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See Appendix 1
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NOTE:
References in footnotes to the Report are as follows:
Q refers to a question in oral evidence;
Witness names without a question reference refer to written evidence.

SUMMARY

Departmental Chief Scientific Advisers (CSAs) are a critically important voice for science and engineering in the formulation and evaluation of government policy. Working in the heart of government departments, they provide a source of independent challenge which seeks to ensure that policy decisions are informed by the best science and engineering advice and evidence available.

The current system of CSAs has much to commend it and we do not intend our decision to undertake this inquiry to be seen as a general criticism of it. We decided to conduct the inquiry for three reasons. The first was a concern about the role and status of CSAs in the light of extended vacancies in the Department for Culture, Media and Sport, Department for Business, Innovation and Skills, and Department for Transport, and also the proposed downgrading of the Ministry of Defence CSA post. The second was a growing realisation that a number of our recent reports included recommendations which added to the functions and duties of CSAs and we considered that it was time to take stock. The third was the appointment on 2 June 2011 of a CSA to Her Majesty's Treasury, the final Ministerial department to do so.

We began by asking how the core functions of CSAs should be defined. We took the view that the description suggested by GO Science summed them up well—namely, that the role of CSAs was ensuring scientific evidence is at the core of departmental decision making; scrutiny and challenge of departmental resources to facilitate this goal; and working together to advise on cross-departmental issues. In this context, we considered what "essential characteristics"—both personal and institutional—a CSA and the role of CSA needed to have in order for those core functions to be discharged effectively.

We concluded that the most important personal characteristic of a CSA is that he or she has standing and authority within the scientific community, nationally and internationally. This characteristic underpins many of our subsequent conclusions and recommendations. We concluded, for example, that, as a result, CSAs should either be recruited externally or have a substantial, recent background outside the civil service; and in order for them to maintain links with academia and industry, we recommend that, save in exceptional circumstances, appointments should be part-time (but at least three days a week) and for a period of three years (with the possibility of renewal). We also make recommendations about other necessary qualities and skills of CSAs, and the composition of recruitment panels.

Having considered the personal characteristics of CSAs, we turned our attention to the institutional arrangements necessary to enable CSAs to carry out their functions effectively. To ensure that CSAs are able to exercise influence at the highest level, we recommend that they should have a right to direct access to ministers whenever they judge necessary, that all CSAs be given a seat on their departmental Board and that they are given a formal role in policy submission sign-offs. We also recommend that they should be graded at either Permanent Secretary level or the level immediately below (that is, Director General or departmental equivalent).

We examined the resources available to CSAs. We noted that there was a marked variation between departments. We recommend that all departments assign CSAs a budget to commission advice and evidence to support departmental policy making. We also recommend that departments and the Government Chief Scientific Adviser (GCSA) assess whether CSAs have adequate teams of staff.

In addition, we considered the work of the Chief Scientific Advisers Committee (CSAC), under the chairmanship of the GCSA. We were encouraged to receive evidence of CSAs working together in CSAC and also maintaining close links with the Academies. We recommend that CSAC build similar links with industry. We also considered the work of departmental scientific advisory bodies with overarching responsibility. Whilst not a principal focus of our inquiry, we received sufficient evidence to lead us to conclude that the GCSA, GO Science and the Head of the Civil Service should undertake an evaluation of such scientific advisory bodies to see whether they are effective in providing external critique to departmental use of science. We recommend in particular that the Home Office Scientific Advisory Committee should no longer be chaired by the Permanent Secretary but, instead, should be chaired by an independent expert.

Finally, we asked whether there were adequate mechanisms for oversight of the personal performance of CSAs in terms of discharging their core functions. We concluded that this was an area which would benefit from a more robust and consistent approach. To this end, we propose annual assessments of each CSA by the GCSA, to be fed, in turn, into their departmental annual appraisals.

The role and functions of departmental Chief Scientific Advisers

CHAPTER 1: INTRODUCTION

1. Writing in 2009, the Government Chief Scientific Adviser (GCSA), Professor Sir John Beddington, said:

> "As we face major global challenges of climate change, population growth, threats to food and water security, human and animal diseases and terrorism, there has never been a time when there has been a greater need for science and engineering to contribute to good policy making and sound government".[1]

The Government have indicated their intention to maintain this commitment to using science and engineering advice to inform policy making.[2]

2. The Government have access to a range of science and engineering advice, from both within and outside of government departments, and departmental Chief Scientific Advisers (CSAs) play a critical role in providing that advice. But it is a difficult role to fulfil. Although appointed as civil servants and working within the department, they have to stand at arm's length and challenge departmental decision making to ensure that scientific evidence has informed the policy making process.

