included:

  "I thought that most of it was exciting. It is hard not to [be] enthusiastic about things that will benefit society"

  "Less worried about the future development of science"

  "More enthusiastic"

  "More positive about technology"

  "I feel more enthusiastic about science and technology"

  "Less worried about the future development of science"

It is not unusual for deliberative processes to result in increased knowledge and understanding among the public participants, but these are particularly high levels of learning that participants felt they had achieved - and particularly high levels of impacts on people's views.

4.3.4 Use of results and influence

There was very positive feedback from participants on the extent to which they understood how the results from the Sciencehorizons process would be collected and used, but much less positive feedback on whether anyone would take any notice. The findings were, in summary:

- **100% of respondents agreed that they understood how the results of this process would be collected and used**, of which 32% agreed strongly.
- **48% of respondents (12 out of 25 people) agreed that government, scientists and policy-makers would take the results of their discussions into account**; only two people (8%) agreed strongly, 12 were not sure and one thought this would not happen.

Although 100% agreed they understood how the results would be used, only 32% agreed strongly, which suggests that there was not a very strong sense of understanding the next stages among participants.

It is more unexpected that so few people had any belief that government, scientists and policy makers would take the results of the public's discussions into account. Less than half agreed the public would be listened to, and only 2 out of 25 people agreed strongly that this would happen. This is quite low for a deliberative event.

It is not clear why there was such a lack of trust in the influence of the process, but certainly the final Sciencehorizons project report also identified a lack of trust among the group in Government and public institutions as an issue. It may be that the fact that the process was so far 'upstream' in policy terms that there were no clear policy 'homes' for the results influenced participants' responses on this issue. It was not possible for the Sciencehorizons project to say **where** or **how** public views would be presented to Government, scientists or policy makers, let alone how they would be taken into account, so it may be that this lack of information affected participants' belief that it would happen.

Also, in other dialogue processes, it is common for the policy makers and others who will use the results to make decisions to be part of the process in some way - often attending deliberative events in person to hear public views first hand. This did not happen in this case (as no specific policy makers could be identified at this stage of the policy process), and it is likely that the lack of policy maker presence (or perceived interest) may also have affected participants' willingness to believe they would take any notice later.

This leads to another surprising finding in this feedback. Although there was not strong belief among respondents that they would be listened to, there were nevertheless very high levels of satisfaction with the process. Usually in public dialogue processes, it is very important to participant satisfaction levels that their views will be listened to and their input makes a difference. Some respondents specifically said that the things that would improve events like this included:

"[People's views} are taken seriously"

"Being able to discuss with decision-makers"

As a large proportion of respondents did not believe they would be listened to, there were clearly other reasons for their satisfaction with the process in this instance. From observation, informal interviews and answers to open questions in the questionnaire, there could be two main explanations:

- **Very well designed and delivered process**. The Panel events were very professionally run by highly experienced process designers and facilitators - some of the most experienced facilitators in the UK. This level of professional delivery gave the events a real sense of status and importance and the participants were treated with great care and respect, their requests for additional expert input were listened to and delivered on, and they were sent reports of the event soon after the events happened. This level of professionalism and care was clearly noticed and appreciated by participants.

- **Other benefits for participants**. Participants clearly learnt a great deal and got a lot out of the experience, so found the actual participation itself enjoyable and worthwhile - whatever happened to the results. These substantial benefits may have outweighed concerns about use of the results and influence of public views.

In addition, almost half **did** believe their views would have some influence, so the lack of trust was not universal.

These findings do have lessons for future 'upstream' public dialogue processes. Even if policy issues are at very early stages of development, it is crucial that routes to use of the results are identified as early as possible, if public trust in the decision-making process on science and technology is to be strengthened.

Since the Sciencehorizons project dialogue events were completed, a network has been established of policy makers who have expressed an interest in public engagement on issues of future scientific and technological development. This network could be much more fully integrated into any future public engagement exercises of this sort.

In this way, it is perhaps more realistic to see the Sciencehorizons as very much a pilot stage of a longer term programme of public dialogue on the future of science and technology, as much as it provided useful data on public views on the issues.

4.3.5 Future engagement

There was great enthusiasm among questionnaire respondents for greater public engagement in future on these sorts of issues of science and technology. The findings were, in summary:

- **96% thought it was important to involve the public** in discussing these sorts of science and technology issues; **88% thought it was *very important***. No-one thought it was not important.
- **96% felt that more events should be held for the public** to discuss science and technology issues. No-one disagreed.

For some respondents, the **sense of involvement** in discussions on important issues was the most important benefit of the whole process. Several said it was the main thing they got out of the process. Comments included:

"A sense of involvement"

"Feeling of being able to contribute"

"I feel more involved, knowledgeable and informed on where to find information".

At this event, the issues that respondents identified as the most important for future public engagement were:

- Health / medical: 9 respondents (36%)
- Climate change / greenhouse effect: 8 respondents (32%)
- Privacy / cyber security / identity cards: 4 respondents (16%)
- Genetics: 3 respondents (12%)
- Robotics: 2 respondents (8%).

4.4 What worked best in Strand 1

4.4.1 Very good professional process design and facilitation

The design of the process worked well to enable people to take in new information, in writing and also in person from experts. It also worked well to enable people to learn and then have time to reflect on and discuss their views with the other participants and come to a considered view on the issues. Also, the experience and obvious professionalism of the facilitators (and a good venue) made participants feel respected and cared for, and thus that their participation was important and their views would be taken seriously. Creating this sense of status but also comfort was important to encouraging open and relaxed discussions.

4.4.2 Time for deliberation

Although it is possible for deliberative dialogue to work in a single day, the opportunity to have two separate sessions with several weeks between allows participants to reflect alone, and with friends and family, about the issues, and come to more considered views on the subject. This is particularly important in considering science and technology issues, where people may have little pre-existing knowledge or views (unlike dialogue on issues such as health or crime).

4.4.3 Mix of plenary sessions and small group discussions

From observation it was clear that the small group discussions allowed people to explore and develop their own views in the context of listening to other people's views. This was valued by participants in the feedback and clearly created a small and safe environment that seemed to give confidence to some people to then speak in the plenary sessions.

The plenary sessions worked very well to pull the discussion together at various points, so that people felt on track. It also enabled participants to get a clear idea of what other small groups were saying in their discussions, and they were reminded about the purpose and direction of the event and the project overall.

4.4.4 Transparent recording and reporting

As identified above, the points made by participants were recorded on flip charts, so what was being recorded was visible throughout to all participants. This provides good opportunities for facilitators to be sure that what is being recorded does actually reflect what people meant by what they said (because they could challenge what was written if they disagreed), which in turn allows for confidence in the data recorded as 'public views' among policy makers.

4.4.5 Mix of experts

Although there were only a few experts in attendance, they came from very diverse scientific and technological backgrounds. Diversity aids public discussion because it allows public participants to see that there are different views on issues, which gives them greater 'permission' to express their own views, rather than thinking there is a 'right' answer.

In addition, it became clear that it was important to participants that experts were 'local', as they seemed to be trusted more than 'outsiders'. This may not be the case if people at the event came from a wider geographical area but in this instance it gave a sense of some common knowledge that broke down barriers that can sometimes exist between experts and the public.

4.4.6 Learning and impacts on views

The feedback from participants clearly showed that almost all (96%) said they had learned from the process: from the expert contributors, and that they valued that input, and also that they highly valued the learning they had gained from listening to each other. Almost all (96% again) also said that taking part had clarified their thinking on science and technology issues. This shows that taking part in the Panel had provided a significant opportunity for participants to learn about and clarify their thinking about these issues.

76% said that taking part had made a difference to what they thought about science and technology; 5 respondents (20%) specifically said they were more enthusiastic, positive and / or less worried about science and technology as a result of taking part. While changing people's views was not an objective of the Sciencehorizons projects, it is interesting to note that it had made a difference to what more than three-quarters of the participants thought about science and technology, and had made quite a few more positive about the future of science and technology as a result.

4.4.7 Enthusiasm for future engagement

The feedback from participants was very enthusiastic about future public engagement on science and technology issues: 96% thought it was important to involve the public in discussing these issues (88% of these thought it very important); and 96% also thought more events should be held for the public to have these discussions. This is very positive feedback and suggests that the Panel had worked very well in enabling participants to understand what future discussions with the public may involve, and in enthusing them about seeing more such events.

4.5 What worked less well in Strand 1

4.5.1 Nothing

The largest single group of comments from participants on what worked least well was '"nothing". Eight respondents (32%) gave this answer; this does not include people who left this question blank.

4.5.2 More time needed

Five respondents (20%) said they would have liked more time for longer discussions. Comments included:

"Lack of time"

"Not enough time to discuss scenarios"

"Too short. Would have like to discuss in more detail"

In addition, three respondents each suggested that more time, and more and longer events, would improve this sort of event (total six = 24%). Together with the feedback from participants on future engagement (with 96% agreeing that it is important to involve the public in thee sorts of science and technology issues, and 96% agreeing that more events should be held for the public), this does show a real demand from participants for more and longer involvement.

4.5.3 Bigger, more diverse group

This was not a major issue for the participants, although one did mention that it would have been better for there to have been a much wider cross-section of the public. However, from observation, it may have given a greater sense of the importance of the issues, and the status of the results, for there to have been a slightly bigger group. In this case, around 25 people discussed the issues in detail for just two days. Although this did provide some very valuable data from an appropriately diverse group, it was a relatively small group which could necessarily include only a relatively limited set of perspectives. The process was very highly resourced, and it may have provided perhaps a little more value in terms of the robustness of the results if the group had been slightly bigger.

4.5.4 Greater diversity of expert opinions

Again, this was not a major issue for participants, although one did say:

"A bigger range of people to come in and talk, so there [are] two views"

The experts that did attend did provide a good diversity of backgrounds in terms of their scientific and technological knowledge. However, because there was only one expert for each discipline, there were no real differences in opinion among the experts. This is clearly at least partly a resource issue, and the investment in experts was high for an exercise of this type and size. Nevertheless, the comment above from one participant shows the interest that the public has in hearing different views on the same subject. It would be worth bearing this issue in mind in planning future events.

4.5.5 Lack of clear links to policy development

This was a problem with the Panel, in that the lack of clear policy 'homes' for the findings from the public discussions meant that it was not really clear how the results would be used, and also that no policy makers took part in the events (or even attended as observers).

The difficulties the Sciencehorizons project had with linking with policy development are explored in detail in section 8, but it is clear from participant feedback here that this is the one area where participants were less confident in the process - particularly in the extent to which government, policy makers and scientists would take the results of their discussions into account. This is an important issue that needs to be considered in planning any other public dialogues on the future of science and technology so far upstream in the policy process.

4.6 Overall conclusions on Strand 1

This is the 'gold standard' of public dialogue: a process over two days with a specially recruited group of the general public, provided with expert support as identified by the participants themselves and with high quality facilities (venue etc) and excellent facilitation, recording and reporting. It was highly resource intensive but:

- the participants expressed a great deal of satisfaction and enjoyment of the event;
- participants felt they had learnt a great deal, and very much valued that learning, with several people saying they felt more positive and enthusiastic about science and technology as a result;
- great enthusiasm for more events to be held for the public to discuss the issues.

The only problems with the Strand 1 process were the quite wide feelings of scepticism about whether government, scientists and policy-makers would take the results of their discussions into account. In addition, some respondents would have liked more time for discussion, and the evaluation analysis identifies the potential for a bigger group of participants and more diversity of opinion among experts.

Overall, however, this was a very successful process that delivered rich and nuanced data on the issues being considered by Sciencehorizons, developed through lengthy deliberative discussions supported by highly effective, fair and respectful facilitation that encouraged the greatest possible input from participants. The detailed and transparent recording of conclusions ensured that participants could review as the event progressed, and additional expert input was provided as required by participants. This all provides significant clarity about the integrity and validity of the data on the issues that have resulted from the process, as details are very clear about the participants and the process they went through.

5 Strand 2: Facilitated group events

5.1 The purpose of Strand 2

The aim of Strand 2 of the Sciencehorizons project was to work collaboratively with science communicators and other science and technology professionals to provide a range of opportunities for the public to discuss the Sciencehorizons issues, and feedback their views to the project nationally.

This strand of work was intended to reach more people than could be achieved in Strand 1, but it was expected that the discussions would be in less depth and at much shorter events (usually around two hours, compared to the two full days for the Panel in Strand 1).

5.2 The nature of Strand 2

Strand 2 of the Sciencehorizons project consisted of facilitated events, usually open to the public, that were held at science centres, museums, *Café Scientifique*s and other community spaces. Organisations were invited to run group discussion events using the Sciencehorizons pack, and were offered advice and support to enable this. The Strand 2 process overall comprises the following activities:

5.2.1 The BA working lunches

To promote and increase understanding of the Sciencehorizons project, the project team worked with the BA (British Association for the Advancement of Science) to run four working lunch sessions to enable individuals and organisations who were interested in the project to find out more and discuss how they could go about running a Sciencehorizons event.

59 people attended the four lunches, representing 49 different organisations. A detailed analysis of the operations and effectiveness of the working lunches is given in Annex 4, and a summary of the findings is given below (see section 5.3.2).

5.2.2 Outreach and publicity

Starting from the informal launch of the Sciencehorizons project at the BA Festival of Science in Norwich in September 2006, the Sciencehorizons project team continued to build relationships with many science and other organisations to develop and support interest in those organisations for running Strand 2 events using Sciencehorizons materials. The team contacted all science centres, science communication and engagement organisations and science festivals individually to inform them of the project and offer the materials. Contact was also developed individually with some universities.

A set of briefing notes for facilitators of events was made available at the Working Lunches and on the Sciencehorizons website which included advice on:

- how to use the Sciencehorizons pack
- organising an event, venue, layout etc
- the role of scientists / experts
- marketing the event
- facilitation and suggested timetable for an event
- applying to the enabling fund (see below).

5.2.3 The Enabling Fund

£30,000 of additional funding was secured from OSI (now the Government Office for Science) to set up an Enabling Fund for the Sciencehorizons project. Science engagement and other organisations were invited to apply to the fund for grants of up to £500 to spend on marketing costs for the Strand 2 events they were running, refreshments and room hire, expenses and/or fees to facilitators and staff running events, and expenses for specially invited scientists and other expert participants.

Organisations receiving funds from the enabling fund were asked to:

- run discussions using the Sciencehorizons materials
- report the results of the discussion back to the Sciencehorizons project on the forms provided, or via the website
- involve one or more practicing scientists in the discussions as a guest speaker, facilitator, or participant
- prove that the money has been spent on the purposes above by providing copies of receipts and invoices etc.
- supply Sciencehorizons with copies of marketing literature before the event
- have the event listed on the Sciencehorizons website
- return monitoring / evaluation forms.

24 applications for funding were received, and 17 organisations received funding. A small number of applications were turned down as they did not plan to use the Sciencehorizons materials and questions.

5.2.4 Participants in Strand 2

36 Strand 2 events were held across the UK, reaching an estimated 842 participants. 97 responses were made to the Sciencehorizons project nationally (some were made by Strand 2 organisers and some by individual participants in Strand 2 events). The events were run by 18 different organisations: some ran only one event; others ran up to four events.

The Strand 2 events varied in style, target audience and approach. Some were open to the public who were informed about the event through websites, listings magazines, or through having attended similar events in the past and who were thus on existing lists. Others were run by groups such as local schools or Women's Institutes.

The style of events also varied, and included:

- informal discussions in the group's normal meeting place
- a science café meeting in a local hotel with drinks and buffet
- a meeting of staff and volunteers (and tourists) in a museum
- events for a science centre's usual target audience with introductory short dramas by professional actors presenting the scenarios
- a group of women with young children which held their discussions over the phone supported by the Sciencehorizons website.

Evaluation questionnaires were sent to all organisers, asking them to specify how many people attended their event, what sort of people attended and how many scientists attended. Data from this source shows that the size of groups varied significantly:

- 2 groups had 6 - 10 participants
- 5 groups had 11 - 20 participants
- 1 group had 21 - 30 participants
- 8 groups had over 30 participants.

This information was not complete on some questionnaires, but gives an indication of the variety of the size of the groups taking part. As can be seen from this, some of the Strand 2 events were relatively large scale meetings, although it is was not always clear from respondents whether their answers referred to a single meeting or several smaller meetings.

The questionnaire also asked for details of the types of people attending the events (e.g. school children, people over 50, special interest groups). Not all respondents provided this information and the only data provided in sufficient detail for analysis was on age, as below:

- 6 groups were mainly school students
- 12 groups were adults
- 4 respondents mentioned that the participants were aged over 50.

Not all questionnaire respondents provided information on age, but from the information available it seems that the majority of Strand 2 groups were adults, rather than school age groups. As can be seen, four respondents mentioned specifically that their participants were over 50 and, from the events observed, there did seem to be more participants who were over 50 than under 40, and who were generally middle-class, educated, well-informed and articulate.

The types of groups running Strand 2 events had to be inferred from an analysis of the group names provided. Again, it was not always possible to tell from the group name what sort of group it was, so this is just an indication of the types of groups that were involved, covering 15 of the 18 organisations running events. The groups were, in summary:

- 6 school groups
- 6 science centres / cafes / museums
- 3 others (Women's Institute, drama group, mothers group working online).

From this analysis, it seems that overall about one third of the Strand 2 events were run by school groups, one third by science centres and one third by others. This is a good mix of different types of groups expected to reach a good range of people.

It is not clear from the data how many of the participants at these events were the 'general public'. From the rather scant information on the questionnaires, this does not seem to have been the case. Rather, the participants seem to have been what could be described as the 'interested public', already in touch with existing science organisations, schools etc.

5.3 The effectiveness and value of Strand 2

The evaluation team attended and observed four different events, and provided questionnaires for all organisers of events to complete.

The following analysis is based on that observation and on the 14 evaluation questionnaires completed and returned (from the 18 organisations running events = 78% of organisers), and covering at least 22 (61%) of the 36 events. This provides a good robust sample for analysis.

The findings below also draw on the feedback to the website and on response forms to a general question (question 13) at the end of each of the four individual theme sections, which asked "What else would you like to say about the stories in this theme, or about the pack in general?". Most of the comments were across all themes but it is noted below where they clearly related specifically to one of the four themes.

5.3.1 General feedback on Strand 2 events

Strand 2 events were designed and delivered by a range of different organisations and, although some guidance was given on designing and running the engagement events (in the packs and in the BA working lunches that launched this Strand), it was much less controlled and the processes and outputs therefore much more variable than Strand 1.

There is much less formal or detailed feedback from the participants in Strand 2 as questionnaires were only completed and returned by organisers. It was felt by the Sciencehorizons team leaders that it would be asking too much of participants to fill in further questionnaires and provide more data.

Organisers were asked in their questionnaire if they had obtained feedback from their participants. From those organisers that did answer the question on the formal questionnaire about feedback from their participants, the feedback was generally positive: five (36%) of organisers said that they found that all the participants enjoyed it, and that participants liked the idea that someone was interested in their views. There was no feedback from organisers that the participants did not enjoy the experience, but that is perhaps not surprising.

5.3.2 The BA working lunches

A series of four working lunches were organised by the British Association. These two hour events were run regularly by the BA, but four events were held specifically to launch and publicise the Sciencehorizons project in Cardiff, Manchester, Edinburgh and Oxford, in December 2006 and January 2007. 59 people attended the lunches from 49 organisations.

An evaluation questionnaire was distributed at the lunches, and achieved an 81% return rate (48 questionnaires from the 59 participants). A full analysis of the questionnaires and further statistics are given in Annex 4; a brief summary is given below.

