

Annex 12 — United Kingdom country case study

BLOSSOM: Support to analysis for long-term governance and institutional arrangements



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- Prof. Sandy Thomas, Head of UK Foresight, and Alex King, Project Leader, UK Foresight Horizon Scanning Centre (interview, 28 April 2009)
- Fiona Lickorish, Head of Horizon Scanning and Futures, Department of Environment, Food and Rural Affairs (Defra) (interviews, 31 March 2009 and 1 July 2010)

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- Prof. Tim Lang, City University, London, Member of Independent Advisory Group, Department of Health (interview, 22 April 2009)
- Gary Kass, Principal Specialist, Strategic Futures, Natural England (interview, 11 June 2010)
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This case study report is one of 12 reports completed for the following EU Member States: Germany, Spain, France, Hungary, Netherlands, Austria, Poland, Portugal, Slovenia, Finland, Sweden, United Kingdom.

The opinions and conclusions presented here are the sole responsibility of the consultants and do not necessarily reflect those of EEA.

Acronyms

BIS	Department for Business, Innovation and Skills
BLOSSOM	B ridging L ong-term S cenarios and S trategic analysis — O rganisation and M ethods
BSE	Bovine spongiform encephalopathy
CO	Cabinet Office
Defra	Department of the Environment, Food and Rural Affairs
EA	Environment Agency of England and Wales
EEA	European Environment Agency
EU	European Union
FAN Club	Future Analysts' Network
FSA	Food Standards Agency
GCSA	Government Chief Scientific Adviser
GMO	Genetically Modified Organism
GOS	Government Office of Science
HSC	Horizon Scanning Centre (of UK Foresight)
LWEC	Living with Environmental Change
NE	Natural England
POST	Parliamentary Office of Science and Technology
SEPA	Scottish Environmental Protection Agency

1 Introduction

1.1 Introduction

This report sets out the current status of the main institutional and governance arrangements for futures thinking in the United Kingdom with respect to environmental — and environment-related — policymaking. It is an update of the case study report completed under the previous Blossom project in October 2009 and is based on a review of changes in documentation and other available resources, and a set of interviews with high-level officials and experts in relevant government departments, agencies and institutions. The aim has been to understand how futures thinking is undertaken in the United Kingdom, the relationships between different futures programmes, and how these relate to, and influence, environmental policymaking. The report particularly tries to identify the success factors in ensuring futures thinking is embedded in environmental policymaking; however, barriers to success are also identified. It does not seek to explore the whole range of futures work, only those aspects of most relevance to environmental policymaking, and is focused on the institutional and governance

structures, not the details of the futures studies or the quality of those studies. Further detail can be found in the Appendices.

In 2009, the previous version of this report, along with similar reports for seven other EU Member States, formed the basis for further cross-country analysis during the summer of 2009 to identify common themes and issues in institutional and governance arrangements, as well as distinctive aspects of different cultural and administrative traditions and approaches to futures thinking. This updated report has been used to inform a revised cross-country analysis, which has also drawn upon new case studies in four additional countries: Germany, Hungary, Austria and Portugal.

This study presents the results of an attempt to synthesise and evaluate current practices: it is meant to shed light on important developments and stimulate discussion, but is not meant to be understood as a comprehensive and concluding assessment of future-oriented studies or their impacts on decision-making.

2 The landscape for long-term thinking and governance in United Kingdom

The United Kingdom now has some 15 years' experience of a formal futures/foresight programme: some parts of government and national agencies have considerable experience of using futures thinking while, in others, it is still in its infancy. There is a considerable amount of cross-fertilisation between government and statutory agencies with responsibility for environmental policy in terms of shared futures thinking and approaches, helped by a number of growing networks of practitioners and advisors. Foresight in the United Kingdom is undertaken by the Government Office for Science within the Foresight programme and its Horizon Scanning Centre (HSC). Other futures work and horizon scanning is undertaken within key government departments, for example the Department for the Environment, Food and Rural Affairs (Defra), and agencies, for example the Environment Agency (England and Wales), Scottish Environmental Protection Agency (SEPA), and Natural England. The origins of futures thinking in Defra lie very much in the need arising from major events such as BSE and foot-and-mouth disease. In July 2008, the Cabinet Office set up a new horizon scanning and response team (known as the Strategic Horizons Unit) to coordinate horizon scanning on national security issues across government to ensure that the assessment of threat drivers, threat actors, and domains of threat activity are kept up to date and looking to the future. This unit is based within the National Security Secretariat (NSS), and its creation prompted other departments to review their own activity in this area. This unit's creation was underpinned by the National Security Strategy (Cabinet Office, 2008) commitment to *strengthening the work of horizon scanning and forward planning* (p. 60) and reported in the update in 2009 (Cabinet Office, 2009).

The UK Foresight programme is part of the Government Office for Science, now located in the Department for Business, Innovation and Skills (BIS) (formed from the merger in June 2009 of the Department of Innovation, University and Skills (DIUS) and the Department for Business, Enterprise and Regulatory Reform (BERR)). It has now established itself as a leading exponent of foresight

practice, publishing a number of highly influential studies over recent years. The first round of what was then known as technology foresight took place 1994–1999, but it was not until 2004 that the first major environmental foresight study was published (*Flood and Coastal Defence*). This was followed by the publication of another environmental foresight study published in 2010, *Land-Use Futures*. In general, the major foresight studies are large and in-depth, lasting typically around two years and having long time horizons, for example 25, 50, 100 years). Smaller studies are undertaken by the Foresight Horizon Scanning Centre, typically in response to requests from other government departments. Studies undertaken within government departments tend to be shorter and quicker and in response to particular policy requests or events. The extent of futures thinking and rate of development across government is illustrated in Figure 1, which highlights the interconnections between futures activities and the change 2005–2008, though this picture is changing constantly. What this figure does illustrate is the increasing diversity of futures techniques that were being used across government departments over that three-year timescale, for example the use of horizon scanning, Delphi techniques, driver analysis, scenarios, visioning and backcasting. Note that Foresight is not included in this figure.

An important distinguishing feature of the Foresight programme is that its studies are identified through a consultation process initiated by the government's Chief Scientific Adviser (who also heads the Government Office for Science) with input from the Advisory Board for Foresight. While the identification and selection process may be informed by the issues identified by the Horizon Scanning Centre, there is currently no formal process by which the HSC informs the prioritisation of potential foresight studies. This contrasts with futures work in individual departments which tends to be driven by policy demands within government departments and agencies, and where their own horizon scanning may be instrumental in identifying policy needs. This difference is largely due to the cross-departmental nature of the work undertaken

by Foresight and its HSC and its need to secure ministerial sponsorship for major studies. The wider consultation process is, therefore, seen as a more appropriate way to identify the priorities for major studies.

The style of governance in the United Kingdom reflects the Anglo-Saxon cultural tradition (Perlitz and Seger, 2004) of a largely centralised state with a less egalitarian and participative tradition (compared to Nordic countries, for example), a low avoidance of uncertainty (and therefore some optimism about the future), and high levels of 'masculinity' and individualism. There are devolved administrations in Scotland, Wales and Northern Ireland, with the Scottish Government and Parliament having stronger powers than Wales and Northern Ireland (e.g. in terms of legislative powers and spending). Typically, government departments/ministries work separately with relatively poor cross-fertilisation across them unless active mechanisms are put in place to facilitate such interaction. Considerable power rests with the prime minister and the Cabinet Office in which is located the Strategy Unit (formerly known as the Prime Minister's Strategy Unit) which provides the UK prime minister with in-depth strategy advice and policy analysis on key priorities. The Strategy Unit has three main functions:

- carrying out strategy reviews and providing policy advice in accordance with the PM's policy priorities;
- supporting government departments in developing effective strategies and policies;
- conducting occasional strategic audits, and identifying key challenges for the UK government.

When government has an overall parliamentary majority, the role of Parliament is relatively weak, although select committees of both Houses of Parliament have an important role in holding the government to account. The civil service provides support to the government, not to Parliament. The Parliamentary Office of Science and Technology (POST), however, is a servant of Parliament and provides briefings to parliamentarians on major topics. It is beginning to do some work in the area of futures explicitly and has produced a briefing note, 'Futures and Foresight' (publication, May 2009) (POST, 2009).

2.1 Responsibilities

The **Foresight programme** and its **Horizon Scanning Centre** are part of the Government Office for Science contained within the Department for Business, Innovation and Skills (BIS).

Foresight projects are overseen by the GCSA, with a minister from the relevant department sponsoring the project. There are usually four to five full-time Foresight staff, responsible for delivery of the project, overseen by the Director of Foresight. The Head of Government Office for Science and of Foresight (the GCSA) initiates a Foresight study by requesting a consultation exercise on what is going on 'out there' (what is exciting, challenging, etc.), the results are developed into a long list, those which best fit the criteria for a project (multidisciplinary, cross-departmental relevance, adding value) are considered by the Advisory Board for Foresight chaired by a Cabinet Office advisor, who will recommend which to fund. (The Horizon Scanning Centre does not directly have a role in identifying priority issues for Foresight studies.)

There is a lead expert group that ensures the selected projects include the most relevant evidence and its findings are of the highest technical and scientific standard. The lead expert group usually has regular meetings and makes substantial and important contributions to the project. Current environmental projects, for example 'Global Food and Farming' and the recently completed 'Land-Use Futures' are/were chaired by renowned scientists/experts in their fields. Government ministers, chief scientists and senior representatives from key interested organisations in the public sector, the research community and business form a High-Level Stakeholder Group (HLSG). The group provides strategic direction for the project, commenting on the approach and key issues the project should address. In addition, the group acts as a sounding board for the project's findings, agreeing a plan of action in response to these findings.

A Stakeholder Advisory Network comprising interested parties, policymakers and NGOs works closely with the Foresight team throughout the life of the project to ensure that the wide range of issues relating to the project are factored into the analysis as appropriate. The advisory network acts as an in-depth discussion group throughout the various stages of the project where wider direct input and a range of interests should be represented. Members of the network disseminate information to other interested parties, take part in scenarios and

systems workshops and also assist with developing particular work streams.

Key to the success of the Foresight studies is that a specific team is allocated to follow up foresight reports, which facilitates buy-in from the relevant departmental ministers to continue to sponsor the team (after submission of the main report). There is a conscious and active effort to take forward the work. Some successful examples include *Future Flooding (Flood and Coastal Defence)*, and *Sustainable Energy Management and Built Environment (SEMBE)*. A recent change in Foresight has been recognition that better communication inside and outside government was needed and this has resulted in the appointment of a Communications Manager and a Communications Strategy for Foresight. This includes the production of an annual report (GOS, 2009), improving the website, more media work, high-level articles in *Nature and Science*, events, for example Cheltenham Science Festival, and using the Science Media Centre in London for the launch of reports.

Defra programme: Defra assesses the resources required for each study, with larger studies executed by an external contractor. Smaller, policy-relevant studies are undertaken at the request of policy teams by Defra's own internal consultancy service provided by the Horizon Scanning and Futures team. Depending on the remit of the particular study, there may be a steering group to ensure that work remains true to the original brief. In addition, futures studies commissioned by Defra include a range of stakeholders from a multitude of various backgrounds representing a cross-section of sectors. The results of the futures studies are used to ensure that policymakers are aware of emerging trends and formulate policy which is current and robust enough to cope with novel and unexpected issues. The HSF programme works alongside Defra policy teams, helping them to develop their skills in employing a futures perspective. Horizon Scanning and Futures is located in the Evidence section of Defra.