3. We were prompted to launch this inquiry for three reasons. The first was a concern about the role and status of CSAs in the light of extended vacancies in Department for Culture, Media and Sport, Department for Business, Innovation and Skills, and Department for Transport, and also the proposed downgrade of the Ministry of Defence CSA post. The second was a growing realisation that a number of our recent reports included recommendations which added to the functions and duties of CSAs (see Appendix 5 to this report) and we considered that it was time to take stock. The third was the appointment on 2 June 2011 of a CSA to Her Majesty's Treasury, the final Ministerial department to do so.

Purpose and scope of the inquiry

4. Our intention in carrying out this inquiry was not to call into question the overall effectiveness of the current system of departmental CSAs but to consider whether it could be improved. We have, therefore, attempted to identify examples of good practice regarding CSAs from across government,

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1 GO Science, *Science and Engineering in Government: An Overview of the Government's Approach*, October 2009.

2 The Government included reference to the GO Science: *Principles of Scientific Advice to Government*, March 2010, in the revised *Ministerial Code*, May 2010, and David Willetts MP, Minister for Universities and Science, gave an assurance about government use of scientific evidence to inform policy in evidence to this committee, 13 July 2010, Q 2
http://www.parliament.uk/documents/lords-committees/science-technology/ScienceGovandPolicy/cSTS130710ev1.pdf

and make recommendations which are intended to ensure that they are observed in all departments. The recommendations reflect our vision of CSAs in terms of having the status and resources to challenge departmental policy making with scientific evidence, to oversee the use of evidence across their departments effectively and, critically, to be able to "speak truth to power".

5. This report is concerned with the work of CSAs in UK Government Ministerial departments and, as such, we have not considered CSAs in devolved administrations or non-Ministerial departments.[3]

6. For the avoidance of doubt, when we refer to "science", we take this to include the social sciences, as well as the natural and physical sciences, and engineering.

Methodology

7. We published a call for evidence on 20 July 2011, which is set out in Appendix 3. Fifty written submissions were received.[4] Also in July 2011, a questionnaire was sent to all CSAs. Questions covered the employment arrangements, relationships within departments and relationships across departments of CSAs. Sixteen questionnaires were returned. A summary of the responses to the questionnaires is set out in Table 1 (see pages 16 and 17). From October to December 2011, the Committee held 11 oral evidence sessions. During June and July 2011, Lord Willis of Knaresborough, a member of the committee, tabled a series of Questions for Written Answer regarding CSA appointments, terms and conditions, background, rank and frequency of meetings with ministers and Secretaries of State.[5] A list of the Written Answers received from departments is included as Appendix 4 to this report.

Structure of the report

8. In the next chapter, we set out the context of scientific advice to government and consider the functions and recruitment of CSAs. Chapter 3 discusses the nature of CSA engagement with departmental policy processes, their position within departmental organisational structures and their work across a department. Chapter 4 looks at the support for CSAs, both in terms of resources and institutional support. We examine resources required by CSAs, their involvement with departmental research spend, the value of effective science and industry community networks to CSAs, the work of Chief Scientific Advisers Committee (CSAC), the range of expertise within CSAC, challenge from external sources, and CSA reporting lines and oversight. Chapter 5 summarises our main findings and recommendations.

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3 We are none the less grateful to the non-Ministerial departments who also completed our questionnaire.

4 Including the departmental questionnaires.

5 HL Deb, 20 June 2011, c242W; HL Deb, 20 June 2011, c255W; HL Deb, 21 June 2011, c280W; HL Deb, 22 June 2011, c305W; HL Deb, 22 June 2011, c306W; HL Deb, 22 June 2011, c306W; HL Deb, 23 June 2011, c336W; HL Deb, 23 June 2011, c337W; HL Deb, 27 June 2011, c365W; HL Deb, 27 June 2011, c366W; HL Deb, 28 June 2011, c402W; HL Deb, 28 June 2011, c402W; HL Deb, 28 June 2011, c403W; HL Deb, 29 June 2011, c434W; HL Deb, 29 June 2011, c435W; HL Deb, 29 June 2011, c435W; HL Deb, 5 July 2011, c44W; HL Deb, 4 July 2011, c8W; HL Deb, 5 July 2011, c45W; HL Deb, 13 July 2011, c180W.

Acknowledgements

9. The membership and interests of the committee are set out in Appendix 1 and those who submitted written and oral evidence are listed in Appendix 2. We are grateful to all those who assisted us in our work.