Overall, feedback from questionnaire respondents was very positive. In summary:

- 94% (45 respondents) agreed that they enjoyed taking part in the lunch
- 83% (40 respondents) agreed that the event was well structured
- 83% (40 respondents) agreed that they were satisfied with the working lunch
- 88% said they understood the purpose of Sciencehorizons and how to take part
- 75% (36 respondents) said they were more likely to organise a Sciencehorizons event as a result of attending the lunch

This is very positive feedback and suggests the events were enjoyable and a success in their own terms.

Analysis of the actual Strand 2 events that were eventually held, and who organised them, shows that 39% (14 out of 36) of the Strand 2 events were run by people who attended the working lunches, and 39% (7 out of 18) organisations that ran events had attended a lunch.

This analysis suggests that the lunches worked very well to target and encourage potential Sciencehorizons Strand 2 event organisers: nearly 40% of the events were run by people who had attended the working lunches, and nearly 40% of the organisers of events had attended working lunches.

5.3.3 Reaching the general public

As outlined above, it is not entirely clear from the data how many of the participants in Strand 2 events were the 'general public'. However, from the data that is available it seems that the participants in Strand 2 were what could be described as the 'interested public' - almost all of them seem to have already been in touch with existing science organisations, schools and other organisations etc - rather than the 'general public'. The assumption at the beginning of the Sciencehorizons project was that the Strand 2 events would provide a different mechanism but would still reach the general public, and that assumption seems to have been unrealistic.

There was a wide range of events with a wide variety of participants, but the nature of the process used (support, timing etc), and the nature of the organisations running the processes (with their existing networks) seems to have resulted in a strand of work that did run different types of discussions on different types of subjects from their normal process and content, but with the people who would normally attend their events.

While this strand did not necessarily reach the audience that had been expected (the 'general public'), this could be seen as a strength as the process reached people with an interest in science but no way of engaging in this sort of debate about current and future issues of significant ethical importance. In addition, from observation it seemed that there was probably a more intensive and informed discussion in the Strand 2 events than there would have been in a random group of the 'general public'.

5.3.4 Motivations for organising the event

The questionnaire respondents (group organisers) gave two main reasons for organising their event:

- 4 respondents (29%) said it was to have a discussion linked to national policy-making
- 2 (14%) respondents said it was to try a new format for discussion.

Several organisers (3) reported that people enjoyed the chance for a discussion within a clear framework about interesting issues of national importance - and it was important that someone wanted to hear their views. Indeed 4 of the 18 organiser respondents (29%) specifically said that their reason for organising their events was to have a discussion linked
to national policy-making.

Comments included:

> *"Was very interested to run a public engagement session that in theory had direct connection to policy making"*
>
> *"Chance to be part of national project - opportunity for dialogue event"*
>
> *"Everyone who attended really enjoyed it and said they liked the fact that people were interested in their views and glad to express them"*

There was some scepticism. For example, one participant said:

> *"Nice to have our views recorded (but only valuable if genuinely followed through beyond this stage)."*

Another organiser reported that participants *"enjoyed explaining their thoughts and were interested in the government listening to what they said"* but *"did question the government's 'agenda'"*.

Other reasons given by organisers (one response on each) as to their motivation included:

- to reach new audiences
- to hear a range of public views
- to raise the profile of science
- because "it is part of our mission".

One respondent said:

> *"I believed it was a good opportunity to express opinion, it was well within our branch remit for events and I thought it would be enjoyable - which it was!"*

Most were fairly satisfied that their events delivered what they hoped or expected: 3 were completely satisfied, and another 7 were mostly satisfied - which is a total of 71% of respondents who were satisfied that their events delivered what they hoped. This is a good satisfaction rate but not entirely surprising as respondents were in some senses judging their own activities.

5.3.5 The involvement of scientists / experts

The questionnaire sent to organisers asked for details of the scientists that attended the event, including how many were there and what was their role.

The questionnaire data shows that almost all groups had at least one scientist, with some of the larger groups having 3 or 4 scientists making presentations, joining in with the discussions and / or facilitating groups. Where respondents specified, they said the scientists involved included science postgraduates, people with research experience, and a professor of nanotechnology; areas of expertise covered included carbon credits, tropical diseases and robotics.

This shows that the Strand 2 events clearly met one of the key Sciencehorizons objectives of promoting direct dialogue between the public, interested groups and scientists.

From observation, the involvement of scientists worked very well and scientists worked closely with the other participants in some cases.

The relationship did not always work perfectly and it was observed at one event that the whole focus of some small group discussions of a scenario was on asking the scientist questions rather than the group discussing the issues among themselves. Elsewhere, where this seemed to be a potential problem, strong facilitation ensured that the question and answer elements were limited so that wider discussions could take place.

It was also noted in observation that it did not always work well for scientists to facilitate discussions, as there could be confusion between their role providing input, and in facilitating the other participants to have their say.

From observation of events it could be seen that participants seemed to particularly enjoy having a ***range*** of views from scientists. In some events, it took a while for the discussion among participants to flow easily, with people initially somewhat reluctant to offer their views. As one person remarked to the evaluator, once you realise that the other participants don't necessarily know all the answers (and that there is no 'right' answer), you felt more comfortable joining in. The same result was observed when experts presented differing opinions; it allowed others to express their own views more easily when no single expert opinion was presented as 'right'.

Scientists were not the only external people involved. One or two organisers used drama to introduce the issues and prompt discussion. While this did change the dynamic of the event, making it feel more creative and less like an educational event, including personalising the issues by having real people speak the words, some problems did arise. In one event observed, the scripts (written by the actors from the Sciencehorizons materials) did not really match the scenarios or the questions on the information sheets that people were discussing, which did cause some confusion. In addition, where there were both experts in groups and actors performing at the beginning of each scenario, the time for discussions among the public participants did become quite short and thus the balance between input and time for discussion was not ideal. However, this sort of creative approach to public dialogue on science and technology may have significant potential for future development.

5.3.6 The materials provided

The Information Pack provided for Strand 2 organisers comprised:

- A summary of the Sciencehorizons project, key elements and timings;
- Marketing and programming information, including templates for publicity and marketing, logos etc;
- A facilitator's pack with brief guidance on how to plan and run the meeting, including gathering feedback;
- Copies of the Sciencehorizons pack with paper versions of the scenarios, information cards, supporting information, a CD / DVD repeating the scenarios, the launch podcast, evaluation questionnaire, a paper form to use to return responses to the Sciencehorizons questions and information on how to enter responses online;
- An application form for the Enabling Fund.

The main focus of responses from questionnaire respondents and in the online and general responses on the process itself was around the Sciencehorizons pack (including the questions).

Overall, findings from the questionnaire responses from organisers of Strand 2 events on the materials were that:

- Four (29%) said that the stories / scenarios were effective in promoting discussions.

  Comments included:

  "The material was generally good and provoked discussion. The facilitation advice was good, everyone had their say - and the 2 discussion leaders did a good job - fair and even-handed"

  "The software and scenarios were very effective in promoting discussions - which were v. interesting.

  "The stories were very good at promoting discussions and enabled everyone to express their opinions freely"

- Three (21%) said that people enjoyed doing it more / materials worked better than the organisers expected.

As can be seen from the figures above, some event organisers seem to have been quite sceptical about the value of the materials until they actually used them.

Comments included:

"Having initially been sceptical about the packages I was really surprised about their effectiveness"

"People enjoyed doing them more than I expected"

"Using materials as starting points for free range discussions - amazing how well it worked!"

These responses are collated from various questionnaire questions and, overall, it can be seen that around half of the respondents (7 out of a total of 14 respondents) were positive about the way the materials worked to promote discussions, even if rather grudgingly so in some cases. For organisers, the materials did seem to work well in prompting and providing a framework for discussion.

There was, however, also negative feedback on the content of the materials:

- Four (29%) said that the stories were too simplistic / not strong enough on facts
- Three (21%) said that the response forms / questions were not well structured / designed
- Two said that the focus in the questions on 'likes' and 'dislikes' was too limited.

The following quotes illustrate the sorts of comments made in questionnaire responses from organisers:

"Material was rather simplistic for our audience"

"The resources supplied were not particularly well thought through - the stories were not set in contexts that would promote discussion being very simplistic and patronising. Use of cartoons was not appropriate to a serious discussion"

"The CD / scenarios were also visually quite poor"

"The forms were very poorly arranged. To expect 'discussions' to be reduced to 'likes' and 'dislikes' seems to defeat the purpose which is surely to gauge people's feelings and ambiguities about the future."

"Inappropriateness of materials supplied was raised several times. Simplistic 'questions' on response forms seem to contradict the aim of promoting proper public debate, it was difficult to keep groups discussing likes and dislikes given the importance of the wider issues".

There was certainly a view in some of the organisers' questionnaire responses that the design of the forms themselves, and the framing of the questions, was not perfect (and did not always fully match the issues in the scenarios). However, it is clear from the responses submitted to the Sciencehorizons project nationally that there had been some good and useful discussions which resulted in valuable data being submitted.

The general responses to the Sciencehorizons project nationally (online and on paper forms) also provided feedback from Strand 2 organisers and participants in answers to a general question (Question 13) asking for feedback about the stories in that theme and the pack in general. A new analysis of all that feedback has been completed for this evaluation report.

The analysis here was based on a total of 88 separate answers to Question 13 from organisers and participants in Strand 2 events, and shows the number of times each issue was raised by respondents, with the issues raised most often first. Several different answers may have been given by a single respondent. The positive feedback was as follows:

- 13 responses said that the stories / scenarios / materials were stimulating / interesting / effective / realistic.

The negative comments were:

- 17 responses mentioned that the problems / stories in the pack were complex and needed more than simple technological solutions
- 14 responses mentioned that the stories / scenarios were too simplistic / immature / depressing / repetitive
- 7 said that too many positive assumptions were made about the implications of the scenarios / too rosy a picture
- 4 said that the scenarios were too close to current reality
- 3 said that the stories were too focused on individuals and not society / wider community
- 3 said that the questions in the pack were not linked closely enough to the stories / not specific enough / simplistic
- 3 said that the stories did not recognise equity / fairness / cost issues enough (e.g. affordability of technology)
- 2 said the stories were too complicated
- 2 said that the response forms were poorly designed / not enough space for answers
- 2 said the stories were racist / sexist
- 2 said the stories were too materialistic / focused on consumption
- 2 said the materials missed key issues (e.g. energy crisis).

This analysis shows that these responses included quite a lot more negative than positive comments.

As can be seen from the above, the issue raised by respondents most often was that the problems raised, and the stories, were complex and could not be addressed purely through simple technological solutions and that there were actually social, economic, environmental and political issues too. Comments included:

> *"Technology is not as important as other social reforms which may address these social problems which the technologies are used for"*
>
> *"Focuses on technology providing quick fixes to problems that are hugely complex and have a social dimension to them that is not considered"*

This was seen by respondents as a problem but was exactly the sort of debate that the Sciencehorizons materials were designed to promote. This feedback - although apparently critical - therefore suggests that the discussions that were held in these events did address precisely the sorts of ethical issues and deeper values that underpin the future development of technologies that Sciencehorizons was designed to address.

However, there was a sense that some respondents felt that they should have been talking about the technology rather than the wider issues (an issue raised in the questionnaire responses too), and felt almost 'guilty' about considering these wider aspects. This suggests that there remain significant difficulties in promoting discussions which link social and ethical issues with scientific and technological development with this audience. This unease with the links between social and ethical issues and science and technology were much less apparent in feedback from Strands 1 and 3.

Another interesting issue raised in this feedback is the extent to which respondents felt that the scenarios presented an overly 'rosy' picture of the future. Comments included:

> *"The pictures depict an overly utopian view of technology - everything is clean and green looking"*
> *"Rather one-sided - gives the impression of positives: downsides not developed or explained".*

Again, this shows exactly the sort of critical reaction that the materials were intended to provoke, although here it is more directly a criticism of the materials rather than a response to the nature of the issues raised. It also relates to the design (and illustration) of the materials as much as to the content.

Other issues mentioned once each in the answers to Question 13 were that the materials raised important issues, the packs were attractive, the respondent was pleased to have views listened to, the scenarios were not related to where we are today, the whole thing was a waste of resources and the technologies identified were too narrow.

This mix of individual positive and negative comments does provide a reasonable reflection of the mix of positive and negative comments overall. Overall, the feedback from answers to Question 13 was less positive than the feedback from the organisers in their questionnaire responses.

The criticism of the materials did vary depending on the type of group responding. In general, schools groups in this strand liked both the design and content of the materials and found them stimulating (although two found the stories too complicated). Some (although by no means all) adult groups were more critical and found the materials simplistic, patronising and immature.

In observation at the Strand 2 events it was noted that, generally, the materials worked well to inform and stimulate discussions, although in several of the groups observed (all adults) there were complaints about the 'Janet and John' style of the design and the scenarios. Overall, the negative reaction did seem to focus on the design, especially the illustrations. This feedback suggests that it is very difficult indeed to produce materials that will appeal to all types of groups and all ages from school children to adults. It may be that different materials are needed to meet the needs and expectations of different groups, especially in terms of design but also possibly in terms of content.

Also, in observation, it was noted that there was a lot of information for people to take in before the discussion could start, especially if facilitators were reading it out for the whole group (which some did; others had copies of the pack for each participant). There seems no way round this problem of getting the initial information across, as people rarely read information in advance even if it is provided in advance. However, it does raise questions about the amount of information provided overall, and whether that is too much for discussion events of this type.

Some of the subjects covered were clearly really difficult for the public to grasp (e.g. DNA vaccines). At one event observed, there was an expert in tropical diseases in the group and there was an excellent discussion about the ethics of the whole issue; at another event observed people did not really understand the difference between DNA vaccines and ordinary vaccines at all. Other scenarios were much more straightforward and people identified the ethical issues that were raised by them quite easily.

There were some specific criticisms in answers to Question 13 of some specific scenarios and stories: on the DNA vaccines, on Cynthia and the gas bill, and on the People and Planet theme. Comments included:

> *"… the DNA vaccines scenario seemed weak and with little factual content"*

"Cynthia and the gas bill scenario was too broad - covered too many possibilities / alternative energy sources. Emily and the vaccines scenario would have prompted a different response if it was about pandemic flu."

'People and Planet' wasn't always technology based"

It may be that having such a range of subjects of differing complexity (and so many different scenarios) was too much for people to deal with. In some events observed there was a sense of the information and the task being overwhelming for a discussion in people's leisure time and within the time suggested for the Strand 2 events (a couple of hours). Some respondents, though, obviously relished the challenge.

In some events observed, it seemed that the discussions were very much at the **starting point** of the public thinking about these issues; almost an introductory phase of something more substantial which could be developed in more depth later that would do more justice to the very significant issues being raised and discussed. Also, even the basic premise of some of the issues was new to people, so they had no 'ready made' views to draw on (as they would have on issues such as health, or recreational drug use for example).

This suggests that staged processes which allowed for ideas and information to be introduced, time given for participants to reflect on this input and then engage in structured discussions, may work better to enable them to develop and articulate a considered view. However, there were also Strand 2 events at which there were high quality, informed and enthusiastic debates.

In addition, there are questions about the **number of issues** raised in the Sciencehorizons materials. The materials were based on issues arising from the Horizon Scanning research, and tried to cover as many of the key areas from that research as possible. In practice it may be that there were too many issues raised and some of them were too complex for the public to respond to.

Also, the issues were presented in a way that was quite separate from the policy context - for example, it was not clear to participants whether there were imminent decisions in any particular area, or any issues around which there were currently disputes. They were therefore dealing with complex issues with little guidance on how likely they were to become real issues, how soon, or whether there were already concerns emerging.

It may be that it would be more effective in future to identify a few issues of topical concern at an early enough stage in the development of the science and technology policies where it is still possible to consider the wider values that may be implicit in future developments and ensure that those values are communicated to policy makers. Given a range of topics, groups could then choose one or two on which to focus their attention. This would limit the demands on the group while also covering a range of issues, and provide choice to groups about which issues to focus on without overwhelming people.

This approach would also place this type of public engagement and dialogue at the agenda setting stage of the policy cycle. It is at this early stage of policy development that public engagement can often make a real contribution, rather than on detailed scientific or technological issues or policies which may require more specific technical knowledge. There may then be a place for different types of public engagement at the detailed policy development / drafting, implementation, or review and evaluation stages. At the agenda setting phase, the public can consider the basic thinking to date, discuss with each other and provide input on their considered values and opinions, rather than becoming overwhelmed with technical detail that may or may not be realistic or relevant.

Taking all the feedback from organisers and participants into account, it is clear that the overall feedback on the materials was that they were stimulating and provided a very valuable framework for a discussion of some of the highly complex issues that are raised by the potential developments in science and technology. Overall, the Sciencehorizons

Strand 2 events process and materials were designed to inform and stimulate these debates, and in that it was clearly very successful.

However, there were some quite stringent criticisms of the design and content of the materials, particularly in the general feedback through Question 13 of the responses to the main Sciencehorizons questions; feedback from organisers was less critical.

More generally, and related to the materials but also to the events, it seems that to some extent these materials were useful in a **first pass over these issues** - starting to consider some of the ethical and values issues related to the future of science and technology.

Both the processes of Strand 2 events and the design and content of the materials clearly stimulated some very interesting discussions that were enjoyed by a lot of people, but the criticisms of the scenarios being simplistic and superficial suggests that there may be potential for deeper discussions to explore the issues in significantly more depth. This may require building on the experience here (and the issues raised in discussion) and developing more in depth, longer term deliberative discussions in future.

5.3.7 Recording and reporting

The recording and reporting of the points raised in the group discussions was the responsibility of the organiser, although individual group members could also send in their comments direct (via paper forms or the website). The information provided to Strand 2 organisers included guidance on the questions to be addressed and a framework for feeding back the conclusions of the group.

In events observed, the points made by the group were captured on flip charts and then reviewed at the end of the session to ensure that participants were happy with the points that would be given to the Sciencehorizons project. This was a very appropriate and effective method of recording in terms of supporting the discussion at the time, and of ensuring that participants were satisfied with their input. It also captured the key points from the discussion, in summary.

However, even this very appropriate approach could not capture the full richness of the data emerging from those debates and the public values and attitudes expressed. It is very difficult to record and report the richness of public dialogue as discussions tend not to proceed in a linear fashion that is easy to record. In addition, given that the organisations running the debates were facilitating discussions in a different way, and covering different sorts of content from their usual meetings, it was perhaps not surprising that the reporting back was not as complete as would have been ideal.

This problem with reporting and recording public dialogue is not unique to the Sciencehorizons project. Almost all public engagement activities are able to record and report on only a relatively small proportion of the points raised in discussion by public participants, unless there are dedicated note takers and / or recordings made of the discussions that are transcribed and analysed later. This was not possible in this case (or most other cases), given timescales and limited resources.

This does point to the potential conflict between a public engagement process which is designed primarily to stimulate and support debate among participants, and a research process which is designed primarily to capture data on public values and attitudes. Both processes will want to both stimulate debate, and record findings, but the emphasis is different, and therefore the design of the process - especially recording and reporting - will be different.

The Sciencehorizons project did both stimulate discussions that were of value to participants, and capture some very valuable data from a diverse set of participants that were expected to be valuable to policy makers. However, the emphasis in process design was on quality of engagement and therefore the focus on recording and reporting was less than it would have been in a process that prioritised research findings. There are also issues here around how best to record and report the richness and depth of the really effective debates and to reflect that quality in reports of the process. Recording and reporting were the responsibility of the organisers, who were also usually facilitating the discussion, and this did perhaps place too heavy a burden on these individuals.

There was also feedback from organisers in questionnaire responses that they found problems with the design of the forms on which to send back responses:

- 3 respondents (21%) said that the forms were not well structured / designed
- 2 respondents (14%) said they found the focus in the questions around likes and dislikes too limiting a structure.