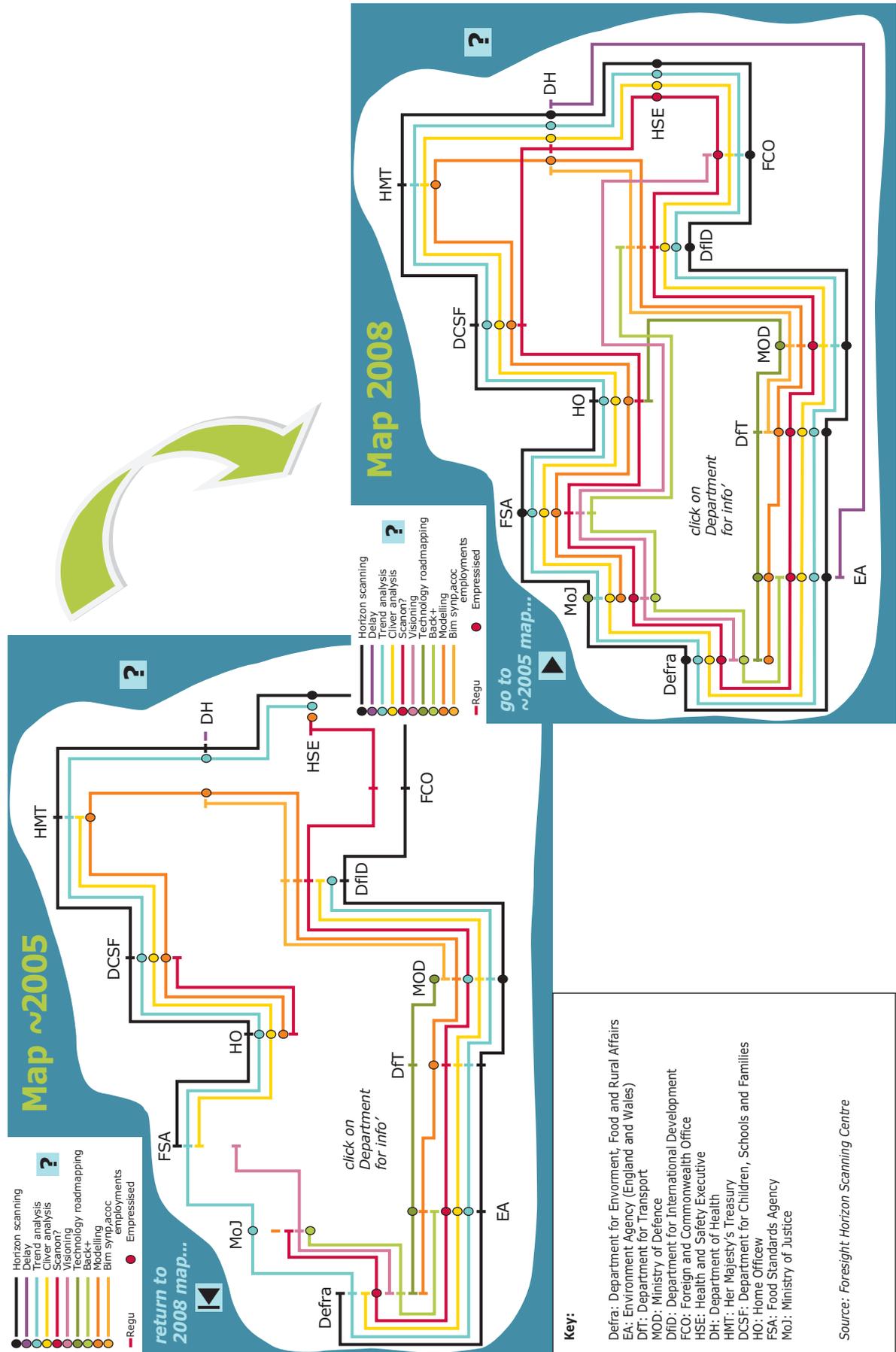
Environment Agency: The Environment Agency has two distinct elements to its futures work, long-term capacity for horizon scanning to inform the EA continuously and specific initiatives in response to specific needs, for example flood risk, water resources and corporate strategy. The use of futures thinking is embedded in the operational processes of the organisation when reviewing a period of horizon scanning is needed to inform policy. There is a mandate for horizon scanning in the science department (within the EA), with a focus around science and technology (there is less of a focus on social trends).

Natural England: Natural England's (NE) purpose is to ensure that the natural environment is conserved, enhanced and managed for the benefit of present and **future** generations, thereby contributing to sustainable development. This statutory obligation requires NE to consider the future, a duty not held by many other organisations. Situated within Natural England's Strategy and Environmental Futures team, their futures function enables them to contribute very directly to, and shape, the developing strategic direction of the organisation, building strategic capability broadly across strategy, policy and delivery functions. To enable NE to anticipate and be ready to respond to long-term future challenges and opportunities, it runs a futures programme, the focus for which includes ensuring a sound, robust evidence base and activities which facilitate embedding of futures thinking within the organisation's business process. Enabled by Natural England's clearly defined corporate reporting process, the benefit that the futures work brings to the organisation, can be recorded against a series of defined targets.

Scotland's Futures Forum: Scotland's Futures Forum (SFF) was established in 2006 by the Scottish Parliament and aims to widen participation, promote 'aspirational futures' by exploring and articulating people's views on what the future should be like, to challenge policy and to increase the ability of MSPs and the wider Scottish community to consider future challenges and opportunities. SFF conducts long-term topic-focused projects (e.g. an ageing society, alcohol and drugs and sustainable communities), though no environmental studies have been undertaken to date. It has a small staff overseen by a board of directors which consists of high-profile public figures from Parliament (including two MSPs), academia, the civil service and business.

Living with Environmental Change (LWEC) Living with Environmental Change (LWEC) is a partnership of 22 major UK public sector funders and users of environmental research, including the research councils and central government departments. It is a 10-year programme (2007–2017) that aims to optimise the coherence and effectiveness of UK environmental research funding and ensure government, business and society have the foresight, knowledge and tools to mitigate, adapt to and capitalise on environmental change (LWEC, 2010). As such, it is a major source of funding for long-term policy relevant environmental research utilising futures techniques.

Figure 1 Connections between futures activities across UK government departments (excluding devolved administrations)



2.2 Resources, staffing involved

Departmental and agency staffing generally rests with a small team (1–4 people) and modest budgets with a significant component (if not all) of an individual's work dedicated to futures work (Table 1). Their role is in part about awareness of future issues (e.g. through horizon scanning activities) and in part often capacity-building among policymakers. Foresight, on the other hand, requires significant resources to undertake major studies (the typical cost of a two year study might be in the region of GBP 1 million). However, these do not necessarily represent the full economic costs since the studies will often include a considerable amount of contribution in kind and goodwill from stakeholders and participants, including some writing of papers and attendance at workshops, for example for a small honorarium.

The **Foresight** programme is continuous, but has been conducted in distinct phases: 1994–1999, 1999–2002, with the current project based phase starting in 2002. Each project draws on different experts and staff based on its particular focus, but is chaired at a strategic level by the minister from the lead sponsor department, with an in-house Foresight team working with networks of experts and stakeholders.

Foresight studies typically run for two years but the organisation is currently thinking whether there should also be shorter studies, primarily because of a recognition that different scales of problems need different scales of studies.

The **Defra** Horizon Scanning and Futures programme, in place since 2002, has been conducted in two phases to date. The first, from 2002 to 2005, covered five distinct research themes (Section 2.4).

The second phase has seen the development of an in-house consultancy service, which has produced significant resource savings. However, the Horizon Scanning unit continues to work with other departments within Defra to offer a futures perspective to their outputs. Since 2008, futures work has become integrated in the policy cycle (Section 2.3) and the team now offers a full in-house consultancy service to policy teams across the department.

The **Environment Agency** has two distinct elements to its futures work, long-term capacity for horizon scanning to inform the EA continuously and specific initiatives in response to specific needs, for example flood risk, water resources and corporate strategy. The use of futures thinking is embedded in the operational processes of the organisation when reviewing a period of horizon scanning is needed to inform policy. There is a mandate for horizon in the science department (within the EA), with a focus around science and technology (there is less of a focus on social trends). Horizon scanning within the EA has had a three-year delivery programme since the new head took over. Year 1 was used to set up networks, Year 2 used to influence policymaking and Year 3 to work on the corporate strategy.

The EA takes a bottom-up approach to horizon scanning in that they are continuously scanning for technology developments etc. Futures work in the EA relies upon a considerable amount of engagement with stakeholders and collaboration across government departments, agencies and research councils.

In Natural England, the futures team generates strategic challenges/issues for the organisation through an iterative process which draws on several approaches. These challenges are then put

Table 1 Resource allocation for key environment-related futures work in the United Kingdom

Programme	Established	Resources
Foresight programme and Horizon Scanning Centre	1994–1999 1999–2002 2002–	GBP 2.8 million, approximately 30 staff including eight staff in the HSC
Defra Horizon Scanning and Futures unit	2002–2005 2006–	GBP 300 000 per year budget to support cross-cutting futures studies, with 1 FTE *
Environment Agency (England and Wales)	Since 2004	Approximately 4 FTE in horizon scanning and dedicated futures work plus consultancy budget as required
Natural England	October 2006 –	Indicative 2.5/3 FTE plus consultancy budget as required (broad range GBP 100 000–200 000)

Note: * full-time equivalent.

Box 1 Communication

Each programme has its own approach to communicating its work and that of its futures studies, internally and externally. Key examples are given below, see also Appendix 1.

Defra:

Environment Agency:

- **ScienceScan** email newsletter and specific communications plan on specific futures projects.

Foresight:

- Regular **HSC Sigma Scans** and **futures networks**
- **Communications Manager**
- **Communications Strategy** for Foresight
- **Annual Report**
- High-level articles in Nature and Science
- Attendance at Events

to a series of high-level groups (Communities of Practice) and to the executive and non-executive boards board for consideration. These groups decide how the challenges should be responded to, if at all. The process of presenting the challenges to these groups means that they have to think about them and decide on a response. This helps create a space where high-level groups in the organisation can build longer-term thinking into their work so that short-term decisions can be more thoroughly considered and grounded in the longer-term (which is more strategic). This helps the organisation to make truly strategic decisions, and set more robust strategic priorities.

2.3 Stakeholders and external relationships

The nature of engagement is a clear strong point within Foresight and departmental/agency futures programmes. Clear networks of futures practitioners and policymakers have been established within Departments and are established as part of the foresight process (Box 1).

In **Defra**, for example, there is a clear and regular process established, following the Defra report *Looking back at looking forwards* (2008). The team offers an 'in-house' consultancy service to provide:

- an internal horizon scanning service;
- monthly Horizon Scanning newsletters, offering insights around a set of close to business 'Key Factors', are published internally and on the team's website (<http://www.horizonscanning.defra.gov.uk>);
- resilience reports to test the 'future fitness' of different programmes and policy teams across the department and also ad hoc support for any futures-related queries;
- annual, horizon scanning insights taken to the Defra Management Board as a Key Factors report which analyses future insights to identify and prioritise the future work programme of the team, for example whether a larger piece of work needs to be done or whether picked up by individual Defra teams;
- ad hoc futures support (including methodology training and workshop design) for any futures related policy queries.

Some policy teams in Defra are now thinking that while they already have regular stakeholder meetings, should one of these should be on futures? Currently ongoing as a major collaborative research project for Defra involving multiple stakeholders, the UK National Ecosystem Assessment (1) is incorporating scenario analysis to examine how habitats and ecosystem service provision might change in relation to different future scenarios.

In the **Environment Agency** there are a number of futures networks utilised.

- The Environmental Research Funders forum, consisting of the EA, research councils and government departments; horizon scanning is used to identify the top 10 areas of uncertainty for the future.
- The Agency is developing research fellowships between the research councils and the EA Horizon Scanning group and also works collaboratively with others, for example SEPA in Scotland, and through the Scottish Futures community (Forum) (<http://www.scotlandfutureforum.org/>) (refer Section 2.3.1).
- At the European Union level, the Agency is a partner in SKEP ERA-NET (Scientific Knowledge for Environmental Protection, funded under the EU sixth framework programme), a network of 17 government ministries and agencies from 13 countries.

(1) <http://uknea.unep-wcmc.org/>.

- Increasingly, the Agency is working with others, for example the Health Protection Agency (which now has a small unit) and the Royal Society. A key benefit of working with the Royal Society is that it has the influence to attract top scientists into the work.

Foresight

- Stakeholder engagement was established in Foresight early on and has been central since 2002. A key element in any foresight study is the HLSG with leaders in the field and chaired by a minister. The current Food and Farming project, for example, has some 25 members on the HLSG. Workshops are used extensively as a means of engaging stakeholders in the process.
- Foresight has a stakeholder strategy – and a top 12 generic stakeholders' group, including for example, the Confederation of British Industry (CBI), research councils, permanent secretaries (of government departments), the OECD.
- UK Foresight promotes networking within the government's community of strategic futures analysts to exchange new ideas, innovative thinking and good practice⁽²⁾.
- Foresight is also seeking to raise the profile of its own work, and of futures thinking internationally, through global networks of Foresight programmes; working with European Commission and Directorates-General on particular projects; international workshops to disseminate findings from, for example, obesity studies and infectious diseases studies in the United States and Canada; and with the African Union in helping to secure funding and setting up networks in Africa on infectious diseases on the back of those reports.
- In 2009, Foresight published its electronic strategic futures tool kit⁽³⁾ to provide support and capacity-building across the community of those working in futures.