Departmental abbreviations

Throughout this report we refer to departments by the following abbreviations:

Abbreviation	Full title of department
BIS	Department for Business, Innovation and Skills
DCLG	Department for Communities and Local Government
DCMS	Department for Culture, Media and Sport
DECC	Department of Energy and Climate Change
Defra	Department for Environment, Food and Rural Affairs
DfE	Department for Education
Dfid	Department for International Development
DfT	Department for Transport
DH	Department of Health
DWP	Department for Work and Pensions
FCO	Foreign and Commonwealth Office
HMT	Her Majesty's Treasury
HO	Home Office
MoD	Ministry of Defence
MoJ	Ministry of Justice

CHAPTER 2: FUNCTIONS AND RECRUITMENT OF CHIEF SCIENTIFIC ADVISERS

The context of scientific advice to government

10. Policy making is informed by various types of advice. Science and engineering advice is one; others include, for example, legal and financial advice. Government departments receive science and engineering advice from a number of different sources, both within (from those employed as civil servants) and outside (from independent advisers) government. Departmental CSAs are one source of science and engineering advice internal to government. Other sources of scientific advice most closely associated with the government include the GCSA, the Government Office for Science (GO Science), CSAC, the Heads of Analysis (HoA) group, Scientific Advisory Committees (SACs) and Councils (SA Councils), and the Council for Science and Technology (CST).

11. The focus of this inquiry is on departmental CSAs. In order to understand their specific role, however, it is important to understand the variety of mechanisms for science (including social science) and engineering advice to government. The following brief descriptions provide an overview.

Government Chief Scientific Adviser

12. The GCSA, currently Professor Sir John Beddington, gives science and engineering advice to the Prime Minister and Cabinet members, and he also advises on science, engineering and technology policy.[6] The GCSA reports to the Cabinet Secretary within the civil service, and to the Prime Minister. He is a civil servant and acts as the Head of GO Science, a semi-autonomous office of BIS, and is Head of the Science and Engineering Profession across government. The GCSA leads Science and Engineering Assurance reviews (SEA reviews), together with departmental Permanent Secretaries, whereby external peers review departmental systems and processes for incorporating science and engineering advice into decision and policy making. The GCSA attends COBR (the Cabinet Office Briefing Rooms and their associated crisis management facilities) when scientific advice is required in emergencies. The GCSA co-chairs the Scientific Advisory Group in Emergencies (SAGE) which gathers experts to inform the government response to emergencies.

Government Office for Science

13. GO Science has two main areas of responsibility: foresight, and science in government. The office's overarching goal is to ensure that major government policy decisions are informed by quality science and engineering advice. Foresight's aim is "to help policy makers think systematically about the future and take decisions today which are robust to future uncertainties".[7] Their projects are either medium or long-term horizon-scanning.[8] They work with government departments and external experts to ensure that projects are relevant to current and future policy making. Examples of projects undertaken by Foresight include *Migration and Global Environmental Change: Future Challenges and Opportunities*, 2011, and *The*

6 GO Science: *Chief Scientific Advisers and their Officials: an introduction*, December 2011.

7 Ibid.

8 Ibid.

Future of Food and Farming: Challenges and choices for global sustainability, 2011. GO Science's second area of responsibility, science in government, incorporates secretariat support to the GCSA, CST and CSAC, Global Issues teams who "help the GCSA to ensure that major policy decisions are well-handled by the Government and that science and engineering evidence is properly considered", and support for SEA reviews.[9]

Chief Scientific Advisers Committee

14. CSAs collectively form CSAC which meets under the chairmanship of the GCSA. CSAC discusses cross-government issues of science and supplies collective advice to ministers, discusses and facilitates implementation of policy on science and engineering, identifies and promulgates good practice, and facilitates communication on new and high-profile issues.[10] CSAC meets informally each week and formally four times a year.[11]

Heads of Analysis

15. The HoA group gives leadership to all analysts in government. This includes science and engineering, economics, social research, statistics and operational research. GO Science described the group as "champions [of] first-rate analysis across government to ensure policy and delivery of government services is as effective as possible".[12] The group is chaired by the Permanent Secretary of HMT and the GCSA is a member.[13]

BIS Director General, Knowledge and Innovation

16. The BIS Director General, Knowledge and Innovation, currently Sir Adrian Smith, allocates the science budget, through the seven research councils. He is responsible to the Minister for Universities and Science. The science and research programme funding budget is £4.6 billion each year from 2011/12 to 2014/15.[14]

Scientific Advisory Committees

17. There are currently over 70 Scientific Advisory Committees (SACs) across government departments and they provide a source of external, independent advice.[15] SACs give expert advice to departments on specific topics, for example misuse of drugs, vaccination and immunisation, and climate change. Some SACs operate as Non-Departmental Public Bodies (NDPBs), others are "expert scientific committees" operating independently of their sponsoring organisation.[16]

Scientific Advisory Councils

18. Scientific Advisory Councils (SA Councils) "provide independent overview and challenge of the management and use of science" across a whole government department.[17]

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9 GO Science: *Annual Review 2010–2011*.