Comments included:

> *"The forms were very poorly arranged. To expect 'discussions' to be reduced to 'likes' and 'dislikes' seems to defeat the purpose which is surely to gauge people's feelings and ambiguities about the future"*
>
> *"The space which was assigned for recording the information was too small"*
>
> *"The packs themselves whilst simple to complete didn't provide explicit questions related to topic."*

Overall, the framework provided by the Sciencehorizons project for discussion and returning responses clearly worked well, and the criticisms above therefore need to be seen as specific points around the design and drafting of the questions rather than generic points on the overall framework and approach. However, these issues would need to be borne in mind in designing future such exercises.

There were also significant problems in ensuring sufficient monitoring and evaluation data was collected on Strand 2 events. Discussions early in the planning of the Sciencehorizons project concluded that it would be asking too much of Strand 2 participants and organisers to provide detailed data on who the participants were, and their views of the process, and evaluation questions were therefore very limited.

In retrospect, it would have been extremely valuable to have had more demographic data on who the participants were, the extent of their existing science and technology knowledge and whether they had been involved in similar discussions before. It would also have been useful to have collected data using a simple categorisation of group. All this would have provided a much richer picture of the nature of the Strand 2 groups and the background of the participants. Although this lack of data does not invalidate the findings of the Sciencewise project in terms of the legitimacy of the conclusions of Strand 2 groups (there is sufficient data to show diversity of participants), it does significantly reduce the potential for learning from this experience for future practice. The appropriate level of collecting data for monitoring and evaluation is therefore something that would need to be considered carefully in future projects of this sort.

5.3.8 Collaboration among science communicators

The Sciencehorizons project had always had an objective of providing opportunities for science communicators to collaborate. In practice, there seem to have been **six new collaborations** established as a result of the project: between the Royal Academy of Engineering and the Dana Centre; Spectrum drama and the Dana Centre; the Glasgow

Science Centre and Coachhouse Trust; Science Oxford and the Institute for the future of the Mind, the Science Partnership: Hunterian Museum and Glasgow University Science Festival; and between the Teacher Scientist Network and the Inspire Discovery Centre.

There were not quite as many of these collaborations as had been hoped. From informal conversations with organisers, it seems that the relatively short timescale for the project was the main barrier to greater collaboration. The emphasis for organisers was on running their event, and getting in the responses to the project by the deadline, and there was little time for more general planning and building up collaboration.

5.3.9 Support from the Sciencehorizons project

Evaluation questionnaire respondents (organisers of Strand 2 events) identified the support they had received from the Sciencehorizons project nationally as follows:

- 13 (93%) had received a grant from the Enabling Fund
- 7 (50%) had received telephone advice
- 4 (29%) had attended a working lunch
- 2 (14%) had been given publicity for their event on the Sciencehorizons website.

Overall the organisers were satisfied with the support they received from Sciencehorizons:

- **12 out of 14 organiser questionnaire respondents (86%) were satisfied with the support they received**; half of these were **very** satisfied, which is very positive feedback. Only 1 person was not very satisfied; no-one was not at all satisfied.

The questionnaire asked for feedback on how support for these types of events could be improved in future. There were very few responses to this question but two respondents said they would have liked more guidance on how to run events. Their comments were:

> *"Give guidance which is clearer on how events could be run - there are a lot of issues to tackle in limited time (and public concentration)"*
>
> *"More support could have been provided on the way of running the event on the day"*

It was noted from observation and informal feedback that the Sciencehorizons dialogue approach to working with the public was new to some organisers, who were more used to more traditional methods of science communications (often scientists presenting to the public, with questions and answers, rather than the public discussing issues among themselves). They were not necessarily experienced in facilitating deliberative group discussions in the way that had been expected (although some organisers were experienced and others did it very well even without previous experience).

Facilitation and process design skills are very important elements of a successful public engagement project of this sort, and may be needed more than was expected when the Sciencehorizons project was designed.

Not everyone was inexperienced in running dialogue events, but even more experienced organisers were pleased to receive support:

> *"We are experienced in running dialogue events so don't need much support although it is very welcome"*

Four people suggested that better and more marketing materials would have helped attract more people to events. Comments included the need for:

"Ready marketing materials and a more catchy / appealing description to use in advertising"

These requests for more marketing materials were linked to the problems organisers reported in recruiting participants for Strand 2 events, even after a lot of effort going into publicity. One questionnaire respondent said:

"The take-up and interest in the event was poor - recruiting numbers was a struggle"

However, it may be that promoting a general discussion on the future of science and technology will always be difficult without the topical and / or controversial issues that are known to attract people to these sorts of events.

This desire for greater marketing material also seems to be linked to the extent to which Strand 2 organisers felt **part of the Sciencehorizons national project**. Strand 2 events were completely different from Strand 1, in that Strand 2 events were designed and delivered by a range of different organisations, mostly existing science centres, museums etc. Some Strand 2 events were publicised through the Sciencehorizons website, so there was some sense of national identity about these events, although this did not apply to all the events in this strand.

The feedback on the extent to which organisers felt part of the national Sciencehorizons project was that:

- 3 questionnaire respondents (21%) felt 'very much part'
- 7 did feel part (50%)
- 3 (21%) felt 'not very much part'
- None felt 'not at all part'.

This is fairly positive feedback, with **10 out of 14 questionnaire respondents (71%) feeling part of the national project**. However, it is not a strong sense as national identify as only 3 (21%) felt 'very much part' of the project. This sense of national identity was always going to be difficult to achieve with Strand 2 groups which were run by independent organisations with their own identities and priorities. However this is something to be considered in planning future similar dialogue projects, especially if there is any desire to build longer term collaborations and partnerships in this field.

Questionnaires also asked organisers how satisfied they were with the information provided. The feedback was:

- **10 out of 14 respondents (72%) were satisfied with the information that was provided**; half of those were **very** satisfied; 3 (21%) were not very satisfied and no-one was not at all satisfied.

These satisfaction ratings echo the mixed responses to the materials outlined in section 5.3.6 above: while 5 (35%) were very satisfied, 5 were only fairly satisfied and 3 were not satisfied. The wider issues around the materials are covered in detail in section 5.3.6 above.

5.3.10 Future public engagement

The feedback from organisers about future engagement was very positive:

- 12 out of the 14 organiser questionnaire respondents (86%) said that it was **very important** to involve the public in discussing these sorts of science and technology issues; plus another 1 person felt it was fairly important; no-one though it was not important.

- 11 out of the 14 respondents (79%) felt that **more events should be held** for the public to discuss these issues; 1 did not know.

This is very strong endorsement for more public engagement on science and technology which is perhaps not surprising as at least one third of respondents were engaged full time in science communications work. However, not all respondents were in the field professionally by any means and this feedback does show strong demand for more work on public engagement on science and technology in future.

In terms of the **topics** that questionnaire respondents from Strand 2 thought were most important for the public to discuss, the two main issues that arose from the questionnaires were the following, although lots of other ideas were also suggested by one person each (see Annex 2 for details):

- 4 respondents (29%) suggested more on stem cell research
- 2 respondents (14%) suggested more on greener alternatives / sustainable living.

One respondent did make the following comment about future public engagement events:

"Are they really informative for policy-makers? Is it an exercise done for appearance only?"

This scepticism about the value of these exercises to policy-makers reflects the feedback from Strand 1 participants, who were sceptical about whether policy makers would take the results of the exercise into account. It would be important in any future similar exercises to be very clear about how results from the public would be used to inform and influence policy, by whom, and for what specific purposes.

5.4 What worked best in Strand 2

5.4.1 New approach to discussing science and technology

The Sciencehorizons project provided organisers in Strand 2 with the opportunity to adopt a new approach to discussing science and technology with the public. Feedback from organisers showed that 29% of respondents said that the main reason they had got involved was to have a discussion linked to national policy-making; and 14% said it was to try a new format for discussion. This feedback suggests that organisers particularly valued the opportunity to engage with the public in a different way, especially linked to national policy development. These motivations will be important considerations in any future similar programmes.

5.4.2 Dialogue with scientists

The ways that scientists and other experts were closely integrated into the Strand 2 discussions often seemed to work very well. The scientists made their input in a variety of ways but, from observation, it was clear that participants particularly valued the scientists actually taking part in the discussions - as long as the scientists did not dominate or assume that because they had greater technical knowledge that their views were more valuable.

From observation, it was also clear that participants particularly enjoyed having a range of views from scientists - a variety of views allowed participants with less knowledge to feel confident about offering their own opinions, because they were more aware that there is no right answer to the sorts of ethical issues being raised, and that their contribution was as valid as that from a scientist.

5.4.3 Materials stimulated and supported dialogue

The feedback from organisers was that the materials worked very well to encourage debate, stimulated consideration of the social and ethical issues around the various scientific and technological developments and provided a framework for capturing and reporting back the groups' views. However, there were differences in feedback from different types of groups, with school groups being more positive about the design and content than adult groups.

In some cases, organisers were slightly uncomfortable with the extent to which the discussion focused on the social and ethical issues rather than the technologies; some seemed to feel almost 'guilty' about not keeping the focus on science and technology. However, the broader issues were precisely the focus for the Sciencehorizons dialogue and was therefore sought and expected. Overall, therefore, the materials were clearly successful in prompting and supporting the discussions.

5.4.4 Outreach through existing organisations

The working lunches delivered in partnership with the BA were very successful in promoting the Sciencehorizons project to potential event organisers, with 40% of events being run by people who attended these events. This suggests that working in partnership with organisations with existing networks of potential group organisers can be a very effective approach to outreach and publicity for a project of this sort.

5.4.5 Support from the Sciencehorizons project

Strand 2 organisers were largely satisfied with the support and information from the Sciencehorizons project (86% were satisfied). Most (93%) had received an enabling grant and many had received telephone and other individual support, which was clearly valued.

Respondents identified two types of support they would like to see more of: more and better marketing materials from the national project to aid recruitment of the public to events, and more support on how to run events. Although many organisers had worked with the public before, the particular 'dialogue' approach was new to many, and there was interest in gaining more skills in facilitating that sort of approach to engagement.

There were also some issues around creating a national identity for the project. Although 10 respondents (71%) did feel part of the national project, only 3 (21%) felt 'very much part'. This is something that any future similar project may wish to consider if such a project was interested in creating longer term relationships between the national project and local events.

5.4.6 Enthusiasm for future engagement

Feedback from organiser respondents shows significant enthusiasm for future engagement with the public on science and technology issues: 86% said it was very important to involve the public in discussing these issues; and 79% felt that more such events should be held for the public. While some Strand 2 organisers were professionally involved in science communications, and may be expected to be enthusiastic about more public engagement, by no means all Strand 2 groups were by these interests, and the strength of enthusiasm does seem to go beyond any professional bias.

The only caveat to further engagement was about whether public engagement really made any difference. This was similar to the feedback from Strand 1 participants, who were unconvinced that government, scientists or policy makers would take public opinion into account. It may be that greater clarity about the potential policy impacts would maximise continuing enthusiasm for public engagement.

5.5 What worked less well in Strand 2

5.5.1 Timing

Timing was a major problem for Strand 2 organisers, both in the sense of overload in terms of a large number of scenarios to get through and limited time to do it within each session, and in terms of getting feedback sent back to the national Sciencehorizons project within the deadline.

Two questionnaire respondents (14%) identified there not being enough time to discuss all the scenarios as the worst thing about the process, and three respondents (21%) identified the need for better timing (e.g. around school terms) and longer deadlines for sending in responses as the main thing that would improve this sort of process. Tight deadlines also affected the potential for collaboration between science communicators, which had been one of the objectives of the process overall.

Overall there was a sense of overload and pressure on time. Comments included:

"The timetable from information to results deadline was a bit tight!"

5.5.2 Recruitment was a struggle

Several of the organisers said they had difficulties attracting enough people to enable them to run an event, in spite of spending a lot of time on publicity and recruitment. Events observed were well-enough attended, but some organisers were clearly disappointed at the turnout they were able to achieve.

When asked for suggestions for improvements to the process, some questionnaire respondents (3) proposed that there should be better and more marketing to attract more people. In addition, some Strand 2 organisers did mention that they would have been able to build up interest, and run more events. if there had been a longer timescale. The timescale was clearly an issue for some who felt the deadlines were too tight for them to get out to their audiences and build enough interest to do more.

5.5.3 Materials did not suit all ages and interests

There was varying feedback on the materials: school groups tended to like the design and illustrations but sometimes found the content too complex; adult groups were more critical of the design and illustration (too cartoon-like and 'Janet and John'), liked the content as prompts but sometimes found the stories too simplistic and superficial. In retrospect, it may have been too ambitious to attempt to write and design materials that would appeal to all ages, interests and levels of knowledge.

5.5.4 Recording and reporting

There were some difficulties with recording the richness of the discussions by the public, which is a problem shared with many public dialogue projects. However, it was a particular problem here as organisers were expected to facilitate groups and record and report back points made, which was a difficult task given they were using a different approach and tackling different types of content to their normal activities.

There were also some problems around the design and content of the forms provided to group organisers to record and return the main points from their groups, with some finding the focusing of the questions around simple likes and dislikes too simplistic for the complex issues being addressed.

5.5.5 Lack of data on participants and processes

It had been agreed in the planning stages of the project that it was not feasible to expect Strand 2 organisers to collect data on the people in their groups as well as publicise and run events, collate comments and feed back a collective response to the project nationally.

Sufficient data has been assembled to enable this evaluation to identify lessons from the experience of this project, and to confirm that the process included a sufficiently diverse group of participants to conclude that the resulting outputs of the project on science and technology issues could be seen as representing a view from the 'interested publics' involved in this strand, and from a sufficient diversity of people. However, it would be useful in any future such projects to ensure that more data on participants in the groups, and the processes used by organisers to stimulate and support discussions, is collected to enable more robust conclusions on lessons for the future.

5.6 Overall conclusions on Strand 2

Overall, Strand 2 attracted what could be described as the 'interested public' rather than the 'general public'. This can be seen as a strength, as these events did provide an opportunity for people with an interest in science with a unique opportunity to engage in a debate about current and future issues of significant ethical importance in science and technology. The actual audience may reflect a more realistic target audience for future events of this sort, rather than aiming to reach the general uninterested public.

Strand 2 also provided a useful mechanism for bringing scientists and those with an interest in science together to discuss some important ethical issues implicit in future science and technology developments, within a defined framework for the discussion and for making input to a national project. Such dialogue is exactly what the Sciencehorizons project was promoting, and these elements of good practice could be built on in future.

The information and support provided through the Sciencehorizons project was valued by Strand 2 group organisers, and they were generally very satisfied with the support provided. There was also interest in further skills development in facilitation and process design for public engagement among the organisers running the Strand 2 events (e.g. science centres, museums, schools and voluntary groups).

The materials provided worked well to stimulate and support dialogue, sometimes to the surprise of group organisers. However, there was mixed feedback on the design and content of the materials, with school groups often giving positive feedback and adult groups more likely to be critical of design and illustration, and what they sometimes saw as simplistic content in the scenarios.

Given the time limits, both to cover all the issues within individual events and for the project overall, there was a sense that this was the beginning of a discussion on these important issues that could be developed into something more substantial with more depth later, to do justice to the issues raised. Many of the ideas raised in Sciencehorizons were completely new to people, and they were only just beginning to develop their thinking on the issues during this process.

Finally, there was a clear demand for more of this type of public dialogue. It is almost always the case that those that organise and take part in public dialogue projects do gain some value from simply taking part and become enthusiastic advocates of more engagement as a result. However, there was also a sense that the real value exists only when the results of the process have some wider impact - in this case, impact on policy decisions in the future. It will be important for future public dialogue in this area can show that there is some clear impact, and that the time people give to these dialogues does make a difference to future policy decisions.

6 Strand 3: Self-managed small group events

6.1 The purpose of Strand 3

Strand 3 of the Sciencehorizons project consisted of self-managed small group events that were held at a variety of venues including schools and colleges, pubs and people's homes, as well as more formal venues.

The purpose of Strand 3 of the project was to provide opportunities for more people to take part in the project than could be accommodated through Strands 1 and 2. Strand 3 were events designed and delivered by a range of different groups and organisations, mostly non-science bodies and quite a lot of schools. It was therefore the least controlled and most variable set of events in the project. Quite a few organisations organised several events, and returned multiple responses to the project. This strand was intended to be a less resource-intensive approach, providing materials and support, and with the expectation that engagement would be shallower but wider.

Evaluation questionnaires were sent to all group organisers who requested the Sciencehorizons materials, with the aim of gaining feedback from a sample of those organisers. This section provides a summary of the findings from that questionnaire; a full analysis of the Strand 3 questionnaire responses is given in Annex 3. The analysis in this section also draws on responses to the general Sciencehorizons questions, which included a general question on the process and materials.

6.2 The nature of Strand 3

6.2.1 Outreach and publicity

The Sciencehorizons project team wrote to 7,808 individuals and organisations such as community groups, environment groups, health groups, adult learning groups, discussion / debating societies, libraries and faith groups. Groups were invited to request Sciencehorizons packs and run their own small discussions using the materials provided. Information about the project was also posted on online discussion lists / boards, blogs etc.

In order to encourage schools to participate, a set of teachers notes was produced and a letter was sent to every secondary school in the UK, announcing the project and the availability of free information materials.

747 requests for packs were received, and over 4,000 packs were distributed in total. 1,320 copies of the teachers notes were distributed.

6.2.2 Participants

Overall, 392 separate responses to the Sciencehorizons questions were received from 78 separate groups. 253 responses were made on paper forms and 139 responses were made online. Analysis of these responses by the Sciencehorizons team suggests that an estimated 2,400 people participated in this strand.

32 groups made one response each on behalf of their group (41% of responses were group responses in this way); and 46 groups sent in multiple responses (59%). Numbers of multiple responses from a single group varied from 2 responses per group to large numbers of responses from schools: one school sent in 75 separate responses.

This variation in the nature of responses does make it very difficult to come to conclusions about the quality of answers submitted overall, as some are considered group answers, and some are quite superficial answers from a single school pupil. In future engagement exercises of this sort, it would be useful to separate group and individual answers so that all those providing a collective group response can be considered separately from answers from individuals. Although answers from groups are not necessarily 'better' quality than those from individuals, they are clearly 'different'.

The evaluation questionnaires asked organisers to specify how many people attended the event they organised, what sort of people attended and how many of those taking part had a science or technology background. This information was not complete on some questionnaires, but the findings do give an indication of the variety of the size and nature of the groups taking part.

In terms of the **size of the groups** meeting for discussions, Strand 3 events were generally smaller than Strand 2 events, with more involving groups of under 10 people than over 10, and only 2 involving more than 30. There were:

- 5 events of up to 5 participants
- 11 events of 6 - 10 participants
- 7 events of 11 - 20 participants
- 6 events of 21 - 30 participants
- 2 events of over 30 participants.

There is questionnaire data on the types of people in the Strand 3 group discussions, and on the types of groups (see Annex 3 for details). However, this data coves less than half the groups taking part in Strand 3 activities so it cannot be relied upon for an accurate overall picture.

However, an analysis has also been undertaken of all the groups sending in responses to the Sciencehorizons project nationally, based on the name of the group (where that was obvious). Although not perfect or complete, this does provide a more robust and representative picture of the types of groups taking part than relying solely on the limited questionnaire responses. This analysis shows that there were:

- 257 (out of 392) responses from schools / colleges (66%)
- 38 responses from Women's Institute groups (10%)
- 26 responses from environmental groups such as Friends of the Earth (7%).
- 13 responses from Humanist groups (3%)
- 10 responses from University of the Third Age groups (3%)

The remaining 11% of responses came from a wide range of other groups including scout and guide groups, science and technology interest groups, mother and toddler groups, faith groups, philosophy groups, women's groups, groups of friends, groups of adults with learning disabilities, and groups of researchers.