Natural England

- Relationships with external stakeholders may be considered less important to the futures work conducted by Natural England as futures are

principally used to inform strategic priorities and, as such, much of the communication around futures is internal, between the futures team and the rest of the organisation, especially high-level groups (Communities of Practice) and to executive and non-executive boards.

- However, the organisation also works with other government departments and agencies (Defra, the Environment Agency) and projects (Foresight) to inform the futures process. This may involve coordinating activities on horizon scanning, sharing scenario work, or sharing expertise on potential challenges in the future.
- Natural England has recently published the first stage in its vision for the natural environment to 2060, which covers the upland environment⁽⁴⁾ in addition to a number of complementary documents⁽⁵⁾ ⁽⁶⁾ ⁽⁷⁾, which sought to understand how future trends might impact on the environment, including a broad-range of scenarios. The intention of publishing this futures work was to encourage dissemination to other stakeholders, both within and outside of government.

2.3.1 Parliamentary and external scrutiny

In the 2007–2008 Parliamentary session, the Innovation, Universities, Science and Skills Committee was established, with a formal remit to examine the administration, expenditure and policy of the Department for Innovation, Universities and Skills, including further education, higher education, skills and the Government Office for Science (the departmental home of UK Foresight until June 2009). This committee replaced the Science and Technology Committee, which was tasked with examining the expenditure, administration and policy of the Office of Science and Innovation and its associated public bodies, including UK Research Councils, the Council for Science and Technology, the Royal Society and Royal Academy of Engineering.

The Public Administration Select Committee (PASC) published a report *Governing the Future* in 2007 reviewing futures work across government and recommended that a report be made to Parliament by the government on futures work once during

⁽²⁾ For example, Foresight ran the Future Analysts' Network (FAN Club) as a wider forum across and outside government 2005–2009.

⁽³⁾ *Exploring the future: Tools for strategic thinking* (<http://www.foresight.gov.uk/microsites/hsctoolkit/>).

⁽⁴⁾ Natural England, 2009a, *Uplands Vision – Natural England's vision for the upland environment in 2060*.

⁽⁵⁾ Natural England, 2009b, *Global drivers of change to 2060*.

⁽⁶⁾ Natural England, 2009c, *England's natural environment in 2060 – issues, implications and scenarios* (to accompany the scenarios compendium).

⁽⁷⁾ Natural England, 2009d, *Scenarios compendium*.

every parliament, and that the role of POST should be strengthened in undertaking futures work for Parliament.

UK Foresight was formally reviewed independently by PREST (University of Manchester Business School) in 2006 (PREST, 2006) which found that it had largely met its objectives and provided an important neutral interdisciplinary space for forward-looking studies, that it had influenced policy and was good value for money. It recommended the encouragement of more engagement with the public as well as stakeholders. The report also concluded that it was still early days in the latest phase of Foresight to draw definitive conclusions.

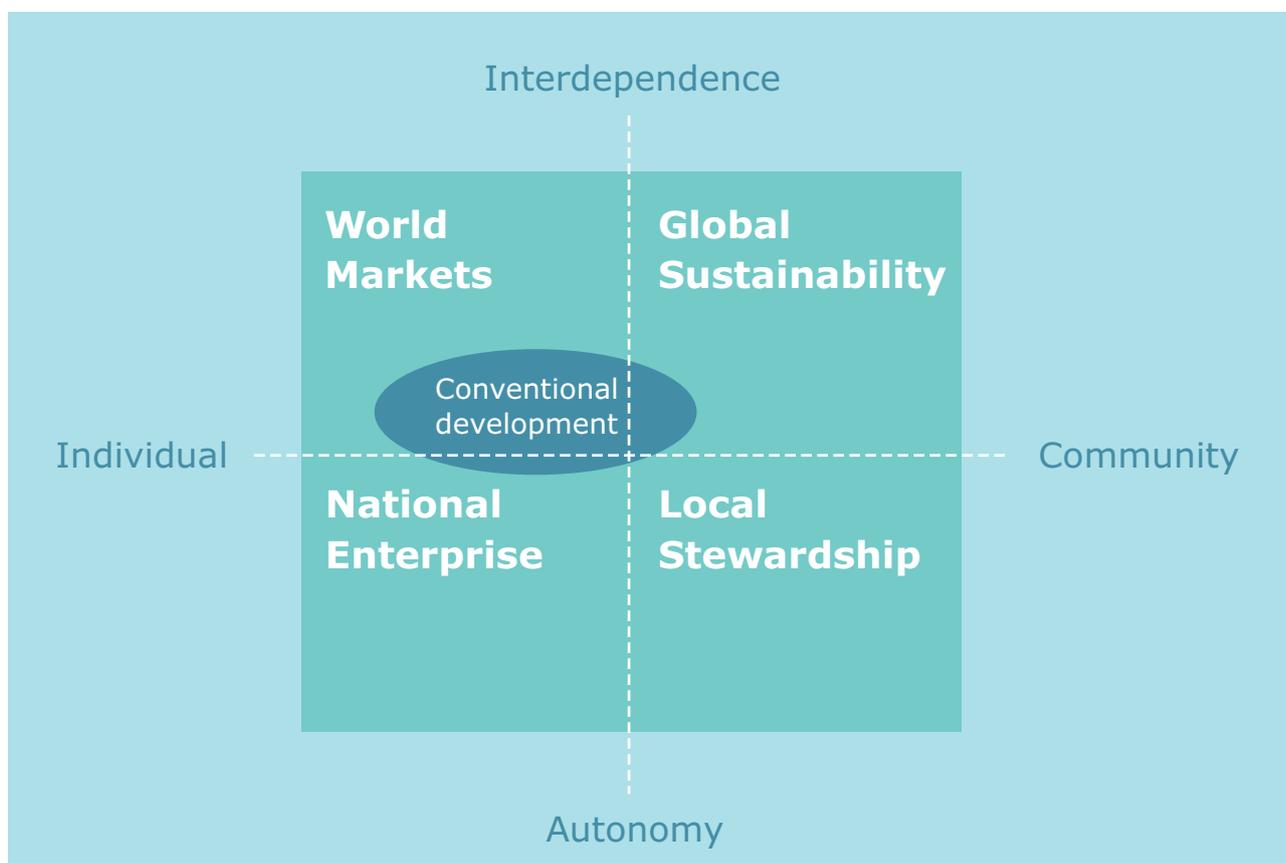
The Scotland Future Forum (<http://www.scotlandfutureforum.org/>) is seen as an increasingly important organisation to help promote new thinking in Scotland. The Forum was created by the Scottish Parliament's corporate body to help Members of the Scottish Parliament (MSPs), along with policymakers, businesses, academics, and the wider community of Scotland, look beyond immediate horizons to some of the challenges

and opportunities of the future. It operates in a fully participatory transparent and open-source manner and seeks to share findings as widely as possible. The Forum also runs lectures, seminars, events, community projects and participates in other creative futures related work. Additionally, the Forum undertakes commissions on futures projects. There have been no environmental studies published to date.

2.4 Relative balance between quantitative and qualitative approaches

The UK Foresight programme uses a range of approaches to futures thinking, which varies between different projects. Some projects, such as *Flood and Coastal Defence*, *Intelligent Infrastructure Systems* and *Cyber Trust and Crime Prevention* employed scenarios to form the narrative backdrop to the analysis and to assess the possible scale and nature of future risks, and options for responding to those risks. An exploratory approach was used during the *Detection and Identification of Infectious*

Figure 2 Foresight Futures scenarios



Source: (OST, 2002).

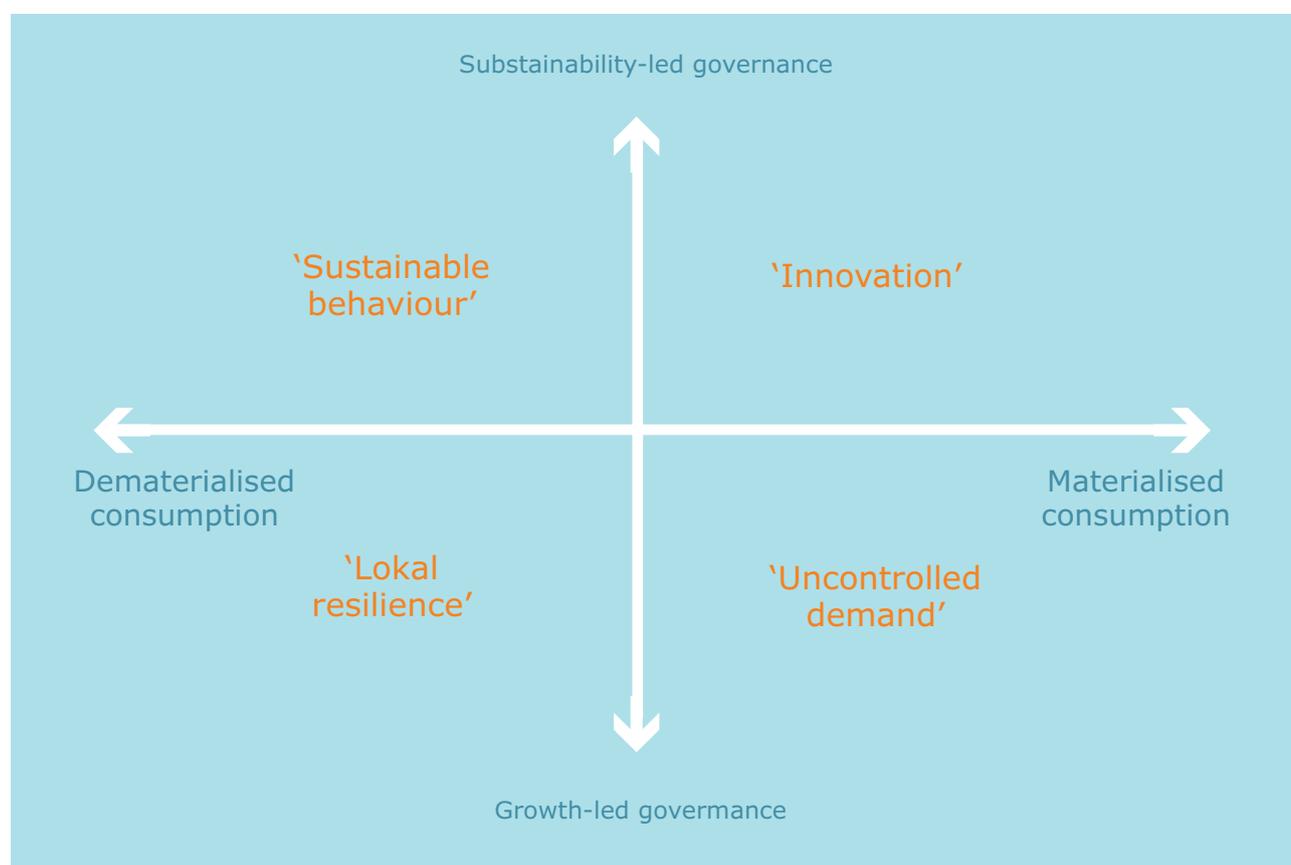
Diseases and the *Cognitive Systems* projects, to explore recent advances in relevant technologies/processes and examine them in the context of their application and development in the long term. The *Brain Science*, *Addiction and Drugs* and *Exploiting the Electromagnetic Spectrum* projects also took an exploratory approach in their futures thinking, as they sought to identify key long-term trends and assess the extent to which the United Kingdom would be capable of responding to threats and opportunities over the long term.

Although there are three distinct categories described above, the Foresight projects completed to date did not necessarily adhere to one type of futures thinking, but instead drew from each. The majority of the studies had some sort of scenario or vision of what the future of the project area would hold and used exploratory techniques to determine potential outcomes.