10 Op. cit. *Science and Engineering in Government*.

11 The Government.

12 Op. cit. *Chief Scientific Advisers and their Officials*.

13 Ibid.

14 BIS: *The allocation of science and research funding 2011/12 to 2014/15*, December 2010.

15 The Government.

16 GO Science: *Code of Practice for Scientific Advisory Committees*, 2011.

17 Op. cit. *Science and Engineering in Government*.

Guidelines

19. The relationships, or "rules of engagement", between SACs, SA Councils and their sponsoring departments are governed by the *Code of Practice for Scientific Advisory Committees*, revised in December 2011, and *The Principles of Scientific Advice to Government ("the Principles")*, March 2010. *The Principles* apply to those giving external, independent scientific and engineering advice to government and provide assurances of independence, freedom, accuracy in representation and respect from the government. *The Principles* seek also to ensure transparency and openness in the advisory process, and encourage government to publish reasons for policy decisions, especially if they do not follow advice offered. These "rules of engagement" do not apply to CSAs. *The GCSA's Guidelines on the Use of Scientific and Engineering Advice in Policy Making*, June 2010, seek to "address how scientific and engineering advice should be sought and applied to enhance the ability of government policy makers to make better informed decisions".[18] The five key principles are that departments should:

- "identify early the issues which need scientific and engineering advice and where public engagement is appropriate;
- draw on a wide range of expert advice sources, particularly when there is uncertainty;
- adopt an open and transparent approach to the scientific advisory process and publish the evidence and analysis as soon as possible;
- explain publicly the reasons for policy decisions, particularly when the decision appears to be inconsistent with scientific advice; and
- work collectively to ensure a joined-up approach throughout government to integrating scientific and engineering evidence and advice into policy making".[19]

Council for Science and Technology

20. The Council for Science and Technology (CST) is another source of external advice. It advises the Prime Minister and Cabinet on "science and technology policy issues which cut across the responsibilities of individual government departments".[20] Members are senior figures drawn from the science, engineering and technology community and are appointed by the Prime Minister. They are supplemented by experts who join sub-committees set up to consider specific pieces of work.[21] The terms of reference of CST are "to advise the Prime Minister on the strategic policies and framework for:

- sustaining and developing science, engineering and technology (SET) in the UK, and promoting international co-operation in SET;
- fostering the practice and perception of science, engineering and technology as an integral part of the culture of the UK;
- promoting excellence in SET education;

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18 GO Science: *The GCSA's Guidelines on the Use of Scientific and Engineering Advice in Policy Making*, June 2010.

19 Ibid.

20 Op. cit. *Chief Scientific Advisers and their Officials*.

21 http://www.bis.gov.uk/cst/about-cst.

- making more effective use of research and scientific advice in the development and delivery of policy and public services across Government; and
- promoting SET-based innovation in business and the public services to promote the sustainable development of the UK economy, the health and quality of life of UK citizens, and global sustainable development".[22]

The CST is co-chaired by an independent chairman, currently Professor Dame Nancy Rothwell, and the GCSA. The independent chairman chairs meetings where CST is discussing and developing its advice to government; the GCSA chairs meetings where it is reporting its advice to government.[23]

Core functions of departmental CSAs

21. Whilst the role of GCSA has existed since 1964, departmental CSA posts pre-date this.[24] For example, Sir Alfred Daniel Hall was appointed as CSA to the Ministry of Agriculture and Fisheries in 1920.[25] All Ministerial government departments now include a CSA post, although DCMS, DfT and BIS have all carried vacant posts for some time. Recently, BIS and DfT have filled these posts.[26] DCMS is currently restructuring and considering their need for a CSA.[27] (We shall be considering issues specifically relating to the DCMS CSA in our forthcoming follow-up inquiry into Science and Heritage.)[28]

22. CSAs are, according to the evidence we received from the Government, always senior officials "in a position to influence departmental decision making".[29] Their functions may include some or all of the following:

- "provision of advice and challenge directly to the Secretary of State, other Ministers and policy makers in the department;
- independent challenge of the evidence base for departmental policies;
- oversight of departmental systems for ensuring that policy makers consider relevant science and engineering evidence;
- oversight of the effective operation of any departmental Scientific Advisory Committees;
- management of departmental research budgets;
- responsibility for departmental science and engineering quality and capability;
- role of Head of Profession role for departmental science and engineering staff;
- working with the other analytical Heads of Profession (for economics, social research, statistics and operational research) and Departmental Directors of Analysis to ensure a robust and integrated evidence base underpins policy formulation, delivery and evaluation;

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22 http://www.bis.gov.uk/cst/about-cst/terms.