This is a remarkably wide diversity of groups in terms of interest, age and likely prior knowledge of the issues, although clearly the largest single group of responses came from schools (two thirds of responses).

Further analysis shows that there was a different type of distribution in term of types of groups, based on analysis of the 78 groups identified. This shows there were:

- 16 school groups
- 15 Women's Institute groups

- 5 Humanist groups
- 4 environmental groups
- 4 University of the Third Age groups, and
- 34 other types of group.

6.3 The effectiveness and value of Strand 3

Questionnaires were sent to all organisers of Strand 3 events as part of the Sciencehorizons information materials. 32 evaluation questionnaires were completed and returned from the 78 groups running events. This is 41% of groups which, although not as high a response rate as in Strands 1 and 2, still provides a reasonably robust sample for analysis.

It was not possible to attend and observe any Strand 3 events, as they were not publicised in any way in advance, and were not part of the calendar of events on the Sciencehorizons website, so it was not possible to know when or where they were taking place.

The findings below also draw on analysis of the 222 responses to the general question (question 13) at the end of each of the four individual topics, which asked "What else would you like to say about the stories in this theme, or about the pack in general?". Most of the comments were across all themes but it is noted below where they clearly related to specifically to one of the four themes.

6.3.1 General feedback

The overall feedback on the way the Sciencehorizons project worked for Strand 3 groups was generally positive:

- **88% of questionnaire respondents (28) were satisfied with the information and instructions** in the Sciencehorizons pack and/or on the website; 38% of those (12 respondents) were **very satisfied**. 2 respondents were not very satisfied and only 1 was not at all satisfied.

- **87% (28 respondents) found it easy to have a discussions with the materials provided** (the pack and / or website); 34% of these (11 respondents found it **very easy**. 3 respondents found it not very easy but none found it not at all easy.

Questionnaire respondents also provided information on how clear they were about the Sciencehorizons project. The results were:

- **78% (25 respondents) said they were clear about the purpose of having the Sciencehorizons discussions**; 31% of these said they were **very clear**. 19% said they were not clear and 1 of these was 'not at all' clear.

- **41% (13 respondents) were clear about how the results of the discussions would be used**; only 19% (6 respondents) were very clear. 57% were not clear; of which 19% (6 respondents) were not at all clear.

These figures show that respondents were fairly clear about the purpose of the Sciencehorizons project (why they were having the discussions) but much less clear about how the results of their discussions would be used: only 6 out of 32 respondents were very clear about that. This suggests that the information provided on the purpose of the exercise worked well, but there was not sufficient information on how the results of the public discussions would be used.

This is a significant issue as participants often judge the success and value of the public dialogue they are taking part in at least in part on whether the results are used, and whether those results make a difference in some way. Lacking knowledge about how the results will be used therefore often affects the ways in which people participate and how enthusiastic and committed they are to the process, which in turn affects the quality of the debates and outputs.

6.3.2 Reaching the general public

Strand 3 events clearly did reach a wide range of people, and participants came from various age groups and backgrounds. Although, as shown above, the data is far from complete, it seems that there was a remarkable mix of groups taking part, including schools, WI groups, environmental interest groups and some groups which were no more formal than a few friends who meet regularly.

Questionnaire respondents were asked whether they had been involved in a consultation like this before. The results were:

- 2 had been involved before
- 22 (88%) had not.

This shows that the great majority of the questionnaire respondents (88%) had not been involved in such a project before. This suggests that the Strand 3 process **did** reach groups that had not been involved before.

However, it is not entirely clear from this fairly broad question whether they were new to science and technology issues, or to taking part in a national project of this sort. It would be useful in any future exercise to monitor this issue more closely so that the success of the initiative in reaching out to groups new to science and technology issues could be more effectively assessed.

Nine responses to the Sciencehorizons project came from groups that could be described as 'science / technology interest groups'. Although it is not possible to show a definitive conclusion, it seems that the other groups responding did not see themselves as primarily interested in science and technology issues, and were discussing those issues because the Sciencehorizons project provided information and a framework for involvement.

Strand 3 groups were usually existing groups that already met for some other purpose and were considering future science and technology issues in this instance.

It was a specific element of the Sciencehorizons design to promote group discussions, rather than simply gathering views from individual members of the public. This is a principle of public dialogue and the benefits of working in a group were recognised by one questionnaire respondent who said:

> *"We each had a different background and experience to draw on. A small group allows everyone to have their say"*

This response shows one of the benefits that participants often identify from being involved in dialogue projects - they value listening to scientists and other experts, but they also value listening to other members of the public and hearing their different perspectives and points of view. This is as important an element of the learning processes within public dialogue as direct conversations with scientists and other experts.
The Sciencehorizons project team have calculated that 2,400 individuals took part in Strand 3 events, providing a total of 392 responses on the issues. Although these participants may not have been a representative sample of the general public in the same sense that Strand 1 was (as Strand 1 participants were recruited specifically to provide a

sample of the general public), those involved in Strand 3 events were less 'interested' than the people who took part in Strand 2 events (who tended to already be within science networks or schools).

This is an important issue for future public dialogue on science and technology. There is often a desire among policy makers to reach the 'general public' but the general public may not be interested in taking part without a good reason. Sciencehorizons was designed to provide opportunities and encouragement for the public to become involved, but did not provide financial or other incentives (other than in Strand 1 to a very small group), so involvement was on an entirely voluntary basis in Strands 2 and 3. This voluntary involvement generally requires a pre-existing interest of some sort which sets the participants apart from the general public as usually defined.

It may therefore be more appropriate to be much more specific in future about the 'publics' that are targeted with projects of this sort: the interested public, the already engaged public and other sub-sectors of the public may be more appropriate target audiences for future dialogues than the general and uninterested public.

6.3.3 Motivations for organising the event

There were various reasons given in questionnaire responses as to the respondent's motivations for organising the event, as follows:

- 17 of the 32 respondents (53%) said it was as secretary to an existing group (e.g. WI, Humanists)
- 8 (25%) said it was a school project
- 6 (19%) said it was to have an interesting discussion
- 3 (9%) said it was to take part in something national Government would take notice of / listen to
- 2 (6%) said it was because they wanted to influence the future
- 1 said it was to stimulate interest in science and technology.

These responses suggest that the motivation for the majority of groups (more than 75% of respondents) was that it was just another subject for their existing group to discuss, rather than because of any special interest in science and technology. In some ways, this was exactly the target audience for the Sciencehorizons project.

It is worth noting that five respondents (16%) said that they organised their discussions because of the links to future decisions and / or national policy. This relates to the point made in 6.3.1 above about clarity among participants about how the results of the Sciencehorizons discussions would be used; this is clearly an issue for at least some participants in terms of how they value the process they are taking part in. In future evaluations, it may be useful to test the importance of this element of the process.

6.3.4 The involvement of scientists

Almost all groups responding to the questionnaire had at least one person with a science or technology background; only four groups had no-one with this background (and four respondents did not answer this question). Often there was more than one person with a science or technology background, and usually this person was simply a member of the group, rather than taking a specialist role. The interpretation of this question varied with respondents (e.g. some school groups of pupils taking science and technology classes described all participants as therefore having a science and technology background).

The role of the scientist / expert did not seem to be separate in any way from the rest of the group - they were usually simply part of the discussion. While this may be the most comfortable relationship and approach, it may be that the lack of clear differentiation or boundaries between detailed scientific and lay knowledges may confuse the issues rather than support new thinking and conclusions.

However, the involvement of scientists within the groups was part of the purpose of the Sciencehorizons dialogue, and this involvement clearly worked effectively and widely even in this strand which was expected to be the least formal process but which still clearly included processes which closely engaged the public with scientists.

6.3.5 The Sciencehorizons materials

As noted above, 88% of questionnaire respondents were satisfied with the information and instructions provided by the Sciencehorizons project, and 87% found it easy to have a discussion using the pack and / or website.

Strand 3 groups were significantly more positive about the materials than the Strand 2 groups. Strand 3 questionnaire respondents said that the following were what worked best in the process for them:

- 28% (9 respondents) said the scenarios / stories were the best part of the process for them
- 9% (3 respondents) said the design of materials worked best (e.g. colourful, liked cartoons)
- 6% (2 respondents) said the content of the materials generally worked best
- 6% (2 respondents) said the best thing was that the materials provided a framework for discussion.

Individual comments on the questionnaires about the materials included that the following worked best:

"The ones [stories] with some controversy"

"The material raised many issues for discussion and made the group aware of new developments. With the references to the scans there was much useful information"

"The discussion of the scenarios rather than trying to answer the questions"

"All worked very well. Pupils very interested and involved"

"The amount of info on reverse of story sheets. Very thought provoking"

"Interested and intrigued with the imaginative extrapolations made of science and technology towards the year 2025 but thought much of it unrealistic and a touch distasteful when viewed in the context of a world faced with more pressing problems"

"It all went well. Everyone took an active role in discussion. We thought the information on the pack was well written and clear"

"Most helpful to have 'where we are now'. Liked the cartoon presentation. Certainly started off discussions and made us re-think"

Analysis of the responses as part of the 222 general responses to Sciencehorizons from Strand 3 groups (rather than through evaluation questionnaires) provided even more positive feedback on materials. The positive feedback here was:

- 34% of respondents (76 responses) said the stories / scenarios / materials were interesting / effective / realistic / stimulated discussion
- 6% (13 responses) said they enjoyed it / very good / fun

- 2% (4 responses) said they were pleased / want to have views listened to / influence / have say / discuss opinions
- 1% (3 responses) said they found packs attractive (colourful, fun etc)
- 1% (3 responses) said the information in stories was balanced (good and bad)
- 1% (2 responses) said the information raised important issues.

However, there was also some negative feedback about the materials, and some questionnaire respondents also identified those aspects of the materials that they felt worked least well:

- 22% (7 questionnaire respondents) said there was too much to discuss in the time suggested (especially too many scenarios)
- 6% (2 respondents) each identified the following problems with the materials:
  - Scenarios too much like today and not futuristic enough
  - Categorising responses into likes and dislikes too limiting
  - Complicated jargon / high reading age needed for materials
  - CD Rom added nothing
  - Questions did not seem to relate to the stories
  - It was hard to keep the focus on technology issues when social factors were so important as well.

Individual comments from questionnaire respondents included the following that they felt worked least well:

> *"Condescending, information-free materials; lack of distinction between science and technology; insufficiently forward-looking; superficiality"*
>
> *"'Interactive' stories on CD ROM a waste of resources. Situations felt very artificial"*
>
> *"The material was very middle-England with few extremes. The group thought it lacked context in global terms and did not acknowledge the competition for resources. We were disappointed that the programme did not make more impact"*
>
> *We all found that trying to categorise our opinions into 'like or dislike' was extremely limiting. We would have preferred 'approve / disapprove' or 'acceptable / unacceptable' to offer us more scope for moral judgements"*

Similar issues were raised in the 222 responses to the general questions in the pack / website about the materials. The main points raised were:

- 14% (32 responses) said that the stories / materials were too simplistic / immature / boring / depressing / repetitive / not realistic / scary
- 11% (24 responses) said that the stories did not recognise equity / fairness / cost issues enough (e.g. affordability of technology / who will pay
- 3% (7 responses) mentioned that the problems / stories were complex and need more than simple technological solutions (e.g. social / political / economic / environmental)
- 3% (6 responses) each identified the following:
  - scenarios were too close to current reality
  - they wanted more information / more science / more specific info on technology / more references
- 2% (4 or 5 responses) said:
  - there were too many positive assumptions made about implications / too rosy a picture (e.g. civil liberties, human rights, equal rights)

    - did not enjoy using the pack
    - it was a waste of time and / or resources
- 1% (2 or 3 responses) said:
    - questions were not linked to stories / did not focus discussion / not specific enough / simplistic / repetitive
    - found packs unattractive (didn't like cartoons etc)
    - materials lacked context especially too UK centric / lacks global context
    - too materialistic / about more consumption
    - need wider debate / issues should be discussed more widely by others
    - stories too focused on individuals and not wider society
    - missed key issues (e.g. energy crisis, transport, education)
    - stories too complicated.

Overall, these figures show that more than twice as many respondents (76) felt the stories / scenarios were interesting and stimulated good discussions than those that did not (32). Also, more than twice as many (13) simply said they had enjoyed it and it was very good, compared to those that did not enjoy using the pack (5).

The analysis of Strand 2 suggested that different groups within that strand reacted differently to the materials. School groups were more positive than adult groups (in general, although by no means universally). It may be that the preponderance of school groups responding in Strand 3 has given a similar result - that school groups liked the materials in general more than adult groups. However, the general point made in the Strand 2 analysis remains valid: that different materials may be needed to meet the needs and expectations of different groups, especially in terms of design but also possibly in terms of content.

It is, however, interesting to note that, after the general comments on the stories, the point raised most often in these comments was about the lack of recognition in the stories about issues of equity and fairness in terms of who would be able to get access to these new technologies, and whether they would only be available to those who are able to pay for them (with poorer people being excluded from any benefits of such technological advances). This was a significant issue in 24 of the responses.

Related points raised included the lack of consideration in the stories of the civil liberties, equal rights issues implicit in some of the technologies (mentioned 5 times), and those that felt that the stories were too materialist and about simply increased consumption (3 comments), which also relate to equity and accessibility. While it was always the intention of the project to prompt just these sorts of discussions, the stories as they currently stand were felt, to some extent, not to have taken these issues sufficiently into account.

There was also feedback here indicating the same sense of 'guilt' as was apparent in Strand 2 feedback among groups who found themselves discussing social and ethical issues rather than concentrating on science and technology issues. One questionnaire respondent said that the thing that worked least well in the whole process was:

> *"Trying to confine ourselves to technology as we all felt human / personal concerns or impact on social life were vitally important"*

Although this was the aim of the Sciencehorizons project and its materials, it should perhaps be made more explicit to those using the materials that this is expected, so they can have these wide-ranging discussions of values and attitudes freely and without worrying about it, and that those discussions are what are valuable to policy makers in deciding future priorities.

Another unexpected aspect of feedback was that, exactly as with Strand 2 groups, some of those running groups were surprised at the effectiveness of the materials. One comment received by email from a Strand 3 group organiser was:

> *"Overall I was really amazed at how much information I was able to extract from 7 people about their beliefs and values in 90 mins, down to quite a specific and philosophical level … We went from 'oh home robots sound a bit pointless why should we talk about them?' to 'but machines have caused the deterioration of the moral fabric of society over the last 2 centuries starting from the Luddites' in about 15 mins - which was great!"*

This person's feedback went on to say that "it did take a lot of intervention and questioning to get a good tangible results for the consultation". It would have been useful to have had more data on the processes used by different groups, to be able to give guidance to those leading groups in future. Collecting this sort of data should perhaps be built into any future projects of this sort.

Both the processes of Strand 3 events and the design and content of the materials clearly stimulated many interesting discussions that were enjoyed by a lot of people. There may now be the potential for deeper discussions to explore the issues in significantly more depth. This could involve building on the experience from the Sciencehorizons project and developing more in depth, longer term deliberative discussions in future.

6.3.6 Timing

There was less feedback than in Strand 2 about lack of time but, as with Strand 2, there were mentions of lack of time within the suggested discussion session length (1.5 hours), and to get comments back to the Sciencehorizons project:

- 7 questionnaire respondents (22%) identified problems around there being too much to discuss in the time suggested, including that each scenario took a long time, there were too many scenarios, and there was too much to take in the time suggested. Comments included:

  "Far too much to discuss. Time suggested much too short"

- 2 questionnaire respondents (6%) and 6 Question 13 responses said there had not been enough time to have their discussions and send in responses to the Sciencehorizons project before the deadline. Comments included:

  "The tight timescales - if we'd known about this 12 - 18 months ago, we could have engaged more WIs"

  "We would have liked more than 2 meetings before the deadline."

The point made in the Strand 2 analysis is therefore also valid for Strand 3 feedback: that to some extent these materials were useful in a first pass over these issues - starting to consider some of the ethical and value issues related to the future of science and technology, but that more time was needed to discuss them in any depth.

6.3.7 Relationships with the Sciencehorizons project nationally

The main reasons identified by questionnaire respondents as to why groups organised Strand 3 events were that they were an existing group (53%) and thus presumably were looking for something to do, as a school project (25%) or they wanted to have an interesting discussion (19%). 5 respondents (15%) were interested because it involved

taking part in something national that would have influence on the future. Only the latter suggests clear links to the formal Sciencehorizons objectives.

This suggests there was not a close relationship between groups in Strand 3 and the Sciencehorizons project nationally. However, there was generally a good understanding of the purpose of the project (78% of questionnaire respondents said they were clear about that), and there was generally positive feedback about the support provided through the materials (see 6.3.5). This suggests that although the relationship between the Sciencehorizons project nationally and Strand 3 groups was not close, there was a good level of understanding about the national goals.

6.3.8 Future engagement

24 of the 32 questionnaire respondents (75%) said they would like to have another discussion on science and technology issues; only 2 respondents said they did not want to do that.

This does indicate a very positive level of interest in future discussions on science and technology, especially bearing in mind that the great majority of these groups are not focused on science and technology issues.

This suggests that the Sciencehorizons project has stimulated significant interest among these groups in continuing to discuss science and technology issues, which few of them had considered before. This is a major achievement of the project, which could be built on in future programmes.

In terms of issues for future events, there was no clear direction from questionnaire respondents. Although many respondents made suggestions, only a few issues were mentioned more than once (see Annex 3 for full list of topics suggested):

- There were 3 mentions each of the need for future dialogue on the food industry and genetic modification / engineering.
- There were 2 mentions each of the need for dialogue to consider farming and agricultural practices, and environmental topics.

However, these were such small numbers that they could not be taken as more than an indication of what a few people felt strongly about

6.4 What worked best in Strand 3

6.4.1 Reached diverse groups

Although the data is not perfect or complete, it is clear from the analysis of groups responding that Strand 3 activities involved a very wide range of groups of diverse ages and backgrounds, and with varying levels of knowledge and interest in science and technology. The groups ranged in size and formality from small groups of three or four friends to established groups, some meeting in events of over 30 people (although some of these may have been school classes). The range of groups included schools, Women's Institute groups, environmental groups, University of the Third Age groups and many others. Most of the questionnaire respondents (88%) had not been involved in a project like this before, so Strand 3 did reach 'new publics'.

Nearly 400 individual responses were provided to the project from an estimated 78 different groups, reaching an estimated 2,400 individuals. This is a very good achievement in such a relatively short timescale.

6.4.2 Dialogue with scientists

Almost all the groups in Strand 3 had at least one person with a science or technology background; only 4 out of 32 respondents had not. These experts seem to have been entirely integrated into the activities of the group. While this may not be the normal role of scientists / experts in public dialogue, it clearly worked very well for these groups (which were much more informal than conventional dialogue processes), and provided an interesting model for the future.

6.4.3 The materials worked well

There was much more positive feedback from Strand 3 groups (than Strand 2) about the information and instructions provided (88% were satisfied with those), and the information provided in the pack / website (87% found these easy to use).

The feedback on the content of the information provided in the pack / website was also very positive, with more than twice as many responses to the consultation being positive about the stories / scenarios being interesting and stimulating good discussions (76 responses) than those that did not (32 responses).

6.4.4 Enthusiasm for more engagement

75% of questionnaire respondents said they would like to have another science and technology discussion; only 2 out of 32 said they would not. This shows a very high level of interest and enthusiasm for continuing to discuss science and technology issues among Strand 3 groups who are largely not focused on science and technology normally.