A set of scenarios *Environmental Futures* (OST, 1999), that emerged from the early Foresight programme in the 1990s, was updated in 2002 as

Foresight Futures 2020 (OST, 2002). These scenarios were structured around two axes: on the vertical dimension is the system of governance, ranging from autonomy where power remains at the national level, to interdependence where power increasingly moves to other institutions, for example up to the EU or down to regional government. On the horizontal dimension are social values, ranging from individualistic values to more community oriented values. This creates the four Foresight futures (Figure 2). They have been used extensively in policymaking. They are referenced, for example, in the Cabinet Office's *Strategy Survival Guide* (CO, 2008) and were used in reviews of energy policy by the (former) Department of Trade and Industry. They were a central focus for the *Future Flooding* foresight study (2004); formed a core element of the approach to managing water resources by the Environment Agency in its national and regional *Water Resource Strategies* published in 2001 (EA, 2001); and were further developed as the basis of the Environment Agency's own scenarios 2030 used in the new

Figure 3 Environment Agency Future scenarios



Source: Environment Agency, *Water for People and the Environment: Water Resources Strategy for England and Wales*, 2009.

national *Water Resources Strategy* (EA, 2009) (Figure 3).

The **Environment Agency** monitors emerging technology and practical environmental management techniques, assessing their potential for protection of, and improving, the environment, to enable the organisation to determine whether its policies and practices should be adjusted to account for new developments. Forecasting risk is used to reduce the environmental impact of the Environment Agency's activities, providing guidance on environmental assessment, sustainable river management and geomorphology. The EA uses social and economic scenarios to frame its futures work (Figure 3) and uses futures thinking that is engagement-focused.

The first **Defra programme** ran from 2002 to 2005 and covered five distinct research themes (Environmental constraints, Coping with threats, Future landscapes, Meeting people's future needs, Rethinking the food economy). Under these five themes, a number of in-depth research studies were commissioned. In addition, the programme also commissioned a report containing four short state-of-the-art studies on biosecurity, and one 'thought piece' on the food chain, 15 pieces in total. The studies varied in their approach depending on the brief and the sector. Some studies were exploratory, others depended on scenarios to facilitate visioning around the topic area. Due to the number of topic areas, and various studies reports commissioned, there is no approach or technique that can be considered typical. Recently, the Horizon Scanning and Futures team in Defra have made a marked shift towards constructing futures based on existing quantitative data (the Morphological approach), moving away from qualitative (workshop-derived) futures. This shift seeks to improve the usefulness of futures to policymakers, increase transparency about how futures are constructed and reduce the financial and time demands of workshops associated with a qualitative approach. This change has only happened recently but, to date, has been successful and well received.

The Defra programme looks at issues on a timescale of 20–100 years in the future for climate change or natural resource protection. However, some work is more short/medium term. Any subject within the Defra remit may be considered and any theme; for example, behavioural attitudes might involve the social science team who would take the lead.

The programme is strongly linked to Defra's Risk programme.

Futures thinking in Natural England is conducted on an ongoing basis, with the key strategic challenges updated once every six months. The timescale considered is usually 10–15 years, but longer term, for example to 2060, timescales are also considered. There are several current strategic challenges identified for the organisation.

- Reductions in EU and public sector funding: How would we cope with a big cut in budgets?
- How do we operationalise an ecosystem services approach?
- Scientific development and technological innovation.
- What could shift people's attitudes and behaviours?
- The role of a national organisation in an increasingly global and local world.

Foresight studies, given their scale and focus, therefore, tend to have a significant 'science' and technical component, including quantitative modelling which may include economic modelling, as part of building the science evidence base for any scenario work. However, the nature of the process is one that engages with the widest range of stakeholders so the qualitative component is important. The balance of quantitative and qualitative approaches, therefore, is one that must be struck in the context of specific challenges — some lend themselves more readily to one or the other although most usually require a mix of both.

In both the Environment Agency and Defra, qualitative and quantitative approaches are equally relevant and depend on the issue in hand. Quantitative models are used routinely in risk assessment, for example, but short-term policy-driven futures studies are likely to lend themselves to more qualitative approaches.

An important issue, and one not yet well addressed, is the lack of (non-economist) social scientists within government departments (and identified by a number of interviewees), which potentially may hamper the ability of departments to implement policy changes that might be appropriate following futures work. Key in futures thinking is to get people to break out of technical models and particularly to focus on the potential implications of low probability high impact issues, and for effective interdisciplinary thinking.

3 Analysis

3.1 Relationship between futures programme

The relationship between futures programmes is complex and to some extent variable. A new horizon scanning team was created in the Cabinet Office in late 2008 in order to coordinate horizon scanning and strategic futures work within the security domain. It complements the existing team with the Civil Contingencies Secretariat within the Cabinet Office which provides early warning of potential civil emergencies of all kinds.

There is some ambiguity in the relationship between Foresight and departmental futures work. On the one hand, they are often mutually supportive, for example Defra contributing to early ideas for potential Foresight studies and HSC undertaking small project commissions for government departments (from a few thousand pounds up to GBP 100 000 in value) and, on the other hand, there may be quite limited interaction with Foresight and HSC on a day-to-day basis. Even where relevant Foresight studies are underway, the link is more likely to be through policymakers in the department than through the departmental futures programme. Foresight does not necessarily at the moment provide a coordinating service or function among government departments on futures thinking where futures specialists in government departments can share knowledge and practice.

The purpose of Foresight projects is distinct from the work of the HSC. The role of the projects is to influence policymakers, and that of the HSC to build capacity in futures thinking. These are undertaken in parallel with individual departments ensuring that these are taken forward together as appropriate. The perceived ambiguity of this relationship has been clarified, however, with the HSC now being identified more clearly as part of the overall Foresight programme (Foresight's HSC) and the distinction primarily based on the scale of futures studies undertaken (Foresight projects take 18–24 months; HSC projects are shorter) and their scope (Foresight projects are science-focused; HSC projects cover the entire policy spectrum

(social, technological, economic, environmental and political)). In addition, HSC has a specific remit to raise the capability of all parts of the UK government to conduct strategic futures work; it, therefore, runs training courses, publishes tool kits and guidance on methodologies and helps departments and agencies set up their own futures teams. Historically, the HSC was set up autonomously in March 2005 following a response to the Treasury Science and Innovation Investment Framework produced in 2004:

... to build up a single centre of excellence in science and technology horizon scanning.

This will feed directly into cross-government priority setting and strategy formation, improving government's capacity to deal with cross-departmental and multidisciplinary challenges. It will also inform and be informed by the government's strategy for public engagement with science (paragraph 1.39, p. 15, HM Treasury (2004), Science and innovation investment framework 2004–2014).

The HSC is also looking at how it might facilitate wider electronic canvassing of views in Foresight's consultation and prioritisation process for major foresight studies, reflecting also the closer integration of the HSC within the Foresight programme.

3.2 Impact on environmental policymaking

Futures thinking is embedded in the quality assurance approach in Defra as part of the policy cycle (Defra, 2008), particularly in terms of ensuring that future policy risks are understood and assessed, including the early involvement of stakeholders.

The location of Defra's Horizon Scanning and Futures programme is within the Evidence Division and therefore co-located with the policymakers. A similar arrangement occurs in the Environment Agency. This seems critical to ensuring futures thinking becomes mainstream among policymakers and not something that someone else does. The clearly established process in Defra for regular

Box 2 Flood and Coastal Defence Study (Foresight, 2004)

To produce a challenging and long-term (30–100 years) vision for the future of flood and coastal defence in the whole of the United Kingdom that takes account of the many uncertainties, is robust, and can be used as a basis to inform policy and its deliver.

This study succeeded in influencing policy over the long term, including to the development of Government policy *Making space for water*. It was characterised by strong support from the lead government minister, in combination with close links with Defra and the Environment Agency, which meant that the Foresight team could rely on their commitment to the project. Critical to the success of the project was the dedication and quality of the project team and the science experts and clear 'client' demand. The imagery used for the project outputs, especially the maps indicating flood risks, facilitated the dissemination of output messages to non-experts. The Foresight study significantly influenced the Treasury's decision to support increased expenditure on flood risk management in England from under GBP 460 million in 2003/2004 to GBP 800 million in 2010/2011.

Box 3 Tackling Obesity: Future Choices Project (Foresight, 2007)

To produce a long-term vision of how we can deliver a sustainable response to obesity in the UK over the next 40 years.

The Foresight Obesity project was noted as providing a clearer understanding of the complexity and scale of the obesity problem. The project shifted the focus from obesity, to promoting healthy weight, healthy lives and recognising that weight is a problem that affects both adults and children. The findings of the report demonstrated the need for a commitment to tackling obesity across government. It highlighted the breadth of the science underpinning weight issues and approaches to tackling them.

The study has been instrumental in shaping Government policy and high profile initiatives, for example the Obesity Strategy (2008), by the Department of Health following strong Ministerial ownership of the study. Increasingly there is wider recognition of the need for joined-up thinking across Government, in relation to health, exercise, open space and transport, though delivering cross-departmental actions has been slower.

meetings at different decision-making levels creates a direct mechanism for regular input of futures thinking, embedding it within the policy cycle to ensure that all policymaking addresses the issue of future risks and challenges explicitly.

The Defra (2006) *Lessons learned* project ⁽⁸⁾ brought external and internal stakeholders and contractors together and identified eight key issues. This led to the rolling Horizon Scanning and Futures programme which produced the report *Looking back at looking forwards* (Defra, 2008). This further led to the Project Life Cycle (Guidance on how to do futures projects) and the Tool kit (of techniques). The tool kit is internal to the department for now but it is intended that it will eventually go on the Internet for wider access.

In the Environment Agency, futures thinking is fully embedded in the corporate strategy process and from that in functional strategies and implementation.

In Natural England, there is evidence of futures and scenarios being used to inform policymaking, which supports an obligation the organisation has to consider the future.

There is a clear rationale and administrative obligation to consider futures thinking in policymaking. This underpins the work of Foresight and the HSC and this is embedded in guidance from the Chief Scientific Adviser:

Individual departments should ensure that adequate horizon scanning procedures are in place, sourcing data across all evidential areas, to provide early indications of trends, issues, or other emerging phenomena that may create significant impacts that departments need to take account of. Departments should ensure that their horizon scanning evidence is appropriately considered and, where necessary, acted upon. Departments should be able to draw on the information included in their Science and Innovation Strategies or their wider Evidence and Innovation Strategies (paragraph 9, p. 4, HM Government, 2005).

⁽⁸⁾ <http://horizonscanning.defra.gov.uk/>.

This guidance and the need for futures studies is also emphasised in the Code of Practice for Scientific Advisory Committees (2007). Several UK government departments have science advisory councils. For example, the Food Standards Agency (FSA) General Advisory Committee on Science (GACS) ⁽⁹⁾ provides independent advice on the Agency's governance and use of science. Its work includes horizon scanning, science governance, developing good practice and informing science priorities.

Critical to the link to policymaking for Foresight is that a particular study must be adopted or sponsored by one or more government ministers and departments. In addition, a dedicated follow-up team is also allocated to facilitate implementation and a report produced one year after the main report is published. Physically, as in the Obesity study (Box 3), a core member of the Foresight team responsible for the study may even move across to the sponsoring department which helps retain the expertise where it is needed. In other cases, new networks may have been established through the foresight process which can provide a long-lasting mechanism for bringing about change.

Foresight seeks to leave networks of people in place that are sustained, for example the infectious disease

study looked at plants, animals and humans and as a result of Foresight these groups now talk to each other where previously they had worked separately. This helps deliver sustained impact, though this may be a second order impact compared to leveraging in real money or action. Examples of such impact include:

- the government's new Obesity Strategy (January 2008), for which the Foresight Obesity (2007) study provided the basis, represents an additional investment of some GBP 400 million over three years;
- on the back of the Infectious diseases Foresight study (2006), work by the Foresight team in conjunction with leading African organisations led to funding support of USD 2.4 million from international donors and, in October 2008, GBP 55 million for research was announced by the UK government following an extended round of discussions facilitated by the Foresight follow-up team working across a number of departments and business decision-makers;
- GBP 200 million additional investment in flood defences provided by the government in light of the *Flood and Coastal Defence* foresight study (2004).