23 http://www.bis.gov.uk/cst/about-cst.

24 Op. cit. *Science and Engineering in Government*.

25 OUP: *Oxford Dictionary of National Biography*, 2004.

26 http://nds.coi.gov.uk/content/Detail.aspx?ReleaseID=422503&NewsAreaID=2, Q 108.

27 The Government.

28 Science and Technology Committee, 9th Report (2005–06): *Science and Heritage* (HL Paper 256).

29 The Government.

- performing an independent challenge function to the department, ensuring that science and engineering evidence and advice is robust, relevant and high quality and that there are mechanisms in place to ensure that policy making is underpinned by science and engineering;
- managing the development, delivery, implementation and monitoring of the department's science and innovation strategy;
- leading and engaging within and for the department on relevant national and international science and engineering issues; and
- networking with CSAs in other department to share good practices across government and maximise the collective expertise of the CSA network to identify and resolve cross departmental problems".[30]

23. Although, within the range of these functions, the role of CSA varies between departments, GO Science said: "the core role of departmental CSAs is to ensure that departmental decisions are informed by the best science and engineering advice. They do this both through offering advice directly to Ministers and official colleagues and by oversight of processes for ensuring that departments take account of, and commission where appropriate, relevant scientific and engineering evidence."[31]

24. As an indication of the importance of CSAs within departments, Box 1 sets out examples of CSA influence over policy development. These examples, which are only a selection of the many we received in evidence, demonstrate the value CSAs can add to the policy making process.

BOX 1

Examples of CSA impact on policy development

The following examples demonstrate the value CSAs can add to the policy making process:

- Professor Brian Collins, former CSA to BIS and the DfT, referred to the example of the volcanic ash incident in April 2010. He described how CSAC had gathered a significant amount of research so that the GSCA could offer informed advice regarding the density of ash in which it was safe to undertake air travel.[32]
- Professor Christopher Whitty, Dfid CSA, described how his team had been able to produce an externally peer-reviewed analysis of evidence on malaria to equip ministers to make informed decisions based on available evidence.[33] Professor Whitty said the evidence paper "was used in the formulation of Dfid's strategic case and policy decisions in response to the Secretary of State's intention to increase funding to this area, and subsequently in the development of Dfid country plans for malaria. Additionally it informed Dfid decisions on gaps for research funding decisions in malaria".[34]
- Professor Sir Mark Welland, MoD CSA,[35] said that he was able to contribute scientific challenge to the MoD's TERRIER procurement programme when a difficulty regarding metallurgy and design of the vehicle's front loader system and chasse arose. His contribution "changed the way in which that programme ... developed".[36]

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30 Op. cit. *Chief Scientific Advisers and their Officials*.

31 Ibid.

32 Q 11.

Variation in departmental arrangements for CSAs

25. The responses we received to the departmental questionnaires demonstrated the variety of arrangements governing CSAs across government departments—in terms of reporting lines, roles, budgetary responsibilities, hours of work, tenure, existence of SA Councils, SACs and other advisory bodies, and management responsibilities. DH and Defra CSAs have seats on their departmental Boards; the other CSAs do not. BIS, DECC, Defra, DH and HO CSAs report to a Permanent Secretary; MoD and FCO CSAs report to Permanent Under Secretaries; other CSAs report to Directors General. DfE, DH, DWP, HMT and MoJ CSAs are permanent appointments; other CSAs are on fixed-term contracts (FTCs) or secondments. Defra, DfE, Dfid, DH and MoD CSAs control their departmental research budget; others do not. Six of the current CSAs hold additional posts within their departments—for example, the Dfid CSA is also Director of Research and Evidence Division. Table 1 summarises departmental arrangements for CSAs. We discuss the relative merits of these different arrangements in later chapters.

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33 Q 79.

34 Q 79.

35 Sir Mark Welland completed his term, which had been extended, as MoD CSA on 29 February 2012.

36 Q 149.

TABLE 1

Summary of Ministerial departments' arrangements for CSAs[37]

Dept	Int/Ext Appointment[38]	Seat on Board	FT/PT	Grade	Actual Pay Floor (— Ceiling)	Reports to	Tenure	Control of research budget[39]	Additional Posts
BIS	External	No	PT 0.6 FTE[40]	SCS2	£72,000	Perm Sec	FTC	No	
DCLG	External	No	PT 0.5 FTE	SCS2	£60,000–£64,999	DG	FTC	No	
DCMS	*Vacant*	*Vacant*	*Vacant*	*Vacant*	*Vacant*	*Vacant*	*Vacant*	*Vacant*	
DECC	External	No	PT 0.8 FTE	SCS3	£105,000–£109,999[41]	Perm Sec	Secondment	Partial	
Defra	External	Yes[42]	PT 0.8 FTE	SCS3	£135,000–£139,999	Perm Sec	FTC	No	
DfE	Internal	No	FT	SCS2	£85,000–£89,999	DG	Permanent	Yes	Director of Research & Analysis
Dfid	External	No	PT 0.8 FTE	SCS3	*Not disclosed*	DG	Secondment	Yes	Director of Research & Evidence Division