It is a significant achievement for the Sciencehorizons project that the materials and support available (even the minimum support available in Strand 3) have resulted in such enthusiasm among public participants for more engagement on science and technology issues in future.

6.5 What worked less well in Strand 3

6.5.1 Timing

The difficulties of fitting in the discussions to the time suggested for each event in the information and instructions provided was the single biggest complaint about the materials (especially having to cover too many scenarios). These groups seem to have had the most difficulty with managing the time in their events.

It also seemed that some groups in Strand 3 (as in Strand 2) did not feel they had time to consider the materials, plan and deliver events and send in comments within the national project deadlines. As Strand 3 events were run largely by voluntary groups (and schools), their time for these activities was limited and that does need to be taken into account in any future planning.

6.5.2 Lack of data on who participated

It had been agreed during the planning phases of the Sciencehorizons project that it was not feasible to expect groups in Strand 3 to provide detailed data on who was involved in the groups and how the groups worked. The focus in the planning was on developing and delivering a good quality dialogue process, with the research elements of the process being seen as less of a priority.

In practice, that balance between encouraging and supporting quality dialogue and collecting research data seems to have worked well for participants in Strand 3 (as the feedback shows they were satisfied with the process). However, it does cause problems for the evaluation and for the role of the Sciencehorizons project in promoting understanding of public dialogue and of methods of reaching large numbers of people as there is not sufficient data to come to definitive conclusions.

However, the data that has been assembled and analysed does provide sufficient evidence from which to draw some lessons for future such projects, including what are the key questions about participants and the processes that need to be asked in future evaluations.

6.5.3 Proliferation of responses from schools

Two thirds of the individual responses to the Sciencehorizons project nationally came from schools or colleges (66% of responses). Schools were also the main single category of groups responding (16 out of 78 groups). One school sent in 75 responses and many others sent in multiple responses.

The differences between views on the materials from schools and from others (some schools finding the stories too complex compared to other groups finding them simplistic), and the difference in the quality and quantity of their responses (in terms of contributing valid feedback) suggests that it may be more effective in future to develop separate materials for schools and to consider their feedback separately.

It is also worth noting that without the schools, there would have been a significant reduction in the scale of feedback to this Strand. Without schools, Strand 3 would have had responses from a total of 52 groups providing a total of 147 responses. This apparently dramatic reduction in response numbers does need to be qualified slightly by recognising that many of the school responses were individual responses (by individual pupils) and many of the other responses were on behalf of groups. However, it may be that estimates of likely responses from the 'general public' may need to be revised downwards in any future exercises, if schools are excluded or treated as a separate category.

Finally on this issue, the answers from each strand were analysed and reported separately, but no analysis by type of group within each strand was done. This is something that future projects of this sort may wish to consider.

6.6 Overall conclusions on Strand 3

Overall, Strand 3 worked very well to reach many diverse groups and to provide materials that stimulated and supported good discussions to the satisfaction of many participants. Scientists were involved in almost all Strand 3 groups on which data is available and their role, as participants in discussions, appears to have worked very satisfactorily.

As a result of the process, many respondents were keen to go on to have another discussion on science and technology issues, showing considerable enthusiasm for the subject among groups who had not in general been involved in this sort of activity before.

There is less detailed data on Strand 3 groups and events than on the other two strands, so it is more difficult to get a really detailed picture of how Strand 3 events were structured and how effective they were. However, there were 392 individual responses as a result of Strand 3 events, so there must have been a good level of discussion and interest to prompt such a good response.

The lack of information about who was involved and what went on in the Strand 3 events has caused some problems in evaluating the process. It was agreed early on in the Sciencehorizons design process that it was not feasible to expect Strand 2 or Strand 3 groups to provide much monitoring information. It may be worth considering in future the balance between making demands on groups for data and the difficulties of assessing the value of their responses without more background information on the nature and composition of the group and what form their discussions took. In particular, it would be useful to separate responses by individuals and by group leaders on behalf of whole groups, and to separate responses from schools.

Feedback on the materials was much more positive from Strand 3 respondents than from Strand 2, with an 88% satisfaction rate here. This may be partly because of the proliferation of schools in this strand (66% of all Strand 2 responses were from schools, including many from individual pupils). The number of school responses did raise the issues of whether separate analysis of responses from individual and groups, schools and other groups, should be considered in future projects of this sort.

The other key issue for this strand, as in Strand 2, as the problem of lack of time, both to cover all the issues in a single meeting of around two hours, and to plan and hold a group meeting and then report back conclusions within the project deadlines.

Overall, however, it is clear from the evidence reviewed for the evaluation, Strand 3 worked well to reach different groups, stimulate and support discussions on science and technology, and provide a positive experience for participants which has clearly encouraged them to want to discuss science and technology issues again in future. It also provided data from a different set of 'publics' to feed into the overall findings from the project which helped 'triangulate' the findings overall by comparing results from the different strands.

7 Assessment of activities against objectives and good practice guidelines

7.1 Introduction

The Sciencehorizons project was designed to develop and support informed, deliberative dialogue processes bringing together citizens, specialists, policymakers and other stakeholders, working in partnership with the broader science engagement community.

The project's **primary objectives** were:

- to discover views about the issues raised by possible future directions for science and technology, from a broad set of participants
- to inform policy and decision-making on the direction of research and the regulation of science and technology, and
- to help identify priorities for further public engagement on areas of science and technology.

Its **secondary objectives** were to:

- widen public awareness of the role of science and technology in shaping the future of the UK;
- improve public confidence in the Government's approach to considering wider implications of science and technology;
- increase understanding of the value of public dialogue in shaping policy and decision–making in science and other policy areas;
- improve understanding of how to engage large numbers of people in discussions and dialogue on science and technology-related issues, particularly issues arising from new and emerging areas of science and technology;
- strengthen coherence and collaboration among science engagement practitioners.

7.2 Assessment against objectives

Primary objectives	Indicators of success	How each objective has been met
Objective 1: To discover views about the issues raised by possible future directions for science and technology, from a broad set of participants.	Issues identified from research on futures of science and technology to present to broad set of participants	The project identified issues from the Horizon Scanning Centre scans, in collaboration with the HSC and others, and turned them into issues that could be discussed with and by the public.
	Demonstrate broad set of participants involved: range of backgrounds, knowledge of the issues	Each strand reached a different set of participants: Strand 1 recruited a demographic cross-section of the UK population; Strand 2 reached the 'interested public' through existing science and technology communications networks; Strand 3 reached groups who largely had no prior experience of this sort of activity, and often with no prior knowledge of science and technology. Overall, therefore, the project reached a broad set of participants in terms of backgrounds and knowledge.

Primary objectives	Indicators of success	How each objective has been met
Objective 1 (continued)	Discover views from a broad set of participants	The process was designed to stimulate discussions that would enable participants to express their views. A framework of questions was provided within the given information materials, so that views could be discovered, recorded, reported and (finally) analysed. This was achieved.
Objective 2: To inform policy and decision-making on the direction of research and the regulation of science and technology	Results of process produced in a form that could be used by policy and decision makers	The results of the discussions in all three strands were analysed separately, and separate reports produced. An overall report was then produced specifically for policy and decision makers, drawing attention to the policy issues raised (section 1.20 of the overall report, p14).
	Results of process fed into policy processes at appropriate times and stages	No specific policy development processes could be identified on any of the issues while the project was in operation, or since. However, policy makers in related areas were invited to a workshop in November 2007 at which the findings from the process were presented, amalgamated with the findings from stakeholder engagement processes in the WIST programme. This was the most appropriate stage to feed in these policy findings.
	Results of process informed (taken account of in) policy and decision making	Policy makers attending the November '07 workshop were provided with notes of all the discussions and conclusions from that event. However, it has not been possible to identify any evidence that those points have been taken into account in formal policy and decision making processes at this stage. It is likely that the findings will form just one part of the background evidence for future policy making and decisions in these fields, and thus difficult to show in terms of direct influence.
Objective 3: To help identify priorities for further public engagement on areas of science and technology	Priorities for future engagement identified as part of the Sciencehorizons process	Participants were asked in all strands of the process what they thought were the priorities for future engagement. Some ideas were given both through the main process and the evaluation research. From all these sources, the final report of the policy implications of the overall findings from the project identified policy priorities (section 1.20 of the overall report, p14). The evaluation questionnaire research also asked respondents in all three strands what topics they thought were most important to discuss in future events for the public, and these have been covered in this report. The November 2007 workshop specifically focused on the policy priorities identified in the amalgamated Sciencehorizons and WIST findings, and identified priorities for future engagement. These priorities were recorded and disseminated to workshop participants for future reference.

Secondary objectives	Indicators of success	How each objective has been met
To widen public awareness of the role of science and technology in shaping the future of the UK	Sciencehorizons reached audiences new to science and technology issues in the UK	Strand 1 of the project reached a demographically representative sample of the general public; science and technology issues were new to almost all of these people. There is less information on the participants in Strands 2 and 3. However, there is evidence that, in Strand 3, 88% of evaluation questionnaire respondents said they had not been involved in these sorts of discussions before. 40% of Strand 2 events were organised by science and technology communications centres etc, and attended by people in touch with existing science and technology networks; however, it is likely that many of the remaining Strand 2 events were with audiences new to science and technology issues. Overall, therefore, there is good evidence that new audiences were reached through all strands of the process, and therefore a wider public awareness of the role of science and technology in the UK.
	Publicity and promotion activities spread awareness of the project and the issues	There was a major promotion and publicity exercise to launch the project, and encourage people to take part, which included sending information to many organisations not currently involved in science and technology issues. This work will have spread some awareness of the role of science and technology in the UK, and the role of public dialogue within that.
To improve public confidence in the Government's approach to considering wider implications of science and technology	Extent to which participants understood how the results of the Sciencehorizons project would be used by government and others	100% of questionnaire respondents in Strand 1 were clear about how the results of the project would be used; although only 32% were 'very clear'. In Strand 3, 41% of respondents were clear about how the results would be used; although only 19% of these were very clear and 57% were not clear. There is no data on this issue from Strand 2 groups. Overall, this suggests some but not great clarity among participants over how the results of the project would be used.
	Extent to which participants thought the results of their discussions would influence government and others	48% of evaluation questionnaire respondents in Strand 1 agreed that government and others would take the results of the project into account in future; and only 8% of these agreed strongly. There is no data on expectations of influence of the project from Strands 2 and 3. Overall, this does not suggest significant expectation that the results of these discussions would have much influence over Government and others.

Secondary objectives	Indicators of success	How each objective has been met
To improve public confidence in the Government's approach to considering wider implications of science and technology (continued)	Extent to which participants are willing to engage in future on science and technology issues, to show trust in potential future processes	96% of evaluation questionnaire respondents in Strand 1 thought it was important to involve the public in discussing these sorts of science and technology issues; 88% of these thought it very important. 96% also thought more events should be held for the public to discuss science and technology issues (no-one though they should not). 93% of respondents in Strand 2 agreed it was important to involve the public, and no-one disagreed. 79% said more events should be held. 75% of respondents in Strand 3 said they would like to have another discussion on science and technology issues in future. Overall, this evidence shows real interest and willingness to engage in future dialogue processes on science and technology, and a strong belief that it is important to involve the public in these discussions.
To increase understanding of the value of public dialogue in shaping policy and decision–making in science and other policy areas	Identify the value of this dialogue in shaping policy and decision-making in science and other areas	This evaluation report identifies the value of dialogue in shaping policy and decision making (see section 8.3).
	Sharing learning from this project	The project team has presented the findings from the project, and from the evaluation at the BA Festival of Science in September 2007, and the joint WIST / Sciencehorizons workshop in November 2007. In addition, the final report on the findings from the project, and this evaluation report, identify lessons for the future. Both reports are being published and disseminated to contribute to improved understanding.
To improve understanding of how to engage large numbers of people in discussions and dialogue on science and technology-related issues, particularly issues arising from new and emerging areas of science and technology	Identify lessons from this project on methods of engaging large numbers of people in dialogue on these issues	This evaluation report identifies lessons from this project's work to engage large numbers of people in dialogue on science and technology issues. The report is being published and disseminated to contribute to improved understanding.
	Focus on new and emerging areas of science and technology	The project specifically focused on issues identified by the HSC as new and emerging areas of science and technology.

Secondary objectives	Indicators of success	How each objective has been met
To strengthen coherence and collaboration among science engagement practitioners.	Stakeholder engagement within the project	There has been extensive stakeholder engagement within the project through the Oversight Group, the Project Board and through separate engagement activities including the initial workshop to consider how to frame the issues from the HSC scans for the public. In addition, stakeholders have been involved through presentations of the projects content and evaluation findings as outlined above.
	Examples of collaboration within the project	Six new collaborations were developed in the course of the project (see section 5.3.8).

The analysis above shows that the primary objectives of the Sciencehorizons project were fully met. The secondary objectives for the project were included so that the project would be seen to be making a contribution to these objectives, which were the objectives of the Sciencewise programme as a whole at the time. Overall it is clear that the project also made a significant contribution to meeting these wider Sciencewise objectives.

Fully assessing the impacts of the project on the secondary objectives (e.g. widening public awareness of the role of science and technology in shaping the future of the UK) would have required research beyond the scope of this evaluation. More importantly, such a broad objective (of awareness raising) is likely to be impossible (and probably inappropriate) for a public dialogue project of this sort. The conclusion that a significant contribution has been made to these objectives has been reached by focusing on the 'outputs' of the project rather than the final 'impacts' which are too diffuse and long term to measure within this evaluation.

7.3 Assessment against principles of good practice

It was part of the objectives of the consultation that it should meet the Government's Guiding Principles for Public Dialogue on Science and Technology[6]. The full set of principles is given in Annex 5. The following analysis is based on the key principles outlined in the guidance.

Key principles of good practice	Indicators of success	How each principle has been met
1. CONTEXT The conditions leading to the dialogue process are conducive to the best outcomes	Be clear in the purposes and objectives from the outset	Clear objectives were set at the outset of the project, and this evaluation has assessed the achievements of the project against these objectives (see 7.2).
	Be well-timed in relation to public and political concerns, and start as early as possible in the policy decision process	This project took place extremely early in the policy decision process, before any detailed policy proposals had been formulated.
	Feed into public policy, with commitment and buy-in from policy actors	After some initial difficulties in identifying relevant policy actors, a process was identified that enabled the findings from the project to be fed to public policy makers at a workshop in November 2007. At present it is not possible to show specific commitment and buy-in to the findings from the project from specific policy actors as the project took place so early in the policy process that there were no specific policy developments in place.
	Takes place within a culture of openness, transparency and participation with sufficient account taken of hard to reach groups where necessary.	The project was open to any participants that wanted to take part (through Strands 2 and 3), and the potential to take part was very widely publicised. In Strand 1, a demographically representative sample of the population was recruited, including from black and minority ethnic communities, people with disabilities and other who would normally be classified as hard to reach.
	Have sufficient resources in terms of time, skills and funding	The project was very well-resourced in terms of skills and funding. However, the evaluation has found that the timing for the project in terms of reaching new audiences and gaining the responses required for the project was very tight. Participants would have liked more time to meet and consider the issues and then input their conclusions than was available. Also, time was a constraint on the number of collaborations that could be achieved (which take time to set up).
	Be governed in a way appropriate to the context and objectives.	The project had very clear governance arrangements, with a Project Board and an Oversight Group, as well as a project team working collaboratively.

[6] Office of Science and Innovation. The Government's Approach to Public Dialogue on Science and Technology. *Guiding Principles for Public Dialogue*. September 2006.

Key principles of good practice	Indicators of success	How each principle has been met
2. SCOPE The range of issues covered in the dialogue are relevant to participants' interests.	Cover both the aspirations and concerns held by the public, scientists in the public and private sector, and policy-makers.	All those involved were largely satisfied with the process. As the subject matter was dealing with 'futures' issues, they were not necessarily immediately relevant to public participants' existing interests, but they did become interested.
	Be focussed on specific issues, with clarity about the scope of the dialogue.	The issues for public dialogue were very carefully identified and designed to be appropriate to the dialogue process, and largely worked well. The scope of the dialogue was made very clear and was widely understood by participants.
	Be clear about the extent to which participants will be able to influence outcomes. Dialogue will be focussed on informing, rather than determining policy and decisions.	The limits to the influence that participants could have were clear. The dialogue was designed to inform future policy making quite broadly, rather than influencing specific policy proposals.
	Involve a number and demographic of the population that is appropriate to the task to give robustness to the eventual outcomes.	The project reached a very diverse audience, with strands ensuring demographic representation alongside reaching 'interested' publics, schools, community groups and various others. The diversity of the audience reached was entirely appropriate to the task and provided the robustness necessary to validate the results.
3. DELIVERY Ensuring that the dialogue process itself represents best practice in design and execution.	Ensure that policy-makers and experts promoting and/or participating in the dialogue process are competent in their own areas of specialisation and in the techniques and requirements of dialogue.	The experts involved in Strand 1 were invited specifically in response to requests from participants and were recognised as leaders in their field. Elsewhere in the process, experts were invited or took part according to their inclination or by invitation on specific subject by the groups and organisations running events. Policy makers did not participate directly with the public; the results of the exercise were presented to them separately.
	Employ techniques and processes appropriate to the objectives. Multiple techniques and methods may be used within a dialogue process, where the objectives require it.	Deliberative dialogue processes were used in Strand 1; other engagement techniques were used in Strand 2; and Strand 3 groups were self-organising. All techniques and processes seemed entirely appropriate to the specific objectives of each strand and to the process overall. The variety of techniques helped ensure that participants could get involved in the ways that best suited them.
	Be organised and delivered by competent bodies.	The consortium delivering the project were highly experienced and skilled, and were leaders in the field of engagement.
	Include specific aims and objectives for each element of the process.	Broad aims were established for each strand of the project.

Key principles of good practice	Indicators of success	How each principle has been met
3. DELIVERY (continued)	Take place between the general public and scientists (including publicly and privately funded experts) and other specialists as necessary. Policy-makers will also be involved where necessary.	There was close communication between the public and scientists throughout all three strands of the project, and through the stakeholder engagement processes of the project. A wider range of policy-makers was involved at the end of the project, receiving the results from the public discussions.
	Be accessible to all who wish to take part – with special measures to access hard to reach groups	Strand 1 of the project was by recruitment only (and included hard to reach groups as identified above). Strands 2 and 3 were open to anyone who wanted to take part. Also, the results and process of the project were published on the project website and so were accessible to all. The only restriction was that the project was designed for group discussions, so input from individuals (other than individuals who were group members) was not allowed.
	Be conducted fairly - with no in-built bias; non-confrontational, with no faction allowed to dominate; all participants treated respectfully; and all participants enabled to understand and question experts' claims and knowledge.	Strand 1 was very carefully facilitated to ensure that all participants were enabled to discuss the issues they wanted, to identify the experts from whom they wanted to get more information, and to question those experts. Strand 2 groups were also facilitated to ensure full and fair discussions. Strand 3 groups were self-managed and there is no data on the quality of their processes. However, there were no complaints received at all on these processes, so it is likely they worked fairly and well.
	Be informed - This will include providing participants with information and views from a range of perspectives, and access to information from other sources.	The same specially written and designed information materials were provided to all three strands of the project, which included links to further information.
	Be deliberative – allowing time for participants to become informed in the area; be able to reflect on their own and others' views; and explore issues in depth with other participants.	Strand 1 of the process was deliberative, with two sessions several weeks apart, allowing time for participants to reflect and discuss the issues with others, as well as within the Strand 1 process. From feedback, it seems that some Strand 3 groups also met more than once to discuss the issues in depth. Strand 2 events tended to be one-off meetings of just a few hours.
	Be appropriately 'representative' – the range of participants may need to reflect both the range of relevant interests, and pertinent socio-demographic characteristics (including geographical coverage).	The participants were very diverse, both in terms of demographics and previous knowledge and interest. The representation was entirely appropriate to the purpose of the project.