⁽⁹⁾ <http://gacs.food.gov.uk/>

4 Conclusions

4.1 Success factors

The key to successful **Foresight** is buy-in by government departments — all Foresight studies have a sponsoring government department(s) and now also a dedicated follow-up team to ensure the link into policy. Reports need to be taken into government and promoted actively if they are to have influence on policymaking. Futures thinking through Foresight can provide a process through which more radical perspectives are drawn into government to identify and address profoundly large issues, for example key mega trends such as obesity and climate change. Large-scale and complex problems may require major resource allocation to generate the necessary evidence base around which considerable consensus can be garnered, particularly for issues that have been ignored or not taken seriously for a long period of time (the Obesity study was such an example). Foresight also ring-fences resources to help ensure impact in policymaking communities. For example, as well as Defra's making space for water strategy, the future flooding report also significantly informed the Environment Agency's:

- future national risk assessment;
- long-term investment strategy;
- catchment flood management plans and shoreline management plans;
- TE2100 (Thames Estuary) project

Several key Foresight success factors were identified by Foresight interviewees:

1. ministerial sponsorship of a project – and co-sponsorship where appropriate;
2. consistently high-quality analysis gives reputation respect;
3. follow-up to the report;
4. strong pull from departments — there needs to be an appetite for the study and it is essential to select the right topics;
5. support from the centre of government, for example the Cabinet/Prime Minister's Office since ultimately that is where spending decisions will be made;

6. resources for Foresight work and for specific projects;
7. strong stakeholder engagement nationally and internationally;
8. while Foresight studies don't make recommendations, they do make a strong case for strategic action to policymakers — the focus needs to be on what is feasible and what works for them (a need to 'press the right buttons') — and therefore working closely with departmental officials in addition to the Minister is critical.

The success of futures studies inside **government departments**, for example in Defra or the EA, is based more on the capacity-building of policymakers to do much of the futures thinking themselves, not to get it done 'outside' or by others, so that it is physically embedded in the policymaking process and people. It is, therefore, more difficult to evaluate 'success' in terms of value added, as the futures thinking becomes integral to the policymaking process. The consequences of this approach, however, is that futures thinking is well embedded in policymaking rather than seen as something separate.

Within Natural England, futures are successful in informing environmental policymaking because they are central to how the organisation identifies its strategic priorities and responds to changes in its external environment. By clearly articulating its vision for the future, the organisation sets clear strategic outcomes it then attempts to reach. The objectives of the organisation, overall and of individual departments, have to contribute to delivering these strategic outcomes. In this way, futures are integral to the functioning and direction of the organisation and are cascaded via a clearly articulated strategy and complementary objectives.

A considerable amount of networking is now in place across government and agencies on futures work in the environmental field and close cooperation occurs among the Defra family (the department and its sponsored agencies).

There appears to be differences in the way in which horizon scanning operates centred around differing perspectives (top-down and bottom-up, cross-department and departmental) and the relationship between issues identified through scanning and subsequent futures studies. High-level scanning is often based on non-standard literature (e.g. news reports) and so may be considered by some (perhaps natural scientists/engineers) to be less robust. Lower level scanning, for example of relevant environmental technologies (e.g. nanotechnologies) by the Environment Agency can provide a useful steer to the need for a futures study to dig deeper and understand the implications for the Agency and policy implementation.

There are also differences emerging between organisations in the nature of futures studies employed, with Defra moving towards quantitative futures (the Morphological approach) and Natural England using a more qualitative approach (albeit with some quantitative elements). The reason for this diversion could be explained by how futures are viewed and where they sit in each organisation. In Defra, futures sit in 'Evidence' and, as such, it may be important that policymakers using the futures are sure that results are transparent, assumptions clear, and can be replicated if need be. Conversely, in Natural England futures sit in 'Strategy' and are an important part of the strategy-making process within the organisation. The use in informing strategic priorities may reduce the need for quantitative data as the results of the futures are to feed into a discursive evaluation on changes to the organisation's external environment.

Within departments, short and quick studies will suffice and be the most effective for some issues but there may always be a need to have the very large studies to address the biggest issues and to help generate the evidence base to support policymaking.

Success factors for getting futures thinking taken on board within government departments and among policymakers include:

- using the method most acceptable to the most senior person in the policy team;
- build up acceptance of more creative methods gradually;
- a good project officer will sell futures work to the policy team;
- understand what outputs are wanted and then get policymakers to think about the methods to achieve them, rather than propose methods to them;

- the need to develop and nurture multi and interdisciplinarity; and
- well-defined processes for incorporating futures into the strategy-making process.

4.2 Barriers to success

The long timescales of major Foresight studies can mean that in a rapidly changing environment, issues are overtaken by events. UK Foresight is now considering whether some shorter studies may also be appropriate to reflect the fact that some problems naturally have shorter timescales and need shorter studies if they are not to be outpaced by events.

A lack of social scientists within government departments (and by that is meant non-economist social scientists — a lack of economists would not appear to be a problem) appears to be a significant issue (and one that was raised in some form by several interviewees). This could make a difference to the ability to implement necessary policy changes, given so many futures studies in the environmental area have significant social repercussions, often fundamentally to do with the way we live now and will in the future. Futures must be part of a process that is cross-disciplinary.

The cost of not including futures thinking was seen in Defra particularly in relation to genetically modified organisms (GMOs). Defra did not think, in the early stages of policymaking in this area, about public perception and, therefore, only did the science and economics work on GMOs, without looking at the full range of STEEP⁽¹⁰⁾ drivers. Had this been done, the policy may have responded differently to the negative attitudes of public perception on certain aspects of GMOs and food.

Changes of minister or senior official during a Foresight study can mean a change in priority in the sponsoring department. A less enthusiastic minister or senior official compared to the previous may effectively 'knock it into the long grass' since the success of Foresight studies is so closely tied to the momentum created within the sponsoring department. In this way, what is a clear success factor when things are done correctly can equally undermine the whole study if that strong buy-in does not occur or fails. Dependence on strong buy-in can also, therefore, be a potential weakness, although that is an inevitable consequence of an essentially political process.

⁽¹⁰⁾ Social, Technological, Economic, Environmental, Policy/political drivers

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Appendix 1

Approaches to futures studies

Country: United Kingdom	
Title of futures programme(s):	
UK Foresight programme	
Defra Horizon Scanning and Future	
Environment Agency Horizon Scanning	
1. Overall governance culture of country	<p>Description</p> <p>The United Kingdom is classified as a unitary state with a devolved system of government. Executive power is exercised by the UK government and the devolved governments of Scotland, Wales and the Executive of Northern Ireland. Legislative power is held by the government and both the House of Commons and the House of Lords, as well as the Scottish Parliament and Welsh and Northern Ireland assemblies. The United Kingdom is highly centralised, with little real power devolved to the regions. Environmental policy is set by the agencies of central government, reflecting the requirements of EU regulations.</p> <p>There is some degree of cooperation between government agencies where their remit overlaps. However, cooperation is often limited with the result that policies in different departments can sometimes be in direct contradiction of each other. This silo mentality may reflect the hierarchical structure of the civil service, and that each department is under the instruction of a minister who has his or her own brief. Ministers are deemed successful depending on the extent to which they deliver their own brief, rather than the extent to which they facilitate another department to deliver theirs. The style of governance in the United Kingdom reflects the Anglo-Saxon cultural tradition as described in Perlitz and Seger (2004).</p>
	<p>Nature of futures organisation(s)</p> <p>Foresight in the United Kingdom is conducted via the UK government's Foresight programme and its Horizon Scanning Centre. The programme acts as the government's think tank on science and technology issues, exploring emerging areas of science and technology and major issues for society where science and technology have an important role to play. The programme is a permanent body that focuses on three to four areas at any one time. It examines issues sectorally but due to the strategic nature of the studies, they usually involve a number of sectors. The outputs of the Foresight programme feed directly into cross-cutting government priority setting and strategy formation.</p> <p>The Foresight team has been very successful in terms of altering government policy. The structure of the team is important as it facilitates government buy-in — one or more minister sponsors and chairs the stakeholder group. The team also consults and brings in high-level experts to provide technical input, from which Foresight produces high-quality material including relevant and competent reports.</p> <p>In addition to the government programme, there is also the Horizon Scanning and Futures (HSF) programme in Defra (Department for Environment Food and Rural Affairs), which aims to question current policy approaches and assumptions and encourage decision-makers to understand how the external environment interacts with, and influences, the policies and strategies that Defra is creating. The HSF programme is permanent, and works on either on large cross-cutting futures projects, or on smaller discrete projects, helping to ensure that there is futures thinking included in policy formulation.</p>

Country: United Kingdom

The Environment Agency uses risk and forecasting, in combination with economics and strategic environmental assessment, to underpin its policies. Forecasting work, including scenario analysis, assists the Environment Agency in dealing with uncertainty and developing improved environmental models. A range of models are used to generate forecasts for the future state of the environment, drawing on trend information on known pressures and the EA's own data on current environmental quality. The forecasts are used to determine the effect of policy options, risk reduction strategies and planned operational activities. There is a distinction between foresight/futures work in the Environment Agency and risk and forecasting involved in the predictive modelling work for flooding. However, there is some coming together of futures and forecasting through strategic business planning.

Natural England: Futures are integral to how Natural England defines itself, as a requirement to consider the future is included in its statutory remit. Its upfront and explicit future perspective is a key element of its distinctiveness and its role. The futures team in Natural England sits in the strategy section of the organisation, not evidence. This is an important distinction as by being located in strategy, it is the futures **process** which is used to contribute to how Natural England operates, by helping to build strategic capability; rather than the **outputs** of futures being overly important, where futures products would be seen (erroneously) as 'evidence of the future'. Futures are thus used to help test and shape strategic outcomes/priorities for the organisation, and identify potential long-term, big-picture challenges. These challenges are generally issues the organisation will face, changes to the ecosystem within which it operates and what it has to deliver. These challenges are usually within a 10–15 year time frame.

Date programme(s) introduced

The first round of Foresight ran 1994–1999, and the second 1999–2002. The current phase of Foresight started in 2002 and is ongoing. The first environmentally explicit Foresight was the Flood and Coastal Defence project which reported in 2004, and there is currently a Land-Use Foresight project underway.

The Defra programme was launched in 2002, and has been running consistently since then. The Environment Agency has had a futures/horizon scanning programme since 2004.

The futures team in Natural England have been using futures to inform the organisations strategic priorities since 2006.

Living with Environmental Change (LWEC)

Living with Environmental Change (LWEC) is a partnership of 22 major UK public sector funders and users of environmental research, including the research councils and central government departments. It is a 10-year programme (2007–2017) that aims to optimise the coherence and effectiveness of UK environmental research funding and ensure government, business and society have the foresight, knowledge and tools to mitigate, adapt to and capitalise on environmental change (LWEC, 2010). As such it is a major source of funding for long-term policy relevant environmental research utilising futures techniques.

Responsibility

The Foresight programme and its Horizon Scanning Centre are part of the Government Office for Science contained within the Department for Business, Innovation and Skills (BIS).

Projects are over seen by the government's Chief Scientific Advisor, with a Minister from the relevant department sponsoring the project. There are usually around five full-time Foresight staff, responsible for delivery of the project, and who are overseen by the Director of Foresight. The head of the Government Office for Science and of Foresight (HMG's Chief Scientific Adviser) initiates a Foresight study by requesting a consultation exercise on what is going on 'out there' (what is exciting, challenging, etc.) then an advisory group chaired by a Cabinet Office advisor will generate a long list of about 20 ideas and produce a shortlist and recommendations of which to fund. (The Horizon Scanning Centre does not directly have a role in identifying priority issues for Foresight studies.)

Country: United Kingdom

There is a lead expert group that ensures the projects include the most relevant evidence and its findings are of the highest technical and scientific standard. The lead expert group usually has regular meetings and makes substantial and important contributions to the project. Government ministers, chief scientists and senior representatives from key interested organisations in the public sector, the research community and business form a high-level stakeholder group: this group provides strategic direction for the project, commenting on the approach and key issues the project should address. In addition, the group acts as a sounding-board for the projects' findings, agreeing a plan of action in response to these findings.