37 Departmental questionnaires and Civil Service Senior Staff pay information and grades from www.data.gov.uk.

38 As classified by evidence received from the Campaign for Science and Engineering (CASE).

39 See table 5 from GO Science for full details of CSA responsibility for budgets. Where the questionnaires were not clear the GO Science information was used.

40 See footnote 94.

41 This is an approximate salary offered by DECC as they do not publish salaries for secondments.

42 Defra have a Management Committee and Supervisory Board rather than a departmental Board.

Dept	Int/Ext Appointment [38]	Seat on Board	FT/PT	Grade	Actual Pay Floor (— Ceiling)	Reports to	Tenure	Control of research budget [39]	Additional Posts
DfT	External	No	PT 0.6 FTE	SCS2	£31,740–£97,500	DG	FTC	No	
DH	Internal but with significant external experience [43]	Yes	FT	SCS3	£225,000–£229,999	Perm Sec	Permanent	Yes	Chief Medical Officer, Chief Medical Adviser, DG Research and Development
DWP	External	No	FT	SCS2	£130,000–£134,999	DG	Permanent	No	Chief Medical Adviser
FCO	External	No	PT 0.4 FTE	SCS3	£49,200	PUS	FTC	N/A	
HMT	Internal	No	PT—no dedicated hours	SCS2	£85,000–£89,999	DG	Permanent	Not specified	Director of Public Spending, Chief Microeconomist
HO	External	No	FT	SCS2	£120,000–£124,999	Perm Sec	FTC	No	
MoD [44]	External	No	PT 0.8 FTE	SCS3	£112,000	PUS	FTC	Yes	
MoJ	External	No	FT	SCS2	£85,000–£89,999	DG	Permanent	No	Director of Analytical Services

[43] See footnote 60 on page 26.

[44] Exceptionally, the arrangements detailed in this table for the MoD CSA are based on the candidate brief for the new MoD CSA post, MoD: *CSA Candidate Brief*, July 2011.

FT	Full-time
PT	Part-time
FTE	Full Time Equivalent
SCS	Senior Civil Service
DG	Director General
Perm Sec	Permanent Secretary
PUS	Permanent Under Secretary
FTC	Fixed Term Contract
SAC	Scientific Advisory Committee
SA Council	Scientific Advisory Council

26. Professor Paul Wiles, former HO CSA, described this variation in arrangements for CSAs as a continuum, and discussed some potential risks associated with particular arrangements:

> "At one extreme, you have the model of a CSA which is a completely independent adviser to Ministers and perhaps to senior officials without any line management responsibility for the production of science or analysis or research within the department … At the other extreme, you have the CSA who has line management responsibility for the whole of the science and research in a department as well as trying to give independent advice to Ministers … Both of those models have potential pitfalls. If you are the purely independent adviser without any line management responsibility, if you are not very careful, you can fairly easily be marginalised … At the other extreme, in the sort of role that I played, the danger is that you become so much of a team player that you cease to have the kind of independence to provide the kind of challenge that you should be providing, and that was a danger".[45]

27. We considered whether there should be standardised arrangements for CSAs. Professor Sir John Beddington thought not: "I do not think there is a one-size-fits-all solution".[46] **The departmental questionnaires showed that each department has a different organisational structure and arrangement for the management of science: some departments manage research and evidence gathering in a central team, others manage it within policy programmes.**[47] **This variation in arrangements for the management of science across departments, alongside the different remit of each department, has led us to conclude that some flexibility should be afforded to departments to allow them to tailor the departmental CSA post to their individual needs.**

28. **However, there are a number of "essential characteristics" which we have concluded must be present, irrespective of a department's structure and science management arrangements, if a CSA is to discharge his or her core functions effectively. These include the personal characteristics of a CSA and characteristics of the institutional arrangements in relation to the post itself.** In this chapter we consider the essential personal characteristics, in terms of the necessary qualities and skills, of a CSA and associated aspects of recruitment. In Chapters 3 and 4 we consider the institutional arrangements.

Qualities and skills necessary for CSAs to be effective

29. We received a range of evidence about the qualities and skills necessary for a CSA to be effective: very few, if any, were controversial, and none were opposed in evidence.