Key principles of good practice	Indicators of success	How each principle has been met
4. IMPACT The outputs of dialogue can deliver the desired outcomes	Ensure that participants, the scientific community and policy-makers and the wider public can easily understand the outputs across the full range of issues considered.	The findings from the project were published on the project website, so all participants could see the results. The results were then analysed and a report for policy makers produced specifically for their needs and to summarise the overall findings of the project as well as to identify the policy implications.
	Ensure that participants' views are taken into account, with clear and transparent mechanisms to show how these views have been taken into account in policy and decision-making.	As the project was so far upstream in terms of policy development, it has not been possible to show how public views have been taken into account, as there has been no policy or decision-making directly relevant to the project to date.
	Influence the knowledge and attitudes of the public, policy-makers and the scientific community towards the issue at hand.	Participants in Strand 1 were clear that they had learned a great deal, clarified their thinking on the issues and said that being involved had made a difference to what they thought. As mentioned previously, the findings from the project have been passed to policy makers but it has not been possible to assess the impact on their views as the findings do not yet fit into any specific policy processes.
	Influence the knowledge and attitudes of the public, policy-makers and the scientific community towards the use of public dialogue in informing policy and decision-making.	Presentations have been made to policy makers and the scientific community at BA national events and at a specially convened workshop. Participants in the three strands of the process were all very positive about the need for more public engagement, and were enthusiastic about more public dialogue events on science and technology. Policy makers also saw clear benefits in the project.
	Encourage collaboration, networking, broader participation and co-operation in relation to public engagement in science and technology.	There were six new collaborative initiatives between scientific institutions and science communications groups established through the project. Evaluation respondents suggested that more collaboration could have been achieved with a longer timescale. The work with stakeholders throughout the project also contributed to encouraging collaboration, networking and co-operation.
	Be directed towards those best placed to act upon its outputs	The policy makers workshop held in November 2007 was a carefully targeted exercise to reach those best placed to act on the outputs of the project.

Key principles of good practice	Indicators of success	How each principle has been met
5. EVALUATION The process is shown to be robust and contributes to learning	Be evaluated in terms of process and outcome, so that experience and learning gained can contribute to good practice.	The evaluation research and this report covers both processes and outcomes, and identifies lessons to contribute to the continuing development of good practice.
	Ensure that evaluation commences as early as possible, and continues throughout in the process.	Evaluation began at the beginning of the project, and continued throughout and after the project had finished working with the public.
	Ensure that evaluation addresses the objectives and expectations of all participants in the process.	The evaluation identified the motivations of participants in Strands 1 and 2, gained their feedback on whether their expectations and objectives were met, and concluded that they were.
	Be evaluated by independent parties (where appropriate).	The evaluation was conducted by a contractor who was independent of the delivery team, although the evaluator worked collaboratively with the team to ensure access to essential data for the evaluation research.

7.4 Performance against targets set

Broad targets were set (in the revised delivery plan, dated September 2006) for numbers of events and numbers of participants in all three strands of the Sciencehorizons project. The comparison between target and actual numbers is shown below.

Strand 1	Number of events	Number of participants
Target	4	15-30 at each
Actual	2	31 first day; 27 second day

Strand 2	Number of events	Number of participants
Target	50 - 100	Unspecified
Actual	36	Estimated 842

Strand 3	Number of events	Number of participants
Target	300 - 500 discussions	5 - 15 people in each (total of 1,500 to 7,500)
Actual	78 groups; no data on number of events	Estimated 2,400

As can be seen from this summary:

- **Strand 1**. The target numbers of participants in Strand 1 was achieved (target 15 - 30 at each event; actual 31 at first event, 27 at second), although only two events were held rather than four.

- **Strand 2**. The target number of events was not reached. Organisers provided feedback that recruitment was very difficult, and that they would have liked more marketing material, but especially a longer timescale to set up and run events and send in responses.

  However, a target was also set that this strand should reach 'hard to reach' groups such as older and younger people, and there is data to show that this was achieved (see section 5.2.4).

- **Strand 3**. The project more than achieved the lower end of the target set for participants in Strand 3 activities (target 1,500 - 7,500; actual estimated at 2,400).

Overall, therefore, it can be seen that these targets were largely met, except for the number of events held in Strand 2. Organisers in Strand 2 identified tight timescales for the project overall as their key problem, with some demand for more marketing materials that could have attracted more participants.

7.5 Conclusions on objectives and good practice

The analysis above shows that the Sciencehorizons project fully met all the primary objectives set, and made a significant contribution to the secondary objectives which were also the objectives of the Sciencewise programme as a whole.

The analysis also shows that the project fully met the Sciencewise guiding principles of good practice.

The targets set for the project were fully met by activities in Strands 1 and 3; Strand 2 met the targets for reaching older and younger people but did not fully meet the target for numbers of events. Organisers identified tight timescales for the Sciencehorizons project overall as their key problem.

8 The policy process

8.1 Introduction

The content of the Sciencehorizons project was based on findings from the UK Government's Delta and Sigma scans of possible future science and technology issues and trends. The connections with the policy making process were therefore very different from much national public engagement activity which usually links to specific current or imminent policy developments.

This section describes the nature of the relationship between the Sciencehorizons project and the policy process, the impacts of the project on policy, and presents some overall conclusions on these issues.

8.2 Relationship with the policy process

The Sciencehorizons project had a very unusual relationship between the public dialogue activities and the policy making process. Normally, public engagement takes place around a particular policy decision (e.g. input to the development of a White Paper announcing new policy proposals), within a clear policy and decision making process.

In the Sciencehorizons project, there were no clear policy targets, in terms of policy developments or individuals in specific Government departments, for the findings from the public dialogue. The issues being discussed, and the public values and attitudes that emerged from the dialogue work, were so far 'upstream' in terms of the policy development process that they did not relate to current Government policy responsibilities or priorities.

The Sciencehorizons project therefore had to find an alternative approach to feeding the findings of the public dialogue into policy development. Initial efforts to identify individual policy makers and invite them to become involved in the project and the events with the public proved very difficult (beyond those individuals on the Oversight Group and Project Board), and no policy makers attended events in any of the three strands of public discussion.

The difficulties of identifying policy targets for the findings of the Sciencehorizons project was only the first problem the project identified in assessing impacts on policy. There were also difficulties explaining to public participants how their input would be used in any detail to develop future policy. The intention to feed the findings into Government policy development was made clear to participants throughout although it was less clear what were the most appropriate channels for that to happen. The lack of clarity among participants in Strands 1 and 3 about how the findings from the project would be used is likely to be a result of that initial lack of clarity.

The first step in the project's work on policy was the production and publication of a launch paper written by Jack Stilgoe of Demos (with Diane Warburton), to provide background to some of the contentious issues and potential policy implications of the project overall. It was entitled *Broadening our Horizons - Public engagement with the future of science*.

The paper was intended to introduce the Sciencehorizons project to policy makers, and to provoke debate on the issues by taking an explicitly contentious position. It argued that experts had been in charge of the future for too long, and that horizons needed to be broadened to include members of the public in this debate. It was a largely theoretical paper, looking at the nature of work on the future of science and technology to date, the challenge of engagement and new ways of talking about the future.

The paper was published to coincide with the formal launch of the Sciencehorizons project in January 2007, and to provide the basis for future work linking to policy issues. Over the remainder of the project, the paper became less central to the work of the project.
The project also made contact with over 200 individuals involved in policy making in related science and technology fields across Government during the early stages of the project and 30 of these individuals actively expressed an interest in taking part in future events for policy makers.

Initially, a seminar for these 'interested' policy makers was planned for June 2007. The aim of that event was to find out what would make the results of Sciencehorizons useful to them, to get their buy in to the findings and to map the areas of policy making against issues raised by the Sciencehorizons work, and identify any gaps in policy 'homes' for issues identified by the public. However, it was not possible to hold this seminar due to lack of availability of key policy makers.

The main focus for the discussion of the Sciencehorizons project's findings with policy makers was eventually identified in partnership with the Wider Implications of Science and Technology (WIST) and the Sciencewise programmes, and a joint workshop was held in November 2007 to consider the overall findings from the public (Sciencehorizons) and stakeholder (WIST) engagement processes. This workshop is described in more detail in section 3.3.13 above.

8.3 Impact on the policy process

Three issues are relevant to an assessment of the Sciencehorizons project's impact on the policy process: the relationship between policy makers and the Sciencehorizons project, the validation of the findings of the project for policy makers, and how to assess the project impact on policy.

8.3.1 Relationships with policy makers

As already mentioned, the issues being addressed by the Sciencehorizons project were so far 'upstream' in the policy process that it proved very difficult for the project team to identify appropriate policy makers until the very end of the project. There were no immediate policy reviews or developments that related to the issues addressed in the project while it was open to the public.

As a result, no specific policy makers could be identified as 'policy targets' and no policy makers attended any of the events at which the public discussed the issues. While the final report provided an excellent summary of the issues in a form that was relevant to policy makers, reports can only ever provide a summary of the issues raised by the public and cannot provide a sense of which issues resulted in the greatest strength of feeling among participants.

In many public engagement programmes, policy makers have stressed the importance of hearing public views first hand, and witnessing the public discussions, so they can experience where there is passion and where there is lack of interest. It is important that the importance of this first hand experience is taken into account in planning any future 'upstream' public engagement processes around science and technology.

8.3.2 Validating the project process

It was important to the Oversight Group that the evaluation validated the process so that policy makers could be sure they were using outputs from a 'valid' process. The evaluation has been able to validate the process in five ways:

- **Process evaluated against principles of good practice**. This final evaluation report evaluates the process against principles of good practice specifically developed for public dialogue projects on issues of national science and technology policy (the Sciencewise principles). The evaluation shows that the process fully met the principles of good practice identified.

- **Process evaluated against the original objectives of the project**. This final evaluation report evaluates the process against the original objectives set for the project, and agreed with the Project Board. The evaluation shows that the project fully met the primary objectives set, and made a significant contribution to the wider Sciencewise objectives.

- **Process evaluated in terms of recruitment and representation**. This evaluation report provides details of who was involved, and the extent to which participants could be seen as a robust sample of the British public.

  It was decided early in the Sciencehorizons project that recruitment would focus on reaching a 'diverse' set of publics rather than aiming for a set of public participants that provided a demographically representative sample of the British public. As this report shows, recruitment differed in the different strands of activity:

  - A representative sample of the general public was recruited for Strand 1 activities, as that was a more in depth deliberative approach and it was important that a range of people were involved from diverse backgrounds. These participants had not previously been interested or involved in science and technology issues and were paid fees as an incentive to take part. This provided the demographic diversity sought.

  - Strands 2 and 3 of the project were open access, and any groups that were willing to get involved were welcome to take part and give their responses to the questions set. This approach was taken both to make the process as open as possible, and also to attract as many people as possible. Strands 2 and 3 reached a very wide variety of groups ranging from science centres and others with an existing interest in science and technology to local community organisations with little or mo previous knowledge or interest.

  The evaluation has concluded that the diversity of publics involved has provided a good robust sample of a diversity of views and backgrounds from among the British public. It is important to note that diversity is as important to ensuring a good quality dialogue process as full demographic representation. Although there is not complete data on all participants in Strands 2 and 3, there is sufficient evidence in terms of the types of people and groups involved to be able to demonstrate that the process was robust in terms of range and diversity of people involved and the range of views taken into account in the final report.

- **Evaluation findings presented with the final report**. The interim evaluation findings were presented alongside the final report of the project at the BA Festival in September 2007. In this way, those listening to the results of the public debates could also see how the process had worked, who had been involved etc, and understand the validity of the process.

This provided an opportunity for this audience to challenge the validity of the process, so it provided a useful 'peer review' element. Questions were raised about the numbers and types of people involved, and some suggestions made that the collection of data needed to have a higher priority in future exercises of this sort. Overall, however, the process was accepted as a valid and innovative approach to public understanding and input on science and technology issues.

- **Triangulation of findings**. The analysis process for the final report of the project provided a triangulation process to review results from all three strands: findings from each strand were summarised and then compared in the final report and results were found to be similar across all three strands. As each strand involved different types of participants, recruited in different ways, the broad consensus on the key issues strengthens the legitimacy of the findings overall. This overall consensus was surprising to the delivery team and to other observers, but does suggest that the findings are universal and very robust.

Overall, therefore, the evaluation has validated the process according to principles of good practice in public dialogue, in terms of meeting the project's stated objectives and in terms of good practice of recruitment for public dialogue and with an element of peer review. In addition, the triangulation process used in the final analysis of the results, used in the final project report, shows a broad consensus on the key issues which also strengthens the legitimacy of the findings as genuinely universal among participants.

Given the purpose and nature of the project, its design and outputs, this is the most appropriate approach to validation. Policy makers can thus be reassured that the final report of the project can be taken as robust findings from a diverse set of 'publics'.

8.3.3 How to assess impacts on policy

Often in evaluations, the most effective way to assess impacts on policy is to undertake interviews with the policy makers directly concerned, and to review documents to trace links (or not) between the findings of the public dialogue and eventual policy statements. In this case, with no specific policy makers or policy developments identified, it has not been possible to assess impacts on policy in these ways, for three main reasons:

- **Too early in the policy process**. The issues considered in the Sciencehorizons were so far 'upstream' in terms of policy development that there were no specific policy developments or policy decisions into which to feed the results of the public dialogue.

  The decision to use the less targeted mechanism of offering the results to potentially relevant policy makers at the November 2007 workshop did have the great benefit of ensuring that the results were 'heard' by relevant policy makers in national Government. However, there is likely to be a significant time lag between the results of the project being heard by policy makers and any final policy decisions relating to these issues, so influence - even then - will be very difficult to show.

- **Findings amalgamated with WIST findings**. The 16 themes presented to the policy makers workshop in November 2007 were developed by amalgamating the findings from the WIST stakeholder engagement processes and the Sciencehorizons public engagement processes. Although this made sense in the context of this workshop, it did mean that the specific findings from the public dialogue were not identified and presented separately. It would not therefore be possible to assess the impacts of the Sciencehorizons process by following through on any policy developments that may arise from among those present at the workshop.

- **Only one aspect of the evidence**. The findings from the Sciencehorizons project will only ever be one aspect of the evidence taken into account when policy makers develop and decide policy in any specific area, and it will therefore be impossible to definitively show cause and effect. This is difficult even in much more time-limited policy processes, where public engagement is linked to a specific decision, and impossible in this instance.

However, there is evidence that policy makers have found the public views expressed in this process useful. The feedback from policy makers interviewed was that the findings have helped to:

- start public dialogue on what may be controversial future decisions, engaging public input and interest before getting too far into detailed policy development processes;
- identify areas where future public engagement work may be needed, and what may be the priorities;
- fill a gap in the wider WIST exercise, which had engaged stakeholders but not the public; by filling this gap the Sciencehorizons project had strengthened the value of the overall WIST process to identify for Government the key safety, health, environmental, ethical, regulatory and social (SHEERS) issues related to emerging developments in science and technology;
- challenge expert assumptions about exactly what the public views on specific issues may be, although there were no major surprises in the findings in this case;
- demonstrate an openness and willingness on the part of Government to listen to the concerns of lay people in what are sometimes very complex technical issues that are rarely debated outside specialist circles.

8.4 Conclusions on the policy process

This section has identified the unusual relationship between the public dialogue in the Sciencehorizons project and the policy making process: in this case, the public dialogue was dealing with issues that were so far 'upstream' in the policy process that there was no clear or obvious policy 'home' for them with either individual policy officers or Government departments.

The approach taken was to re-integrate the public engagement strand of the Sciencehorizons project with the wider WIST work, and present the overall findings to a workshop of policy makers in November 2007, and then to identify priorities for future public engagement. This provided a valuable platform for the results of the Sciencehorizons work.

The evaluation has validated the process according to principles of good practice in public dialogue, in terms of meeting the project's stated objectives and in terms of good practice of recruitment for public dialogue and to provide an element of peer review. In addition, the triangulation process used in the final analysis of the project's findings, used in the final project report, shows a broad consensus on the key issues which also strengthens the legitimacy of the findings as genuinely universal among participants.

Given the purpose and nature of the project, its design and outputs, this is the most appropriate approach to validation. Policy makers can thus be reassured that the final report of the project can be taken as robust findings from a diverse set of 'publics'.

Finally, it has not been possible to demonstrate any clear impacts of the Sciencehorizons project on specific policy developments or decisions because it is too early in the policy process, the Sciencehorizons findings were amalgamated with WIST findings before being presented to policy makers, and the findings will only form one aspect of evidence used. However, feedback from policy makers involved has shown that the process has had value, particularly in helping to plan for future priorities in public dialogue on national science and technology policies.

9 Summary of findings

9.1 Introduction

This section summarises the main findings from all three strands of public engagement in the Sciencehorizons project, and from the activities of the national project overall. It covers what worked well and what worked less well overall, and then summarises some of the issues and questions that have emerged. Each of the preceding sections of this report also identifies lessons from the specific activity covered in that section.

9.2 What worked well

9.2.1 National framework for public engagement

The project worked well to provide a national framework for engagement that drew in contributions from a wide range of people. The framework provided the stimulus for the group discussions in all three strands (through the specially commissioned materials provided), and the common set of questions provided for all three strands ensured that everyone could respond whatever their background or existing knowledge of science and technology or where they were based.

The challenge for the project was that the ideal process for many dialogue processes is face to face discussions at interactive workshops held over one or more sessions (the Strand 1 approach in Sciencehorizons). However, that can be a highly resource intensive activity, especially if people are brought together from different geographical locations. The Sciencehorizons project showed that people could have worthwhile discussions that contributed valuable data using devolved patterns of engagement that offer numerous lessons for the future in spreading dialogue geographically and in terms of numbers of people reached.

For a good proportion of participants providing feedback (e.g. 29% of respondents in Strand 2), the motivation for taking part was to have a discussion linked to national policy making, which the project provided. In addition, 71% of Strand 2 organisers who provided feedback said they did feel part of a national project. This aspect of the project could be strengthened in any future similar projects; although 71% overall felt part of the national project, only 3 respondents (21%) felt 'very much part'. Organisers felt that more marketing materials with stronger branding, that they could use to recruit people to attend events, and a longer timescale, could have helped them achieve more and contributed more to the national project.

Overall, however, there was positive feedback from participants about the experience of taking part, and on the support provided by the national Sciencehorizons project team: 100% of Strand 1 were satisfied with the way their events had been run and the information provided; 86% of Strand 2 respondents were satisfied with the support provided; and 88% of Strand 3 respondents were satisfied with the information and instructions provided. These very high satisfaction levels across all three strands show that the project did achieve a great deal in a short time to provide an effective national framework for engagement on science and technology issues.

9.2.2 Testing different approaches to public engagement on science and technology

This evaluation has showed the strengths and weaknesses of the approaches used in the three different strands, and showed that people could have worthwhile discussions using either a highly-resourced deliberative panel approach (Strand 1) or more devolved patterns of engagement (Strands 2 and 3).

However, there are major differences between the achievements of the three strands. While the findings from the different strands were very similar (identifying similar issues of concern or interest), the Strand 1 process provided much richer data on 'why' participants raised the issues they did because there was much more time for participants to consider the information provided, discuss it at length with others, reflect on these conversations, request more input from specialists to follow up key issues, and come to much more considered views which were recorded in detail.