A Stakeholder Advisory Network comprised of interested parties, policymakers and NGOs work closely with the Foresight team throughout the life of the project to ensure that the wide range of issues relate to the future of land use are factored into the analysis as appropriate. The advisory network acts as an in-depth discussion group throughout various stages of the project where wider direct input and a range of interests should be represented. Members of the network disseminate information to other interested parties, take part in scenarios and systems workshops and also assist with developing particular work streams.

The HSC is part of Foresight, and came up with the prioritising process for Foresight studies roughly two years ago. The HSC is currently considering using a wider range of electronic means to canvass ideas from a wider group of stakeholders to identify potential Foresight studies. Ideas for Foresight studies are gathered from consultation and where there is support in government. The cross-departmental nature of the work HSC is involved in inhibits the organisation from identifying priorities, since the priorities identified might not be consistent with those identified by the departments themselves, or HSC might identify lots of priorities for one department which would not be able to follow them through.

Key to the success of the Foresight studies is that a specific team is allocated to follow up foresight reports, which facilitates buy-in from the relevant departmental minister to continue to sponsor the team (after submission of the main report). There is a conscious and active effort to take forward the work. Some successful examples include Future Flooding, and Sustainable Energy Management and Built Environment (SEMBE).

In order to relate to government departments, a lead officials group exists which attempts to make sure studies are complementary across government (Foresight studies tend to be further into the future than departmental studies).

Defra programme: Defra commissions the studies, which, if large, are usually executed by an external contractor. Depending on the remit of the particular study, there may be a steering group to ensure that work remains true to the original brief. In addition, futures studies commissioned by Defra include a range of stakeholders from a multitude of backgrounds representing a cross-section of sectors. The results of the futures studies are used to ensure that policymakers are aware of emerging trends and formulate policy which is current and robust enough to cope with novel and unexpected issues. The HSF programme works alongside Defra policy teams, helping them to develop their skills in employing a futures perspective.

Natural England: The futures team in Natural England generates strategic challenges/issues for the organisation through an iterative process which draws on several approaches. These challenges are then put to a series of high-level groups (Communities of Practice) and to the executive and non-executive boards for consideration. These groups decide how the challenges should be responded to, if at all. The process of presenting the challenges to these groups means that they have to think about them and decide on a response. This helps create a space where high-level groups in the organisation can build longer-term thinking into their work so that short-term decisions can be more thoroughly considered and grounded in the longer-term (which is more strategic). This helps the organisation to make truly strategic decisions, and set more robust strategic priorities.

Country: United Kingdom

Resources

Foresight receives its budget through the Department for Innovation, Universities and Skills.

Total budget for **Foresight and HSC** is GBP 2.8 million per year, with a staff of 30 people (including civil servants and contractors). Large Foresight projects, which are proactive, generally cost around GBP 1 million, possibly up to 1.3–1.4 million and down to GBP 0.8 million. Smaller projects like the HSC studies, which are reactive, may last from two weeks to a year and are initiated in response to a request from other departments or to help them consider an issue. The studies might cost anything from a few thousand pounds to GBP 40–50 000 and up to GBP 100 000.

The **Defra programme** is funded by the Defra Evidence programme budget and located in the Strategy and Evidence group within Defra. The programme is allocated GBP 300 000 per year to complete its work. If a piece of work is cross-cutting, it is funded centrally. Work relevant to particular policy areas is provided 'in-house' or funded through the policy area concerned.

Environment Agency HS team: three full-time staff and one third MG (he also has other responsibilities); futures more generally, a project manager half-time on futures work for the corporate strategy process and part of the Head of Futures. So around four FTEs, plus external consulting to support, e.g. GBP 120 000 spent on Science Futures project, plus GBP 2 000–30 000 projects elsewhere.

The resources allocated to foresight work in the Environment Agency may change (increase?) in the near future under current reorganisations.

Natural England Strategy and Environmental Futures team — indicative 2.5/3 FTE plus consultancy budget as required (broad range GBP 100–200 000)

Tradition

The Foresight programme is continuous, but has been conducted in distinct phases, 1994–1999, 1999–2002 and 2002–present. Each project draws on different experts and staff based on its particular focus, but is chaired at a strategic level by the minister from the lead department, working with an in-house team working with networks of experts and stakeholders.

Foresight studies typically run for two years, but the organisation is currently considering whether there should also be shorter studies, primarily because of a recognition that different scales of problems need different scales of studies. For example, Foresight was going to do a short study on high-end scenarios of climate change, but that was overtaken by a realisation that, actually, the country was probably following high-end scenarios anyway.

Once a study is complete, there is the possibility of revisiting it and its scenarios, but this is difficult to do, especially if the study had a low impact in the first instance. If a study had a high impact there may be some momentum already there.

The Defra programme, running since 2002, has been conducted in two phases to date. The first ran 2002–2005 and covered five distinct research themes (discussed below). The second phase has seen the development of an 'in-house' consultancy service which has produced significant resource savings.

The Environment Agency has two distinct elements to its futures work, long-term capacity for horizon scanning to inform the EA continuously and specific initiatives in response to specific needs, e.g. flood risk, water resources, and corporate strategy. The use of futures thinking is embedded in the operational processes of the organisation when reviewing a period of horizon scanning is needed to inform policy. There is a mandate for horizon scanning in the science department (within the EA), with a focus around science and technology (there is less of a focus on social trends). Horizon Scanning within the EA has had a three-year delivery programme since the new head (Malcolm Gorton) took over. Year 1 was used to set up networks, Year 2 used to influence policymaking and Year 3 to work on the corporate strategy.

Country: United Kingdom

The EA takes a bottom-up approach to horizon scanning in that they are continuously scanning for technology developments etc. Futures work in the EA relies upon a considerable amount of engagement with stakeholders and collaboration across government departments, agencies and research councils.

Natural England usually has a 10–15 year horizon in its futures work. Futures work is conducted on an ongoing basis, with strategic challenges being presented to a series of high-level groups (Communities of Practice) and to the Executive and Non-Executive Boards for consideration every six months. The futures team also works across the organisation to facilitate the incorporation of futures and strategic considerations more widely.

Parliament

During 2007–2008, the Innovation, Universities, Science and Skills Committee was established, with a formal remit to examine the administration, expenditure and policy of the Department for Innovation, Universities and Skills, including further education, higher education, skills and the Government Office for Science.

This committee replaced the Science and Technology Committee, which was tasked with examining the expenditure, administration and policy of the Office of Science and Innovation and its associated public bodies, including UK Research Councils, the Council for Science and Technology, the Royal Society and Royal Academy of Engineering.

Public Administration Select Committee (PASC) published a report *Governing the Future* in 2007 reviewing futures work across government and recommended report to Parliament by the government on futures work once a parliament and strengthening the role of POST in futures work for Parliament.

The Scotland Future Forum (<http://www.scotlandfutureforum.org/>) is seen as an increasingly important organisation to help promote new thinking in Scotland. The Forum was created by the Scottish Parliament's corporate body to help members of the Scottish Parliament (MSPs), along with policymakers, businesses, academics, and the wider community of Scotland, look beyond immediate horizons to some of the challenges and opportunities of the future. It operates in a fully participatory transparent and open-source manner, and seeks to share findings as widely as possible. The Forum also runs lectures, seminars, events, community projects and participates in other creative futures related work. Additionally, the Forum undertakes commissions on futures projects. There have been no environmental studies published to date.

Advisory councils

There is an advisory board, composed of expert advisers, for **Foresight** that advises the government's Chief Scientific Advisor on the strategic direction of the Foresight programme. During any given Foresight project, there is also a high-level stakeholder group that facilitates stakeholder deliberation.

Stakeholder engagement is a key element of Foresight, and was established early on (around 2002), It usually takes the form of a high-level group composed of leaders in the field and chaired by a minister. (The current food group has approximately 25 in the high-level group.)

Stakeholder engagement is important, and is undertaken via a multitude of methods: workshops, annual reports, improved website, media work (e.g. the Today programme), high-level articles in *Nature* and *Science*, events (such as the Cheltenham Science Festival). Recently, a communications manager and a communications strategy have been employed to improve communications inside and outside government. In addition, Foresight uses the Science Media Centre in London for the launch of reports and similar events. There is also a stakeholder strategy, and a 'top 12' generic stakeholders, for example, the CBI, research councils, permanent secretaries, the OECD.

Country: United Kingdom

Foresight works with the European Commission and Directorates-General on particular projects, international workshops, etc., to disseminate findings from, e.g. obesity studies and infectious disease studies in the United States and Canada, and with the African Union in helping to secure funding and setting up networks in Africa on infectious disease on the back of those reports.

The **Defra** programme has monthly meetings of the Horizon Scanning Futures Club, which includes wider interests in futures work across Defra, e.g. social scientists, the Environment Agency, Natural England, the Rural Payments Agency. There are quarterly ground-truthing meetings, which cluster scans into trends which are presented to an Evidence Forum bringing together people from across Defra, agencies and others (including external) in a workshop to look at the implications of the trends. These trends are then presented to the management board on an annual basis, to a workshop to prioritise the work (e.g. whether a larger piece of work needs to be done or whether it can be picked up by individual Defra teams).

The **Parliamentary Office of Science and Technology** (POST) provides the UK Parliament with an analysis of public policy issues related to science and technology with a view to informing parliamentary debate by providing impartial advice. It is an in-house group, and its activities include horizon-scanning to anticipate issues of science and technology that are likely to impact on policy. Although not officially linked to the Foresight programme, POST can play a role in communicating the findings of the programme to parliamentarians.

**Legal
framework**

There is no legal requirement to provide long-term analysis, but the UK government committed, in its 10-year science strategy, to establish a Centre of Excellence in Horizon Scanning based in the Foresight Directorate of the Government Office for Science. The outputs of this centre are intended to inform cross-government priority-setting and strategy formation.

Policy documents establishing the need to undertake futures work include, e.g. Treasury Orange Book — Risk Register; Chief Scientific Adviser's Guidance for Policymaking; Code of Practice for Scientific Advisory Committees; Cabinet Office Strategy Survival Guide; Public Administration Select Committee (2006) Governing the Future review.

There is no legal requirement on the **Environment Agency**, but various policy imperatives and the nature of the organisations business involves long-term investment and planning for things like flood defences and water resources. The framework for futures thinking in the Environment Agency is derived directly from its corporate strategy, which includes the need to create a better place now and for future generations, advice from the Chief Scientist and old guidelines from the Office for Science and Technology about taking a long-term view. In addition, there is a duty on the Environment Agency to report on their opinion on the state of the environment, which therefore includes reporting on trends into the future.

There is no legal duty for the **Defra** work, but there is a mandatory requirement (administrative provision) secured through the assurance programme and the policy cycle (which is relatively informal).

Natural England's remit 'to ensure that the natural environment is conserved, enhanced and managed for the benefit of present and future generations, thereby contributing to sustainable development' (Natural Environment and Rural Communities Act 2006) requires consideration of the future.