Standing within the scientific community

30. A number of witnesses referred to the need for a CSA to have standing or authority within the scientific community, nationally and internationally, as a

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45 Q 5.

46 Q 112.

47 Questionnaires, the Government.

result of his or her experience and achievements. Professor Sir John Beddington referred to a CSA having to "command the right respect".[48] The Better Government Initiative (BGI), an organisation which aims to improve policy change and legislation processes, made a similar point when they said that all CSAs should be "of outstanding status, whose views will be respected by their academic and professional peers".[49] The Health Protection Agency (HPA) argued that "public trust in the independence and authority of the scientific basis of government policies is greatly enhanced if CSAs are seen themselves to be independent and are highly respected among their relevant professional communities".[50] Ian Downie, Managing Director, Serco Science, said that there was a "requirement to have a CSA that has an international respect".[51]

31. The significance of the standing of a CSA is twofold: first, it enables a CSA to benefit from the expertise of the national and global scientific community (external influence) and, secondly, it may bear upon a CSA's capacity to exercise influence within the department (internal influence) (an issue which we consider further in Chapter 4). With regard to external influence, the Royal Society commented: "CSAs ... draw significantly on national and international networks of experts in providing specific advice. This requires the CSA to command the respect and support of the domestic and global scientific communities".[52] The Royal Society described a CSA as being a "convenor of experts".[53] Lord May of Oxford, former GCSA, also said that CSAs had to be able to access a wide range of expertise, and the Institute of Physics (IoP) said that CSAs had to be able to evaluate this information.[54] Professor John Pethica, Physical Secretary and Vice President of the Royal Society, and the Royal Society of Edinburgh (RSE), made similar points.[55]

Communication and management skills

32. Whilst standing in the scientific community is of primary importance, we recognise that it is not in itself sufficient to ensure that CSAs are effective in discharging their functions. They also need certain practical skills associated with many senior posts. Dr Christopher Tyler and Dr Robert Doubleday of Cambridge University, for example, referred to the need for CSAs to have excellent communication skills.[56] Other witnesses mentioned the importance of management skills, including the ability to build effective relationships. Sir Kevin Tebbit, Chairman of Finmeccanica UK and former MoD Permanent Secretary, for example, said: "a successful Chief Scientific Adviser needs to be able to chair meetings effectively, be a very good manager ... Can they run meetings? Can they network well? Have they the ability to bring issues to the table that matter and get good conclusions out of them?".[57] Research Councils United Kingdom (RCUK) argued that

48 When discussing the downgrading of the MoD CSA, Q 116.

49 BGI.

50 HPA.

51 Q 239.

52 Royal Society.

53 Ibid.

54 IoP, Professor Lord May of Oxford.

55 Royal Society, RSE.

56 Dr Tyler and Dr Doubleday.

57 Q 243.

experience of working across disciplines and collaboration would assist CSAs in providing a range of relevant scientific evidence to their department.[58] (We consider the importance of building effective relationships within departments in Chapters 3 and 4).

Public engagement

33. Some witnesses emphasised the public engagement function of CSAs. The RSE argued that CSAs have a role in enhancing public understanding, particularly when scientific values run counter to "values of society".[59] Getstats, the Royal Statistical Society's campaign for statistical literacy, called for CSAs to educate the public with facts and analysis.[60] The HPA suggested media training for CSAs and the British Academy advised that CSAs should consult the National Academies on effectively communicating scientific advice.[61] The Wellcome Trust called for the CSA role to be explained to the public in order to combat limited public trust in scientific advice from government.[62] This led us to conclude that skills associated with public engagement are also important to the efficacy of CSAs.

Understanding the policy environment and risk assessment of policy

34. Dr Richardson (HMT CSA) and Carole Willis (DfE CSA), both CSAs appointed from within the civil service, identified understanding and working within the policy landscape and familiarity with departmental structures as important for CSAs.[63] The Royal Society argued that CSAs require a "sensitivity to the wider policy environment" if they are to provide independent advice and challenge effectively.[64] We note, for example, that Professor Sir Robert Watson, Defra CSA, had had previous experience of the policy process whilst working at the White House, where he was responsible for "ensuring that science underpinned policy making".[65]

35. Robust risk assessment and mitigation of risk are included in the descriptions of the role of the CSA submitted in evidence by several departments (including the Health and Safety Executive (HSE) and BIS), and also by the Government.[66] The Royal Society of Chemistry (RSC) endorsed the need for CSAs to have the ability to assess risks associated with various policy options.[67] The RSE expressed a similar view: "CSAs have a role to play here in informing government of the opportunities and risks of accepting advice".[68] Analysis of policy and working within departmental structures to influence policy are central to the CSA role. It is perhaps unsurprising therefore that an ability to evaluate evidence and to weigh up conflicting

58 RCUK.

59 RSE.

60 Getstats.

61 HPA, British Academy.

62 Wellcome Trust.

63 Q 130, Q 35.

64 Royal Society.

65 HL Deb, 23 June 2011, c336W.

66 The Government.

67 RSC.

68 RSE.

evidence from a wide range of disciplines is regarded as crucial to CSAs discharging their functions effectively.