The Strand 1 processes also significantly influenced participants' knowledge and thinking, with 96% of respondents saying they had learnt something, the same number saying it had helped them think more clearly about the issues, and 76% saying that being involved had made a difference to what they thought about science and technology; 20% said (without prompting) that they felt more positive about science and technology as a result of being involved.

Other strands did help spread awareness of the issues, because many participants were clearly engaged enough in the discussions to send in responses, but not to the depth and richness of those in Strand 1.

9.2.3 Validation of results

The mix of methods allowed the project to reach a relatively large number of people who were supported to have group discussions using different methods but considering the same issues and answering the same questions. Each strand was successful in reaching different types of audiences: Strand 1 involved a recruited sample representative of the general population, Strand 2 reached the 'interested public' with some existing knowledge or interest in science and technology. Strand 3 reached a wider range of groups (the 'active public'), some with no knowledge at all of science and technology issues.

The issues, hopes and concerns identified in the responses from each strand responses were remarkably similar, in spite of each strand having very different sizes and styles of events and discussions (see section 3.3.11 and the project final report[7]). This 'triangulation' of the results (comparing the results from different processes) was a useful method for testing the robustness of the findings, and allows the project to conclude that its findings are very robust as a representation of general public concerns on the issues discussed.

The Sciencehorizons project did not use traditional social research methods (such as overall demographic sampling), but aimed instead to trial a different approach to gaining public views on potentially contentious issues that treated those involved as 'participants' rather than research 'subjects', and provided an experience of as much value to the participants as to those wanting to see and use the results in future policy and decision making. This approach worked well in this case, creating a highly satisfactory process for participants as well as data for policy makers to refer to in future.

9.2.4 Effective materials that stimulated and supported discussions

Feedback shows general satisfaction with the materials provided: 96% of Strand 1 respondents found the materials fair, balanced and helpful and 100% were satisfied with the written information they had; 87% of Strand 3 respondents found it easy to have a discussion using the materials. Strand 2 respondents were less positive about the value of the materials for their audiences, although even here around half were positive about the materials provided.

[7] Sciencehorizons. *Strands 1- 3 Summary Report*. Dialogue by Design, September 2007.

The materials were clearly useful in stimulating and supporting discussions, to the surprise of some Strand 2 respondents who found the materials worked better than they expected. However, there were some criticisms of the design and content of the materials, which were different from different types of respondents. As mentioned above, the materials were general extremely successful in turning highly complex potential scientific and technical developments into stories, scenarios and questions that could be understood by a very wide range of audiences.

The impact of the information provided through the process and the materials was significant: 76% of Strand 1 respondents said that being involved had made a difference to what they thought; 20% said that being involved had made them more positive, enthusiastic and / or less worried about science and technology.

It was a major challenge for the project to take the very complex and technical results of high level scans of potential scientific and technological developments, and translate those into issues and stories that were simple enough for completely uninformed public audiences to understand, that stimulated those people to discuss the issues, as well as convincing those people that their opinions mattered so they would feedback their views.

This was a very complex task, especially given that the materials had to be drafted, piloted, designed and printed within four months (September to December 2006). However, it was a task that was achieved with considerable success by the project team, which met these tight deadlines and provided materials that were generally well understood and welcomed by many people.

9.2.5 Contribution to the development of evidence-based policy making

The findings from the Sciencehorizons project have been presented in a final report designed to inform policy and decision-makers about the issues of interest, concern, enthusiasm and fear among the public, and to provide some insight into why they have those views. It was designed to highlight any 'early warning signs' to identify which issues may be controversial at later stages of development, and has provided indicators of where priorities may be for future public dialogue. In addition, the process has allowed the general public to have a voice in future policy and decision-making in science and technology.

Although there were problems in using the results of the project directly in specific policy developments, the Sciencehorizons process has identified and used new methods of providing both valuable data and in running a valuable experiment in how public engagement can feed into future policy making. The project has also provided a valuable opportunity to demonstrate Government's support for a process to find out about public views on these issues.

The triangulation of results through a range of different methods of public engagement is different from the conventional research processes used in policy development, but provides a number of interesting alternatives for future work in this field as a new approach to gaining and validating public views.

The project has also provided some valuable learning about public dialogue in science and technology for those delivering the project and for the stakeholders involved in designing and delivering the project. It is hoped that this evaluation report will also contribute to that learning.

All of these achievements have contributed to the development of methods of evidence-based policy making that aim to gain and use the views of the public as part of the process.

9.2.6 Reached diverse groups

The Sciencehorizons project reached a good mix of diverse groups. It reached the general public through Strand 1, which involved recruiting a demographically representative sample of the general public (age, gender, black and minority ethnic groups and people with disabilities), including those often defined as 'hard to reach'. It also reached the 'interested public' through Strand 2, as those who attended those events tended to be those already linked into existing science and technology centres or existing voluntary groups and schools. In Strand 3 there was a wide range of groups taking part; the bulk of responses came from schools but there were also responses from environmental groups, Women's Institute groups, humanist groups, University of the Third Age groups and many others. This range in Strands 2 and 3 therefore added richness to the sample as it included some participants with existing knowledge and experience, and some without.

The focus in Sciencehorizons was on 'group' discussions but it is notable that many individual participants fed back their individual comments as well as group leaders feeding back the collective group response. While this did raise some issues for analysis (how to deal with the different 'quality' of responses from groups or individuals), it was interesting that many participants were keen to put in their own views as well as the collective view of the group. In future it may be valuable for the collective group responses to be collected and analysed separately, although it was not a major issue for the Sciencehorizons project as the analysis was qualitative and focused more on types of issues raised than on numbers of respondents raising each issue. However, the question of whether only group responses should be allowed in future, and if so how individuals could take part, may require further discussion.

There were some concerns from the Oversight Group that the project sample was not a demographically representative sample of the UK population overall. However, that type of sample was covered by Strand 1 (although this was a relatively small group - maximum 31 people). The other strands provided different types of responses from groups providing different perspectives. This added to the richness of the data and also strengthened the validity of the findings by having data from three different types of 'publics'.

9.2.7 Worked with scientists and experts in variety of ways

The Sciencehorizons project provided opportunities in Strand 1 for local scientists to attend the first session as participants (three did attend from local universities) and also for the Panel to identify the issues on which they wanted further input, and four additional experts were invited to the second session of the Panel. In Strand 2, scientists and other experts participated in the events as speakers, and they facilitated events and took part as general participants. In Strand 3 scientists participated as group members.

Feedback suggests that all these roles worked well, and that the process overall had significant involvement of scientists throughout: in Strands 2 and 3 almost all groups had at least one scientist taking part. It is an important objective of the Sciencewise programme overall to promote dialogue directly between scientists and the public, and the Sciencehorizons project clearly achieved that very well. Indeed, this integration of scientists across all the activities was a notable achievement of the project.

9.2.8 Created enthusiasm for further engagement on science and technology

The feedback from participants shows that each of the three strands ended with great enthusiasm for further engagement on science and technology issues: 96% of Strand 1 respondents thought it was important to involve the public in discussing these sorts of science and technology issues, and 96% also thought that there should be more such events for the public. 86% of Strand 2 respondents through it was very important to involve the

public and 79% thought there should be more such events. 75% of Strand 3 respondents said they would like to have another discussion on science and technology issues. Enthusiasm for future engagement can be greatly affected by participant satisfaction with the processes they have taken part in and, in this case, there was significant satisfaction with the processes (especially in Strand 1) and the materials provided (especially among school groups in Strand 3).

The feedback does show a very large majority of respondents in favour of more public engagement on science and technology issues, and suggests that the Sciencehorizons project did encourage interest and enthusiasm for this work. This feedback also identifies a valuable resource in terms of an enthusiastic set of groups and individuals who are likely to want to take part again themselves in future such discussions.

9.2.9 Opportunities for learning

Strand 1 participants were probably the group with the least existing knowledge and experience of science and technology issues, and they seem to have learned the most and valued that learning most highly. However, based on the nature of the feedback to the Sciencehorizons questions, knowledge and understanding seems to have been developed among participants in all three strands.

The Sciencehorizons project also provided opportunities for science communications and other organisations to experiment with new approaches to working with the public on science and technology issues, particularly in Strand 2, and respondents from that strand clearly valued that opportunity. There was clear feedback from Strand 2 event organisers that they would have valued more training and capacity building in running events that promoted dialogue and would be keen for more skills development in designing and delivering deliberative public events in future.

9.3 What worked less well

9.3.1 Policy connections

There were some significant difficulties in linking the Sciencehorizons discussions and findings with specific current policy developments. Lack of policy impact does not necessarily mean any failure of the dialogue process, as policy processes are rarely predictable or controllable. However, in this case the lack of direct links between the project and policy impacts did have a number of implications for the achievements of the project itself. For example:

- **Hard to explain how results would be used**. The project discussed issues that were so early in the policy process that no specific relevant policy initiatives could be identified with which the project could work. This made it hard to explain to participants how the results of the process would be used.

- **Lack of direct contact between public and policy makers**. As no specific policy 'homes' could be identified for the findings from the project, there were no policy or decision-makers identified that could be involved in the discussions directly. This is a significant gap in the potential for the public to have direct influence and for policy makers to understand public views. Policy makers tend to use reports in more formal policy drafting processes but are more deeply influenced by seeing, hearing and understanding public views first hand. Other evaluations have shown that policy makers particularly value being able to hear public views first hand so they can understand where the public feel particularly strongly (or not), and that the public value policy makers being there to hear their views.

- **Lack of topicality and contention in the issues to draw in participants**. The issues being discussed in the Sciencehorizons project were rather distant from current policy concerns. Although this may be inevitable in discussing the sorts of 'futures' issues considered in Sciencehorizons, the lack of currently topical or contentious issues may make the discussions less attractive to some audiences (especially Strand 2 type audiences); more topicality and contentiousness of the issues, together with direct opportunities to feed into policy, may have made recruitment to Strand 2 type events easier for organisers.

- **Lack of evidence of policy impacts**. Although the results were fed to policy makers (at the November 2007 workshop), by that stage public views were amalgamated with stakeholder views, and the headline messages from the Sciencehorizons project were necessarily less clear. It is therefore difficult to report back to participants on how their input made a difference.

Overall, therefore, the lack of close links with current policy initiatives or issues, and with specific policy makers, is likely to have limited the Sciencehorizons project's impact on policy in the longer term.

9.3.2 Recording and reporting

There were three main problems around recording and reporting in the project:

- **Capturing participants' views**. Points raised by public participants in the Strand 1 discussions were carefully recorded and reported by professional facilitators. In Strands 2 and 3 the recording and reporting of participants' views relied on the event or group organisers, on top of their role in designing, delivering and facilitating the discussions.

  Although group responses were often carefully recorded by organisers and fed back to the project in many cases, it is always difficult to capture the richness of public discussions and ensure that the feedback really represents all the points made through the process, and therefore that the final analysis of the findings fully reflects the key points made in discussion. In some Strand 2 events observed for the evaluation, group facilitators were very careful to check with participants that the points recorded and fed back were genuinely a consensus from the group, which could be a useful model for future projects of this sort.

  Also, although self-reporting will not necessarily have captured all the details of participants' discussions, it does have the advantage of being in participants' (or organisers') own words, without any mediation or translation.

- **Limited questions for feedback**. Feedback from some respondents pointed to the limits to the input that could be made by participants because the main project questions were around 'likes' and 'dislikes'. For some respondents, this limited the content of the answers to a level of superficiality they felt did not match the complexity and importance of the issues being discussed. One group said they would have preferred to have been asked to decide between 'approve / disapprove' or 'acceptable / unacceptable' to allow more emphasis on moral judgements.

  Also, some respondents felt the feedback forms were not well designed, again limiting the nature of the answers that groups could give. Any future project may wish to reconsider the wording of the questions and the design of feedback forms.

- **Lack of data on participants and processes**. A major issue for the Sciencehorizons project overall was lack of data on who the participants were in Strands 2 and 3, and also on the types of processes used. This sort of data is vital in understanding the validity of the process and thus of the resulting data that is used for the analysis and final report to policy makers. Also, as this was an experimental project, it was important to understand

who had been attracted to take part in Strands 2 and 3, and to get some feedback from them directly, to assess the value and quality of the process from the participants' perspective.

This was not possible in this case as the project team took an early decision that it would be unreasonable to place too many demands of participants and organisers in terms of providing personal and process data. This did make the evaluation less complete, particularly in trying to 'validate' the findings in terms of fully assessing the sample of people involved and the processes they went through. Although sufficient data was identified to undertake an assessment and to come to evaluation conclusions, this would have been more effective if more information had been available.

9.3. Timing

There were four main problems with the timing of the Sciencehorizons project:

- **Too much to discuss in the time suggested**. In Strand 2 and 3, groups were advised that their discussions on the Sciencehorizons issues were likely to take two or three hours. However, the feedback from organisers and participants was that this was not long enough to cover all the scenarios, and they felt that they had not been able to give the discussions the attention they deserved.

  These were complex issues and it takes time for people to absorb the nature of the process, and the information provided, let along have in depth discussions on 16 stories in four different themes, exploring personal values with others and coming to a set of views that could be sent back to the Sciencehorizons project.

  While there was no imperative that groups discussed all the scenarios, many clearly felt they 'ought' to cover them all, but were unable to do so in the time they had given themselves, and therefore felt somewhat frustrated by the process.

  Given that many groups are unlikely to want to commit more than a single meeting of two to three hours to issues of this sort, providing 16 different stories within the four themes was too much for some of them to handle. A smaller number of stories and issues could have been a better starting point, even if groups then became enthused and wanted to continue longer and take the discussions into areas of greater complexity themselves.

- **Deadline too close to launch**. The project was launched, and materials made available, in January 2007, with a closing date for comments of June 2007. Some organisers in Strands 2 and 3 found this timescale too short to plan and publicise events, recruit participants, deliver events, and collate and submit feedback from their groups.

  Some groups also suggested that they would have liked to have had time for two or three separate meetings to come to conclusions on their views and feedback, and that was not possible during the timescale of the project.

- **Too early in the policy process**. The difficulties of lack of clear policy 'homes' for the findings of the project have already been mentioned. The Sciencehorizons project was always designed to be very much 'upstream' in the policy process, to provide early warning signs of any vital issues for the public.

  However, in practice the project was working with issues that were so far upstream that the lack of policy 'homes' for the findings not only made it very difficult to achieve policy impact, it also made it very difficult to explain to the public what policy impacts were being sought and how their discussions contributed to that input. This reduced the ability of the project to show any policy impacts, and thus to be fully accountable to the public participants in terms of their contribution.

- **Parallel rather than iterative processes**. The working of all three strands of public engagement in parallel worked well to spread awareness of the issues, and to provide triangulation of results by allowing comparisons of findings across the strands. However, with more time, an iterative process could have been used to provide opportunities for the broad and shallow engagement to identify issues (Strands 2 and 3), and for the narrow and deep engagement (Strand 1) to then explore these findings in more depth, possibly by bringing some Strand 2 and 3 participants together to follow up initial discussions.

  This type of iterative process allows participants more time to examine the issues in greater depth, and come to more considered views. It also allows detailed and specific research questions to be identified from the first pass over the issues in the wider but shallower engagement processes. Iterative processes also provide a clear path for taking, testing, developing and agreeing findings in more depth with participants, and thus potentially providing more refined findings for policy makers.

9.3.4 Target audience very broad

The Sciencehorizons project aimed to reach the public and explore their views of science and technology. The project and the materials were designed to reach and provide support to as wide a cross-section of the public as possible. In practice, this very broad target audience caused a number of problems for the project:

- **The content of materials did not suit everyone**. There was a mixed response to the materials provided to stimulate and support the public discussions, depending largely on the types of participants rather than the Strand within which respondents were participating. In general terms, schools and young people liked the materials and the personalisation of the stories, and found them helpful and stimulating, although some found the stories too complex. Adult groups, especially those with existing knowledge, found the materials too simplistic and superficial.

- **The design of materials did not suit everyone**. Again, there was a mixed response to the design and illustration of the materials depending on the type of participant. Schools and young people liked the design and illustrations. Adult groups found the design and illustrations too cartoonish, and the illustrations too 'utopian' and presenting an unrealistically idealised picture of the future (clean, bright, colourful).

- **Marketing and publicity not suitable for everyone**. Strand 2 organisers identified the most problems in recruiting people to take part in their events, and several asked for more and different marketing materials and 'branding'. Strand 2 events were expected to reach those already involved in networks, including through existing science and technology centres, so this was a relatively well informed and knowledgeable audience. Other public engagement processes aiming to reach these sort of audiences often find participants are attracted to issues that are topical, immediately contentious and linked to specific policy developments.

  In this case, the project had none of these attributes and Strand 2 organisers reported significant difficulties in attracting participants and the target number of Strand 2 events (50 - 100) was not reached (36 events took place). Several Strand 2 organisers asked for more and different marketing materials, and stronger 'branding'.

- **Proliferation of responses from schools**. About two-thirds of responses in Strand 3 were from schools, which could have unbalanced the findings, although here the responses were analysed qualitatively not quantitatively so it was less of an issue in this case than it might have been in other circumstances. Nevertheless, the number of responses from schools, including from individual school pupils, was an issue for the project, including in potentially unbalancing the view of the responses for those reading the full results on the website, where the source of the response was not shown.

- **Lack of involvement by some 'hard to reach' groups**. The main 'hard to reach' groups identified originally as targets for the project were younger people and older people, and the project clearly reached both ends of the age scale in all three strands. In addition, Strand 1 did include 'hard to reach' groups. While there was not sufficient data to come to definitive conclusions about the nature of the participants in the process, it appears from the data that is available that there were few responses from black and minority ethnic communities, neighbourhood or community groups, workplace communities (including unions), or groups from disadvantaged communities. These types of disadvantaged groups usually require very precise targeting and support if they are to participate in these sorts of exercises.

These problems suggest that it is impossible to write and design materials that will be appropriate for audiences of all ages and levels of knowledge of the subjects. Also, if disadvantaged groups are to be involved effectively, special efforts may be needed to reach out and provide specific support for them. It may be therefore that aiming for such a wide target audience is not the most effective strategy in gaining a wide range of public opinion and that a more focused and targeted approach may be needed.

In addition, any analysis of findings needs to recognise the source of the input, and it may be more effective in future to collect and analyse responses from groups and individuals, and from schools and other groups, separately.

9.3.5 Collaboration and cohesion with stakeholders

Overall, there were six new and successful collaborations between the project and stakeholders in Strand 2, particularly where science communicators and educational establishments worked together. There were also good working relationships at the beginning of the project, through joint work with the BA (especially the BA working lunches to launch the project) and the initial project workshop to involve stakeholders in developing the key themes for the materials (August 2006).

However, there were less of these collaborative activities than had been hoped for and expected originally. Problems arose in two main areas:

- **Lack of time to develop collaborations**. Although there were some innovative collaborations, as mentioned above, feedback from organisers in Strand 2 suggests that there were not more simply because of the timing problems identified above: too much to do and too short a time between the project launch and the deadline for comments to be sent in.

  While there are good existing networks between science communicators, new relationships take time to develop, and feedback was that six months was not sufficient time to achieve these new relationships and develop joint events or other activities, although there was clearly enthusiasm for these.

- **Limited project guidance nationally**. The Oversight Group met twice, early in the life of the project, and worked well to provide initial guidance, contacts and ideas. However, it proved very difficult to maintain the interest of this Group and subsequent meetings were cancelled due to lack of availability of Group members to attend, although one or two Group members continued to provide advice through individual contact (telephone and email).

  It may be that different arrangements are needed that would provide continuing oversight of the project and guidance by key stakeholders, without requiring too much commitment from them in terms of time and responsibility.