Country: United Kingdom

Political framework	<p>There is no explicit political framework although the UK Sustainable Development Strategy (SDS 2050) is concerned with long-term time frames for action and the consequences of current activities for the future. The SDS sets the policy context for a host of other government initiatives and policies, for example those relating to land use and spatial development, ensuring a long-term view to decision-making. The growing climate change agenda has provided a long-term focus to debates around the environment, in respect of the implications of climate change on various aspects of the environment and the requirements for environmental policy to ensure it is capable of coping with the various scenarios. Climate change legislation, with its formal recognition of climate change projections, has resulted in a 'futures perspective' being reflected in government. Although this is relatively recent (Climate Change Act 2008), it has the potential to cascade a 'futures perspective' to other areas of environmental policy.</p>
Role of environmental research/ foresight programmes in providing futures thinking	<p>The Foresight programme is the primary mode of central government. Other departments and agencies have their own programmes supplementing and complementing the Foresight programme and providing direct support to policymakers within their departments.</p> <p>Horizon scanning and futures thinking is now more ubiquitous in government. The Horizon Scanning Centre undertakes Sigma and Delta scans (Sigma — synthesis of knowledge; Delta — quick looks), which have now been combined, in addition to conducting scans following requests from government departments.</p> <p>Futures are important in ensuring that the strategic direction of Natural England is reviewed and updated on an ongoing basis. It is the process encouraged by the consideration of futures which is particularly important to Natural England, rather than the outcomes (e.g. specific scenarios, visions).</p>
Actors	<p>Within the Foresight directorate, each project has a dedicated team assisted by scientific experts. Each project draws on inputs and insights from a network of external experts and scientists and leaders in their fields. It is common for a wide degree of consultation during the foresight research, especially at the beginning of a project. This consultation is to ensure that the various (external) organisations involved in, or affected by, the Foresight research have the opportunity to offer advice on their area of expertise and ensure that the research is as useful and relevant as possible. This consultative process has been described as a key factor in the successful uptake of the research findings, as the findings are more relevant to the organisations involved.</p> <p>It is usual for networks and links between stakeholders to be established during the course of Foresight research projects. Generally, these networks are novel, making linkages between organisations that are appropriate for the issues related to the research, and are thus a viable way of addressing many of the research findings/recommendations.</p> <p>The HSC was set up autonomously in March 2005 — formally launched in response to the Treasury Science and Innovation Investment Framework 2004. It runs reactive projects and also runs training, networking, seminars, etc., to build futures capacity in departments. The HSC has a general responsibility for raising capabilities across government, but it cannot meet the demand from all departments. For this reason, it may become more of an enabling organisation in the future.</p> <p>The HSC is looking to gather all of the scenarios used to date through Foresight in one place so that they may be available for others for use. Some previous studies had ad hoc follow-up only, unlike now where follow-up is required. Foresight puts resources into a follow-up team, which has been in place for two years now, to achieve impact with the report findings. The follow-up team makes a report/findings and defines an action plan with departments, making the one-year action plan happen and looking for new initiatives. This happens for one year or more. There are three people on the follow-up team.</p>

Country: United Kingdom

- The Mental health and well-being follow-up involved multiple departments, and the launch of the report coincided with the Department of Health's New Horizons Mental Health Strategy, helping to take it forward.
- The Energy/Sustainable Buildings report, the follow-up group is now working with DECC, BERR and CLG, helping them by feeding work to them and running workshops for them.
- The first year review on obesity took place early in 2009.
- The Flooding report — good quality work which was well communicated — resulted in increased funding for flood defence and also influenced major flooding strategy (Making Space for Water).

Thus Foresight studies take existing work and sometimes commission new work, combining them both together to produce something authoritative. (The expert group now has an expert chair, rather than a civil service chair.)

Within **Defra**, smaller studies are carried out internally, with the HSF programme working with policy teams to help them apply a futures perspective.

Within Natural England, the majority of futures work is conducted by the futures team, but the consideration of futures by employees across the organisation is encouraged. Natural England also works with Defra and the Environment Agency during the course of its futures work, in addition to other stakeholders.

Perceived institutional need

The 1993 White Paper *Realising our Potential — A Strategy for Science, Engineering and Technology* recognised and emphasised the importance of science, engineering and technology to wealth creation and quality of life. The White Paper also indicated that the government would launch a technology Foresight programme, to be led by the Chief Scientific Advisor, with the aim of ensuring closed interaction between scientists, industry and government. This aim would be realised through a programme which sought to identify future opportunities and threats for science, engineering and technology. The first cycle of Foresight projects ran 1994–1999.

The Foresight programme has worked on an obesity study, a problem that has many parallels to environmental issues as they both come down to how we live today. In the case of the obesity study, the problem was widely acknowledged amongst leading experts, but the government had refused to accept the existence of a problem (especially over the long term). Eventually, as the problem was picked up by a health select committee that resulted in the Department of Health deciding to do something about the issue. This 'doing something about it' resulted in it being handed to the Chief Scientist to establish the evidence base over the long term. The resulting Foresight study raised awareness on the enormity of the problem, and provided an irrefutable evidence base that way key to getting government buy in and eventual policy change.

The Foresight obesity study was instrumental in getting the issue to the heart of government, because it brought previously non-favoured people (critics of government policy) into the process. However, this success has been to some extent limited to creating awareness and a sense of urgency in government, but the actual policy responses (that are wide-ranging, joined-up and effective) are more difficult.

The Defra Horizon Scanning and Futures programme was established due to the perception that current policy was not capable of coping with unexpected events. Over the preceding decade, there were a series of costly crises in food and agriculture, the emergence of the threat of climate change and the growing emphasis on sustainable development. These issues pointed to the need for more forward-looking and strategic approaches to policymaking.

Internally, in the Environment Agency, futures thinking is used to inform strategies. For example, internal scenario work for the Environment Agency from a few years ago led directly into the new Water Resources Strategy (2009). Within the organisation, different policy programmes may have specific requirements for Horizon Scanning/Futures thinking to help them shape operational policy.

Country: United Kingdom

		<p>Another driver for foresight/horizon scanning work are the interactions with other government departments, such as the Department for Innovation Universities and Skills (flooding/land use), Defra (to inform UK and EU high-level policy), and the Department of Energy and Climate Change (DECC) (climate change futures in corporate strategy). In addition, futures thinking is used to inform work related to flood risk and climate change, notably flooding used to inform the 25-year strategy due to the pressures of long-term planning.</p> <p>On emerging issues and technologies, there is a clear PUSH from the horizon scanning team within the EA, i.e. in building capacity across the EA and providing the service. The PULL (demand) for futures thinking is patchy, with some coming from operations and the water resources areas where there is a strong demand for use of the Horizon Scanning team services. Awareness-raising and capacity across the EA appears to be increasing due to work of Horizon Scanning team, and in response to external demands, which is evident in the chief executive and chairman both asking for briefings in areas that horizon scanning has identified for a number of years.</p> <p>The need for futures within Natural England stems from its remit, which includes consideration of the future. In addition, it is acknowledged within the organisation that futures help in the definition of strategic outcomes which the organisation uses to set priorities and objectives. It is felt that futures are essential to ensure that the organisation is proactive in responding to changes to its external environment.</p>
<p>2. Institutional structure for environmental policymaking</p>	<p>Relevant government departments, ministers, agencies, etc.</p>	<p>Ministers from the relevant government department sponsor specific Foresight projects and are closely involved with setting the direction of the project. Thus, environmental foresight studies will include a minister from the most relevant government department: for example, Eliot Morley (Minister of State for Environment and Agri-Environment at the time) was the sponsoring minister for the Flood and Coastal Defence project.</p> <p>See Appendix 2 for project-specific information.</p>
<p>3. Foresight/ scenario culture traditions</p>	<p>Approach to futures thinking</p>	<p>The UK Foresight programme uses a range of approaches to futures thinking, which vary between projects. Some projects, such as <i>Flood and Coastal Defence</i>, <i>Intelligent Infrastructure Systems</i> and <i>Cyber Trust and Crime Prevention</i> employed scenarios to form the narrative backdrop to the analysis and to assess the possible scale and nature of future risks, and options for responding to those risks. An exploratory approach was used during the <i>Detection and Identification of Infectious Diseases</i> and the <i>Cognitive Systems</i> projects, to explore recent advances in relevant technologies/processes and examine them in the context of their application and development in the long term. The <i>Brain Science</i>, <i>Addiction and Drugs</i> and <i>Exploiting the Electromagnetic Spectrum</i> projects also took an exploratory approach in their futures thinking, as they sought to identify key long-term trends and assess the extent to which the United Kingdom would be capable of responding to threats and opportunities over the long term.</p> <p>Although there are three distinct categories described above, the Foresight projects completed to date did not necessarily stick to one type of futures thinking, but instead drew from each. The majority of the studies had some sort of scenario or vision of what the future in the project area would hold, and used exploratory techniques to determine potential outcomes. The techniques used, and the balance between the techniques, may have been influenced by the subject area, or may have been influenced by those conducting the study.</p>

Country: United Kingdom	
	<p>The first Defra programme ran 2002–2005 and covered five distinct research themes (Environmental constraints, Coping with threats, Future landscapes, Meeting people's future Needs, Rethinking the food economy). Under these five themes, a number of in-depth research studies were commissioned. In addition, the programme also commissioned a report containing four short state-of-the-art studies on biosecurity, and one 'thought piece' on the food chain, 15 pieces in total. The studies varied their approach depending on the brief and the sector. Some studies were exploratory; others depended on scenarios to facilitate visioning around the topic area. Due to the number of topic areas, and various studies reports commissioned, there is no approach or technique that can be considered typical.</p> <p>The Defra programme looks at issues on a timescale of 50–100 years in the future for climate change or natural resource protection. However, some work is more short/medium term. Any subject within the Defra remit may be considered, and any theme, e.g. behavioural attitudes might involve the social science team who would take the lead.</p> <p>The Environment Agency monitors emerging technology and practical environmental management techniques, assessing their potential for protection and improving the environment, to enable the organisation to determine whether its policies and practices should be adjusted to account for new developments. Forecasting risk is used to reduce the environmental impact of the Environment Agency's activities, providing guidance on environmental assessment, sustainable river management and geomorphology. The EA uses social and economic scenarios to frame its futures work, and uses futures thinking that is engagement focused.</p> <p>Natural England uses a range of processes in its futures work and is not restricted to one method or process.</p>
	<p>Thematic or issue</p> <p>Large-scale projects are generally thematic and non-sectoral: smaller-scale studies may be very issue-specific.</p>
<p>4. Summary of programme^(s) as a whole, including within agencies</p>	<p>Due to the multidisciplinary nature of futures studies, it appears that they may be capable of breaking through the silo mentality, often a feature of policymaking in the United Kingdom. This could be a crucial determinant in their success as policy formulation, by its very nature, should be future-oriented. However, until recently, much of the policy formulated (including environmental policy) has been largely based on past events and current issues, lacking a formal methodology to consider the potential of variable future scenarios. Futures studies in the United Kingdom have provided a methodological framework to include various scenarios and improve the robustness of policy, ensuring that policy delivered is robust enough to cope with a multiple of scenarios.</p> <p>There is evidence that appreciation of the benefits of futures thinking is spreading throughout government, with Defra, the Environment Agency and Natural England using environmental futures studies to improve the robustness of their policies. These organisations are conducting futures studies as a matter of course, and they have become embedded in the policy-formulating process. Defra has adopted futures thinking as an integral component of policymaking, recognising the benefits of contrarian views in futures studies, in that they potentially offer valuable insights which may not be considered otherwise. The Environment Agency uses foresight techniques to improve its risk analysis though increasingly is using it in developing corporate strategy. Natural England uses futures to inform its strategic priorities and objectives, which filters throughout the organisation. There appears to be an appetite for horizon scanning in government and for futures thinking, but this needs to be part of a process. This is sometimes difficult as there are not many social scientists in government departments, and many of the issues are in the political/social science areas. In addition, to ensure the successful outcome of futures studies (especially large studies like Foresight) buy-in from government departments is critical. This includes buy-in on scenarios of what the world might look like, and buy in of the timescales used.</p>

Country: United Kingdom

The strength of futures studies, for the government Foresight programme and Defra at least, is the effective use of stakeholders and the formal system in place to incorporate their views, drawing on their expertise to formulate alternative futures and potential trends. This formal system ensures that the findings of the future studies are more acceptable to those affected by the outcomes, and thus the findings may be more likely to be successfully disseminated (to policymakers). Consulting, and including the opinions of, a broad range of stakeholders from the early stages of a futures study ensures that opinions and expertise are included (insofar as is possible) and increases the relevance of the final outcomes, thus facilitating the eventual uptake of the research findings by preventing the exclusion of important sectors/issues which might not be otherwise considered. The explicit links between government departments and the government Foresight programme may produce relevant outcomes as the research is likely to be addressing explicit policy needs, and must also ensure its findings are usable by policymakers. This focus on the final outcomes, ensuring that they are tailored to the eventual audience is a feature of government sponsored foresight studies, and appears to be a factor in their successful uptake by policymakers. A detailed follow-up plan discussed with stakeholders and ministerial departments is crucial to the successful outcome and implementation of Foresight recommendations. The final report needs to be taken into government, for example through presentations to the department management board — to facilitate civil services as well as ministerial buy-in. In addition, often working groups that existed for the study are funded after the study to maintain the momentum.

Other success factors (for Foresight studies) identified during interview include:

1. ministerial sponsorship — and co-sponsorship where appropriate;
2. consistently high-quality analysis gives reputation respect;
3. follow-up to the report;
4. strong pull from departments — there needs to be an appetite for it and it is essential to select the right topics;
5. support from centre of government, e.g. the Cabinet/No 10;
6. resources;
7. strong stakeholder engagement nationally and internationally;
8. while Foresight studies don't make recommendations, they do make a strong case for strategic action to policymakers — the focus needs to be on what is feasible and what works for them (pushing the right buttons) — working closely with departmental officials in addition to the minister.

An important aspect is that Foresight seeks to leave networks of people in place — the infectious disease study looked at plants, animals and humans and, as a result of Foresight, these groups now talk to each other whereas previously they had worked in separate silos. This gives rise to sustained impact, though of a second order compared to leveraging in real money or action (cf. Annual report 2008, published 24.4.2009). Foresight studies can also influence international policy (e.g. Obesity and the WHO Public Health Action Plan — The Second Action Plan for Food and Nutrition Policy, 2007–2012).

The increasing complexity of policy required to deal with emerging trends, with the need to consider effects across a broad range of sectors/drivers/actors also highlights the need for effective stakeholder consultation to ensure a successful outcome. Policy options must be capable of providing solutions to 'non-point' or 'diffuse' issues, and this could serve to increase the use of futures-style studies to inform policy more generally. Although several government departments (e.g. Defra) are conducting horizon scanning activities, more time is required to allow horizon scanning to embed itself as part of the policymaking process. The Foresight process is of such length and scale that it creates an evidence base that is difficult to contradict and reflects the scale, complexity and cost of an issue.

The strength of the Defra programme is that it is policy-led and thus has the ownership and relevance required to ensure that any findings are incorporated into policy. In addition, it functions by providing the skills necessary for policy teams to incorporate a futures perspective themselves and this reinforces the sense of ownership.

An *Evaluation of the United Kingdom Foresight programme* report, undertaken by the University of Manchester (PREST) in 2006 concluded that the Foresight programme had been largely successful, cost-effective (though under resourced) and could benefit from wider engagement including with the public. A number of the recommendations have been addressed.

Country: United Kingdom

As 'futures thinking' extends across government there may be increasing need for Parliament to have greater futures capacity to be able to scrutinise government policy. A key recommendation from a review of futures work across government by the House of Commons Public Administration Select Committee in 2007 was that the role of the Parliamentary Office of Science and Technology (POST) should be strengthened in this area to support parliamentarians, and that government should report to Parliament once per Parliament on futures issues (i.e. similar to the Finnish reporting procedure).

The use of futures in Natural England as an explicit component of the generation of the strategic priorities of the organisation is worth highlighting. In this case, it is not the outcomes of the futures process that are important (although these are useful in describing possible futures) but rather it is the process of generating futures and using them to identify and agree on the strategic priorities which is important. This encourages and facilitates the organisation which is working towards well-defined strategic goals and is capable of responding proactively to changes to its external environment.

Appendix 2

Examples of futures studies

Country: United Kingdom		
Futures programme(s): UK Foresight programme		
1. Description/ characteristics of future study	Examples of specific studies	Flooding and Coastal Defence (2004)
	Exploratory/ normative?	Exploratory, extensive use of scenarios based on climate change and socio-economic scenarios
	Qualitative/ quantitative?	Quantitative, in relation to changes in future flood risk
		Qualitative, in relation to the socio-economic and climate change scenarios against which the changing flood risk factors can be considered
	Thematic focus?	Flooding, and its impacts on society
	Specific issue focus?	Reflects theme of climate change, land-use planning and future policy priorities
	Spatial/ temporal scale	United Kingdom, 2030–2100
	Ad hoc/ongoing established futures process?	Established futures process using established futures processes such as scenario analysis
		Established team of futures researchers, with input from a wide range of stakeholders
Sector/cross-sector-based?	Sector (flooding) and cross-sector (the effects of flooding affects many sectors)	
Science-based/ multiple stakeholders?	Multiple stakeholders, informed by science to establish baseline and potential scenarios	
2. Original purpose and application	For what purpose?	<p>To inform future flood protection policy</p> <p><i>To produce a challenging and long-term (30–100 years) vision for the future of flood and coastal defence in the whole of the United Kingdom that takes account of the many uncertainties, is robust, and can be used as a basis to inform policy and its deliver.</i></p> <p>The project aimed to produce a long-term vision for the future of flood and coastal defence in the United Kingdom, by answering two questions:</p> <ul style="list-style-type: none"> • How might the risk of flooding and coastal erosion change in the United Kingdom over the next 100 years? • What are the best options for government and the private sector for responding to the future challenges?

Country: United Kingdom	
	<p>The objectives of the project were to:</p> <ul style="list-style-type: none"> • identify and assess the relative importance of drivers which will affect future flood risk; • construct a set of risk-based scenarios 30 to 100 years out; • provide an overview of responses and when best to use those responses; • inform policy and its delivery; • consider implications for the future skills base; • identify possibilities for knowledge transfer from other areas of science and technology; • inform public understanding; • promote effective and enduring dialogue between the science base and stakeholders.
	<p>Requested by a specific entity? Defra/Environment Agency, and in response to flooding events</p>
	<p>How used? Scenarios developed during the course of the study have been used as scenarios for other flooding related policies, e.g. CFMPs, SMPs.</p>
	<p>By whom? Findings of the study have been used by a wide range of stakeholders, from Defra, the Environment Agency and the Department for Transport.</p>
3. Outcomes (immediate and long term)	<p>Where and how used in policy (if at all) Used to inform CFMPs and SMPs</p>
4. Evaluation	<p>Any formal evaluation of effectiveness or updates One-year review available, providing information on the relative effectiveness of the project outputs in communicating the findings of the study. The review also includes an analysis of dissemination of the report as reported in the press. The report contains an evaluation of the outcomes of the report in a wider sense rather than the impacts of specific project outcomes. These findings are based on solicited feedback from stakeholders, together with a low level of continuing and responsive activity within the Office for Science and Technology. Findings are structured under the following headings:</p> <ul style="list-style-type: none"> • Better understanding of the future challenges • Informing cross-government strategy • Making Space for Water (MSFW) • Funding • Climate change • Highlighting research priorities • Scotland, Northern Ireland and Wales.
	<p>Success factors/drivers Early and effective stakeholder consultation, establishing novel networks of experts and policymakers who are particularly suited to deal with issues surrounding flooding and changes to associated risk over the long term.</p> <p>The three-phase project structure of the project was identified as allowing the project to maintain flexibility and adapt to changes in priorities. This combined with the robustness and quality of the novel approach and logical framework demonstrated to stakeholders the value that the project brought to considering the future challenges of flood, coastal defence and climate change.</p> <p>Another success factor identified was the strong support from the lead minister, which, in combination with the close links to Defra, meant that the Foresight team could rely on their commitment to the project. Critical to the success of the project was the dedication of the project team and the high-class science experts.</p> <p>The imagery used for the project outputs, especially the maps indicating flood risks, facilitated the dissemination of output messages to non-experts.</p>
	<p>Barriers to success None identified</p>
5. References	<p>http://www.foresight.gov.uk/OurWork/CompletedProjects/Flood/index.asp</p>

Country: United Kingdom		
Futures programme(s): Defra Horizon Scanning		
1. Description/ characteristics of future study	Examples of specific studies	Defra (2006) Potential impacts of future renewable energy policy on UK biodiversity
	Exploratory/normative?	Exploratory, extrapolating likely impacts on future biodiversity based on current trends Scenarios related to possible deployment scenarios of renewable technologies
	Qualitative/quantitative?	Qualitative, using a narrative themed by potential impacts on biodiversity by renewable energy technology
	Thematic focus?	Focus on renewable energy technologies
	Specific issue focus?	Biodiversity
	Spatial/temporal scale	United Kingdom-specific, to 2030
	Ad hoc/ongoing established futures process?	Ad hoc, one-time study
	Sector/cross-sector-based?	Sector, specifically the energy sector
	Science-based/multiple stakeholders	<i>Science-based, in combination with consultation of multiple stakeholders</i>
2. Original purpose and application	For what purpose?	To review the potential impacts of renewable energy sources on UK biodiversity and assess how biodiversity in the future may be affected by a growth in these types of technology. This includes considering the positive and negative impacts of the current energy policy on UK biodiversity, and also providing a detailed assessment of the potential impact of future energy policies on biodiversity.
	Requested by a specific entity?	Defra Horizon Scanning and Futures
	How used?	To inform policy (unclear)
	By whom?	Defra policymakers
3. Outcomes (immediate and long term)	Where and how used in policy (if at all)	Unclear
4. Evaluation	Any formal evaluation of effectiveness or updates	No
	Success factors/drivers	Unclear
	Barriers to success	Unclear
5. References	Defra (2006) Potential impacts of future renewable energy policy on UK Biodiversity Ref: CR0295. Final report to the Department for Environment, Food and Rural Affairs (Defra) and the Scottish Executive Environment and Rural Affairs Department (SEERAD) as part of the Defra Horizon Scanning programme http://horizonscanning.defra.gov.uk/Default.aspx?menu=menu&module=Programme0205&navID=30	

Country: United Kingdom		
Futures programme(s): UK Foresight programme		
1. Description/ characteristics of future study	Examples of specific studies	Foresight Tackling Obesity: Future Choices Project (2007)
	Exploratory/normative?	Exploratory, use of scenarios on the future of obesity in the United Kingdom Looking at key drivers and impacts
	Qualitative/quantitative?	Qualitative: Qualitative analysis exploring the potential impact of different response options in each of the scenarios developed. This work explored the potential impact of different response options in each scenario. Quantitative: Modelling to provide a quantitative assessment of future levels of obesity based on the project's scenarios, and to provide a demonstrator for the development of a model for long-term strategy planning in this area.
	Thematic focus?	Social (health)
	Specific issue focus?	Obesity
	Spatial/temporal scale	United Kingdom, to 2025 and 2050
	Ad hoc/ongoing established futures process?	Through established foresight programme using established processes
	Sector/cross-sector-based?	Cross-sector
	Science-based/multiple stakeholders?	Multiple stakeholders
2. Original purpose and application	For what purpose?	<i>To produce a long-term vision of how we can deliver a sustainable response to obesity in the United Kingdom over the next 40 years.</i> To use the scientific evidence base from a wide range of disciplines to identify the broad range of factors that influence obesity, looking beyond the obvious to create a shared understanding of the relationships between key factors influencing levels of obesity and their relative importance to build on this evidence to identify effective interventions to analyse how future levels of obesity might change and the most effective future responses
	Requested by a specific entity?	Chief Scientific Adviser at the Government Office for Science and sponsored by Department of Health
	How used?	Has been used to inform health policy, and determine the relative importance of health issues. Explicit reference to the findings of the study have been made in the Department of Health annual report and have been cited as a reason for a number of government initiatives to reduce the number of overweight and obese people in the United Kingdom. The Foresight Obesity project was noted as providing a clearer understanding of the complexity and scale of the obesity problem. The project shifted the focus from obesity, to promoting healthy weight, healthy lives and recognising that weight is a problem that affects both adults and children. The findings of the report, in conjunction with a review of the available evidence by the Department of Health and the Department for Children, Schools and Families demonstrated the need for a commitment to tackling obesity across government. It highlighted the breadth of the science underpinning weight issues and approaches to tackling them.

Country: United Kingdom		
		The project also highlighted the cross-departmental nature of the response required, due to its concern with prevention, amelioration and management of obesity, and the requirement for any response to be based on sound evidence. The report also advocated the importance of working across government and creating synergies with other policy agendas to promote common goals, and government initiatives have taken the findings of the project's report to structure their response.
	By whom?	The Department of Health, Food Standards Agency and, to a lesser extent, the Department for Children, Schools and Families
3. Outcomes (immediate and long term)	Where and how used in policy (if at all)	Has been used to inform numerous government initiatives related to healthy living and reducing obesity.
4. Evaluation	Any formal evaluation of effectiveness or updates	First year report published in 2008
	Success factors/drivers	Effective consultation and clear policy need Buy in and follow-up by sponsoring department (DH) Took issue to heart of government
	Barriers to success	Successful implementation of policy change will require more joined-up thinking across government, e.g. to deliver health benefits through other departmental action, such as cycling and walking facilities, green space provision, as well as through encouraging healthier eating.
5. References	http://www.foresight.gov.uk/OurWork/ActiveProjects/Obesity/Obesity.asp	

European Environment Agency

Annex 12 — United Kingdom country case study

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