9.4 Issues and questions raised

The overall evaluation findings of the project raise a number of wider issues and questions about the nature of public dialogue on science and technology, especially when considering dialogue on future potential issues in science and technology that are at very early stages of development. Some of these issues are outlined below.

9.4.1 Different engagement methods for different types of issues?

There is a sense from some of the feedback from Sciencehorizons participants that some of the issues they were asked to address were fairly straightforward, and participants felt they could articulate and feed in their views relatively easily. The difference seems to come where the issues are more contentious, and challenge existing expectations and assumptions.

In Sciencehorizons, the most contentious issues for Strand 1 were around climate change, apparently largely as a result of a Channel 4 TV documentary questioning that climate change was a result of human actions and therefore whether human behaviour needed to change. Few participants had seen the documentary, but many had seen press coverage of the debate and that had affected their views.

Generally, deliberative dialogue (as recommended by the Sciencewise programme overall and involving significant time for information input, in depth discussions and strong facilitation) is seen to be a very good method for engaging with the public on highly contentious issues. It is also a good method for engaging with the public on issues where the science is uncertain. Uncertainty does not seem to create problems for the public who generally accept fairly easily that knowledge is evolving. The public often actually feel more comfortable with what they see as the honesty of uncertainty, rather than feeling that they are being manipulated or 'sold' a conclusion that is actually still under debate.

However, the difficulty for Sciencehorizons in differentiating between contentious issues and non-contentious issues was that the project was intended partly to identify exactly which issues were the most contentious, so that any need for future dialogue could be identified, and any key concerns from the public identified early on.

If different issues do require different engagement methods, depending on how contentious they are, a future experimental project may further investigate how well that works, and whether certain issues could be the focus of a continuing process including more in depth engagement methods if the issues turn out to be more contentious than expected when discussions started. This sort of iterative process would only be possible in a longer timescale than was possible in the Sciencehorizons project.

9.4.2 Same issues raised across all three strands: why pay more?

The final Sciencehorizons project report points out that the broad pattern of likes, dislikes and tensions between them was very similar across all three strands. In terms of research outputs, running all three strands in parallel was valuable in providing triangulation to validate the results. However, it raises questions about the need to fund highly resourced deliberative processes, such as the Strand 1 Panel, when very similar issues were also raised by the much less resourced Strand 3 participants.

However, while the processes in the different strands were very different, the participants all considered the same scenarios and issues, and answered the same questions, so it is not entirely surprising (although interesting) that the answers were largely common across the strands. It has been considered one of the benefits of public dialogue that it confirms the expected view of what the public think as well as providing challenges to expectations.

While similar issues were raised in all three strands, the evaluation suggests that the simple identification of issues may be possible across a large number of people at relatively low cost, but that deeper and more resource intensive dialogue (as was used in Strand 1) can provide much greater richness and depth of data to explain 'why' people hold the views they do, and what influences those views. As with the previous point (9.4.1), it may be that an alternative approach is a more iterative process. For example, there could be a relatively low-cost exercise at the beginning of the process that identifies the key issues as headlines, and involves a large number of people in a fairly short term, superficial exercise. This could then be followed by a much more in depth deliberative process investigating and understanding why participants have come to the views they have, and what makes a difference to those views.

9.4.3 Is dialogue about engagement or research?

Public dialogue is usually only partly related to producing research outputs for policy makers. Other important outputs will include, for example, opportunities for participants to have their say and be listened to, for them to learn about the issues being discussed, and for their views to be used to inform future policy.

The assessment of public engagement (and thus the validation of the process) will therefore focus on different standards of good practice from conventional research, which is why this evaluation has assessed the project against the Sciencewise principles of public dialogue rather than against principles of research quality. In addition, the validation of a public engagement process may depend as much on the subjective feedback from participants about the quality of the process, and their sense of engagement, as it does on assessment against objective standards of good practice.

The Sciencehorizons project did raise some dilemmas in terms of assessing good practice. The project was designed and delivered as a public engagement exercise, but with a need to produce research-like outputs that would be valid and have value for policy makers. This required the project to show evidence of the quality of the process as well as gaining positive feedback from participants.

9.4.4 Is dialogue about engagement or education?

There is still an unspoken assumption in much planning of dialogue in science and technology that a basic objective is public education. The foundations of dialogue tend to come from two very different fields: the public understanding of science field, and consensus building within contentious issues. Even though in theory the field has moved from public understanding of science (PUS) to public engagement in science and technology (PEST), the deficit model that sees the essential objective as providing information so that the public better understand science and scientists remains as an underpinning assumption.

In practice, dialogue can provide both engagement and learning (rather than education). However, it is essential for effective dialogue (according to Sciencewise principles) that the primary purpose of the process is engagement to influence and improve policy, and the design of the process is expected to reflect that and ensure that the outputs are appropriate to policy impact - here learning is a by-product rather than the driving force.

9.4.5 Extending the Sciencehorizons approach

The Sciencehorizons project, especially Strand 1, was designed and delivered by leading practitioners of public and stakeholder engagement in the UK, and the quality of the public dialogue activities was very high. The Strand 1 process was clearly very successful in

terms of the Sciencewise good practice guidelines (e.g. unbiased and useful information, no single view allowed to dominate, opportunity to have say etc), and participant feedback (satisfaction with events and information provided, enjoyment, and increased willingness to get involved again).

In Strand 2 there was an interest in the provision of more capacity building to develop greater skills in the design and facilitation of dialogue activities, which suggests less experience and confidence in delivering this type of public dialogue.

The Strand 1 process was 'gold standard' dialogue, and thus costly. There is an issue about the extent to which the benefits can be spread more widely (especially more and extended opportunities for public engagement), while at the same time continuing to invest in the leading edge of dialogue delivery from the most experienced practitioners, and ensuring that the process is cost effective.

In this field, innovation is important and everyone is learning all the time, so it will be important to find new ways to maintain the balance between extension, quality, and innovation, and extending the skills of those relatively new to public engagement, within realistic budgets.

9.4.6 Making the most of expert involvement

Experts were involved in the Sciencehorizons project across all three strands in different roles, including giving structured input and answering questions (Strand 1), and facilitating and participating in group discussions (Strands 2 and 3).

While it is recognised that not all scientists and other experts will be willing and able to take part in these processes, there are questions about the extent to which such involvement could be extended and improved, without compromising the independence of scientists (e.g. some may not wish to be too closely associated with Government policy processes).

Feedback from other dialogue processes suggest that scientists and other experts do gain a great deal from being involved. While scientists may often say that the public "didn't say anything new or that we didn't know already", the experience may nevertheless enable them to discover what was important to people, what really interested and excited them, or shocked or annoyed or frightened them. From observation, these processes also seem to give experts a chance to talk about their subjects in a rather different way from their normal channels of communication - being able to talk about their personal involvement with the subject, and discuss values and principles openly, as well as sharing their technical expertise.

The Sciencehorizons project has shown that it is important to identify experts with good communication skills, to enable the public to understand and use technical and professional input that is intended to support their discussions. Experts from institutions close to the location of the dialogue events (local experts) are likely to be particularly warmly welcomed.

Any extension of dialogue activities in this area (e.g. to reach more people) will require identifying more experts with these special skills, developed by increased experience of working with the public. Equally, there may need to be some clarification with the experts about the boundaries of their role, and what is expected of them (beyond the usual brief focused on the content of their input), so that they and the public participants feel comfortable with their involvement, and it is very clear that the input to the process is fair and balanced overall, and there is no overall bias that may skew the direction of the discussion.

9.4.7 Measuring policy impacts

The Sciencehorizons project has provided an insight into various problems around the links between dialogue and policy making (see section 8). Overall, it has shown that it is almost impossible to fully or accurately measure the policy impacts of public dialogue in science and technology. This is partly because there are so many sources of evidence that inform any final decisions or policy recommendations that it is rarely possible to identify specific causes and effects from dialogue. It is also partly because it is impossible to benchmark policy positions, and thus to measure change, from before public dialogue as these are rarely expressed as clear positions.

9.4.8 Diversity or representation?

There is often a demand for the participants in a dialogue process to be demographically representative of the British population, as this can be a conventional approach to sampling in some social research. As a result, this approach to sampling may be seen as a prerequisite for the findings from the process to be seen as sufficiently 'valid' to be used in policy processes.

Depending on their specific purpose, it is likely that many dialogue processes will want to be reasonably representative in terms of including people of different ages, gender, and black and minority ethnic backgrounds, in order to ensure that a major sector of society is not excluded. Also, participants usually highly value the opportunity to discuss contentious issues with a diverse group, many of whom they may not normally meet, and that mix of people usually contributes to a much richer and more satisfying dialogue for all involved. Overall, this project has suggested that ensuring a good mix and diversity of participants will provide the range of views necessary for effective dialogue.

9.4.9 Continuity

As the Sciencehorizons project was so far upstream in terms of the policy process (and indeed in scientific and technological development and certainty), it does raise issues about how key messages from the public are preserved, built on and taken forward. It also raises issues for how participants can be kept informed about that process, in recognition of their contribution to date.

The Sciencehorizons project built in feedback to the design of the project, with the results of the process published in full on the website (in August 2007), and the final report of the findings of the project also published on the website (in September 2007).

The issue of continuity and continuing feedback to participants raises difficult practical issues. Normal practice is for contracts to end when the final report of the dialogue is presented to the commissioning body (e.g. Government department), and the delivery body then usually has no further involvement in the policy process.

Also, Government teams may have been created specifically for a particular policy development process, including dialogue, and that team may be disbanded once the specific policy decision has been taken, or the project has ended. This leaves the problem of there being no clear location for the responsibility for longer term communications with participants and stakeholders which, ideally, would continue.

The Sciencehorizons project has in some ways just started a conversation with the public on future issues for science and technology, that has begun to generate interest and considerable enthusiasm for future engagement. It will important to consider how that interest and enthusiasm can be built on in future.

10 Conclusions and lessons for the future

10.1 Introduction

This section summarises the conclusions of the evaluation in terms of the objectives of the evaluation, and also identifies some key lessons for the future in terms of the practice of public dialogue in science and technology.

10.2 Lessons for the future

The Sciencehorizons project generated some clear lessons for future dialogue in science and technology, including:

- **Scientists and other experts can support and stimulate dialogue**. The evidence from this evaluation suggests that the most effective input comes from scientists who are clearly knowledgeable and are experts in their field, who are based relatively locally (e.g. from a local university or other local body), who are good communicators and can speak plainly and honestly, who are prepared to openly recognise doubt and uncertainty, and who are prepared to disagree with other experts present. These qualities seem to stimulate and support public dialogue most effectively. Scientists and other experts need to be carefully briefed about their role (e.g. input not direction if they are making presentations), and supported to understand and learn from the public and the dialogue processes, as well as helping the public to understand science and technology.

- **Learning can reduce fear and negativity**. Strand 1 of the Sciencehorizons project showed clearly that some public participants (about 20%) felt more positive and less fearful about the future of science and technology as a result of learning more from experts and from discussing the issues with each other. Equally, experts and policy makers may become more positive about the sense, commitment and enthusiasm of the public for discussing these issues as a result of learning from the experience of taking part and listening (ideally first hand) to public dialogue. In other circumstances, of course, the reverse may happen, and finding out more may raise more questions and concerns than it answers.

- **Involvement of policy makers vital to policy impact**. Although the Sciencehorizons project produced the required data on public views, the impact of those public perspectives on policy development are unclear and uncertain, and here is no guarantee or evidence of policy impacts.

  Ideally, policy makers should be directly involved in the dialogue process so they have a sense of 'buy-in' to the dialogue process and a commitment to using the results. There need to be specific policy makers identified and involved, so they can benefit from hearing the strength of public views first hand, which is vital for understanding what are the key issues for the public, and for providing clear guidance to policy makers if, for example, the public are supportive of more radical action than was expected. A report can identify and describe the key issues arising from public dialogue, but can rarely provide the full flavour and richness of the process that can be shared when policy makers are present in person.

- **Boundaries of the dialogue need to be clear**. There was a sense among some Sciencehorizons respondents that they felt almost 'guilty' about discussing the social and ethical issues that arose from the scenarios and stories. This was always the intention of the project, but it may not have been sufficiently clear to enable participants to consider these issues fully, and provide full feedback. In addition, the limited questions in the Sciencehorizons case (around likes and dislikes) also seemed to limit

the depth of discussions. It is important in some cases to give explicit permission for the discussion of values and attitudes, and for those issues to be recorded and fed back. In general, the focus of the dialogue should be spelt out very clearly (e.g. to consider the social and ethical issues and not just the technology) so that participants know what to expect and what is expected of them.

- **Materials and dialogue need to be targeted**. Feedback to this evaluation suggests that it is impossible to produce materials, in terms of content and design, that will suit all age groups and levels of knowledge. Also, special efforts and support are likely to be needed to ensure that disadvantaged communities are included in dialogue processes, both in deliberative processes (such as Strand 1) but also in wider processes (such as Strands 2 and 3). Working through existing networks is very effective (e.g. through the BA in Sciencehorizons), and this approach could be broadened to reach other target audiences beyond existing science and technology networks.

- **Realistic timescales are needed**. It is important that there is time for relationships to be developed as the basis for new activities if there are aims to improve collaboration and cohesion among stakeholders. Also, it takes time for publicity to filter out through networks, and then for people to *decide* to hold events, let alone time to plan and run events and then collate and feedback answers to project questions. Six months is very tight to achieve all that. In addition, a longer timescale would allow options for iterative processes to be used to develop and refine findings with participants.

  It is also important that realistic guidance is given to people running events about how long it is likely to take to get through the materials provided as the basis for giving feedback. Public participants find it frustrating not to be able to complete a given task as expected.

- **Identification of sources of views is vital for research purposes**. The views of participants in Strand 1 were recorded and reported separately as part of the Panel process. The views of participants in Strands 2 and 3 were separately recorded and submitted by group organisers, but there were also extensive views (especially in Strand 3) from individual participants.

  In future processes, it will be very useful to collect and analyse data from groups and from individual participants separately, and from schools and other groups separately, so that sources of views can be identified where appropriate. In the Sciencehorizons project this was not a major problem as views from all three strands were so similar. However, separate analysis does allow for more effective attribution of specific views if and when views from different sources differ.

- **Feedback and continuity is vital**. The Sciencehorizons project did provide good online feedback to participants and other interested parties, publishing the full set of responses to the project and the final report of findings on the website. However, the Sciencehorizons project provided very much the first stages of dialogue on some very upstream issues in science and technology, in terms of policy development. While recognising the practical difficulties (e.g. future budgets), it would have been useful to have been able to develop some contingency plans for continuing contact with participants both to report policy influence and future developments in the longer term.

10.3 Meeting the evaluation objectives

The objectives for the evaluation of the Sciencehorizons project were identified at the beginning of the project, and the findings overall have been as follows:

- **Evaluation objective 1. Determine the success of the Sciencehorizons project in meeting the objectives specified at the outset**. The evaluation has shown that the primary objectives of the project were fully met, and the project made a significant contribution to the secondary (wider Sciencewise) objectives, as shown in section 7.2.

- **Evaluation objective 2. Contribute to the body of knowledge about public engagement in science and technology, and to the development of evaluation of these processes**. The evaluation findings summarised in this report are designed to contribute to this body of knowledge, particularly the final sections 8 and 9 which identify overarching issues. In addition, a presentation was given to the BA Festival of Science in September 2007 to further contribute to knowledge and understanding. The publication of this report is also designed to meet this objective.

- **Evaluation objective 3. Contribute to understanding among policy-makers, government etc about the value of public engagement**. The evaluation findings summarised in this report are designed to contribute to this body of knowledge. In addition, the evaluator attended the policy makers workshop, which considered the Sciencehorizons findings with the findings from the WIST programme, to provide input and answer questions on the process evaluation.

- **Evaluation objective 4. Identify specific lessons for future public engagement in science and technology**. Specific lessons for future practice in dialogue in science and technology are identified in section 10.2 above, and sections 8 and 9 identify wider issues arising from the evaluation.

- **Evaluation objective 5. Involve participants from all parts of the process in providing data for the evaluation, to ensure that all perspectives are included in the final assessment**. Participants from all three strands of the process have provided data through questionnaires and through answering a general question on the Sciencehorizons website. In addition, informal interviews were held with the delivery team and with participants and organisers in Strand 2, participants in Strand 1, and formal interviews held with policy makers and the commissioning team in DIUS. This has ensured input from participants in all parts of the process.

- **Evaluation objective 6. Provide data and analysis that can be incorporated into the overall final report of the Sciencehorizons project.** The final report of the project incorporated data and analysis from the interim findings of the evaluation. In addition, the interim evaluation findings were presented alongside the final report of the project at the BA Festival of Science in September 2007 so both could be seen together.

The Oversight Group raised three additional questions for the evaluation, which are summarised and answered below:

- **The extent to which the people who participated in the Sciencehorizons project could be seen to be representative of wider public opinion and therefore the extent to which this approach to public engagement is as 'valid' as representative survey work in terms of producing 'valid' data**. Overall, the Sciencehorizons project can be seen to have reached a sufficiently diverse audience to be representative of wider public opinion. Strand 1 reached a representative sample, which was recruited as such. Although there is not complete data on the participants and processes in Strands 2 and 3, there is sufficient data to show that these strands also reached a diverse group of the public both in terms of demographic representation and levels of knowledge and interest in science and technology.

This conclusion is supported by finding that the issues raised across all three strands of the Sciencehorizons project were largely similar, providing a degree of triangulation of the views received. The evaluation can therefore conclude that the process is 'valid' in terms of the sample of the population reached and the representativeness of the public views identified. It is a different sampling approach to conventional social survey work, but entirely appropriate to public dialogue. The issue of validation of the Sciencehorizons findings is also addressed in sections 9.2.2, 9.4.3 and 9.4.8 above.

- **Whether the data from the different strands of the project were qualitatively different.** The final project report showed that the content of the views from the different strands were largely similar. This evaluation has shown that there were qualitative differences between the strands: Strand 1 provided data from a recruited group of the public providing a demographically representative sample of the UK population, and went through a carefully designed, facilitated and recorded process providing the richest and most easily attributable data. Strands 2 and 3 relied on group organisers to feedback data, and data was provided by group leaders on behalf of whole groups and by individual group members (especially from schools).

  This did create a wide range of qualitatively different data. As the views were so similar across the strands, there were no major problems in taking these qualitative differences into account in this case. However, there is a lesson here about the need to collect and analyse data from different sources (especially whether from individuals or on behalf of groups, and whether from schools or from other types of organisations), so that any differences can be fully attributed.

- **What impact the project has had on policy, policy makers and policy making processes, and therefore what value public engagement has in supporting evidence-based policy**. This issue is addressed in detail in section 8 of this report. Overall, the evaluation found that the Sciencehorizons project has had significant value to evidence-based policy development in providing data on public views on the issues raised by the project, and also in terms of learning about effective public dialogue. It has not been possible for the evaluation to show direct impact on specific policy developments, policy makers and policy making processes as there have, to date, been no specific policy processes relevant to the Sciencehorizons issues.

10.4 Final conclusions

The Sciencehorizons project was very successful in meeting its stated objectives, and in meeting standards of good practice in public dialogue according to the Sciencewise guiding principles.

The project has reached diverse publics and developed valuable materials that have stimulated and supported discussions among a wide range of groups on complex issues of future scientific and technological development. The participants were very satisfied with the process overall, and the project has provided valuable data for policy makers on public views on these issues.

There have been lessons from the process, especially in terms of ensuring more direct links between dialogue and policy processes, targeting materials and support, and allowing realistic timescales both for discussions in individual events and for the project overall.

Overall, however, the Sciencehorizons project has achieved a great deal in a short timescale, and provided excellent foundations for future dialogue in science and technology.