Project delivery

36. Witnesses also identified project delivery experience as an important skill for CSAs. The RAEng argued that greater project delivery experience in government would reduce the likelihood of policy programme failures, referring to failed NHS IT projects as a particular example where the difficulties encountered could have been foreseen by someone with project delivery experience;[69] and Jeremy Evans, Chairman of ITS UK, said: "I think it is very valuable to have experience from industry, delivering projects and delivering the science, if you like, rather than the theory of the science".[70]

37. **The primary essential characteristic of all CSAs is that they must have standing and authority within the scientific community, nationally and internationally. This will, amongst other things, help ensure that the CSA is able to access a wide range of expertise. In addition, a CSA should be able to demonstrate the following:**

- **an ability to engage in effective dialogue with internal and external stakeholders, including academia, industry and the wider public;**
- **an ability to work in and manage a multi-disciplinary team;**
- **an understanding of the policy environment;**
- **an ability to evaluate evidence and to weigh up conflicting evidence from a wide range of disciplines; and**
- **an understanding of project delivery.**

We recommend that all departmental recruitment processes for CSAs should be designed to ensure that candidates selected possess these characteristics.

Recruitment of CSAs

38. Having reached a view on the essential personal characteristics of a CSA, we considered whether we could go further and make some practical recommendations to ensure recruitment of the most suitable candidates. Our recommendations in this respect cover three areas: first, source of candidates; secondly (and linked to the first area), terms and conditions of employment; and, thirdly, the recruitment panel.

Source of candidates: internal or external?

39. All CSAs currently in post have been appointed from outside the civil service (external appointments) except for the CSAs for DfE and HMT (see Table 1 above) who were appointed from within the civil service (internal appointments).[71] We received limited evidence (largely from within

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69 Q 95.

70 Q 243.

71 Questionnaires. Professor Dame Sally Davies, DH CSA, was appointed DH Deputy Director, Research and Development 2003–04, and CSA and Director, Research and Development in 2004. She was appointed Chief Medical Officer for England and Chief Medical Adviser to the UK Government, as well as retaining her previous roles, in March 2011. Prior to her employment in DH Professor Dame Sally worked as a consultant haematologist Central Middlesex Hospital (1985–2011), Professor of Haemoglobinopathies, Faculty of Medicine, Imperial College London (1997–2011), and Director of R&D, NHS London Region (1999–2004).

government) regarding the advantages of CSAs being internal candidates, and considerable evidence about the advantages of CSAs being external appointments.

Advantages of internal appointment

40. Ms Willis (DfE CSA), an internal appointment, argued that an internal appointee would have a better understanding of how policy is made:

> "The big advantage of having somebody from within Whitehall, generally, is that they have a much greater understanding of how policy is made. They do not have to get up to speed as quickly as academic external appointments might have to do, so they are in a better position to feed that evidence in at the right time and to be influential and to build networks with the right people. I am not saying that external academics cannot do that, but it takes a little bit of time to get up to speed".[72]

Dr Richardson (HMT CSA), also an internal appointment, agreed: internal appointees are "more likely to find it easier to gain traction" because they understand the organisation and how it operates.[73] The Government submission concurred that internal appointees may have a better understanding of the policy process and the departmental structure.[74]

Advantages of external appointment

41. On the other hand, Dr Richardson (HMT CSA) conceded that an external appointment would have stronger connections to useful external networks and were more likely to have up-to-date technical knowledge.[75] The RSE argued that scientists with the most current knowledge usually come from industry and academia, not the civil service.[76] The Government, in their written submission, similarly suggested that an appointee from academia or industry "bring[s] with them up-to-date expertise in relevant areas of science and engineering and the associated networks and contacts".[77] Lord May went further, arguing that CSAs had to be recruited externally to ensure that they know who to seek advice from, and can "climb the clean rock" of "problems that excite wide public interest and concern and which lie at or beyond the frontiers of the thoroughly well-known".[78]

42. Professor Sir Robert Watson (Defra CSA) said: "I think they [CSAs] have to be externally hired to be independent",[79] and RCUK questioned whether "the in-house appointment of the Treasury CSA may raise questions regarding ability to provide independent challenge".[80] The BGI argued that external appointments would reduce the likelihood of CSAs being constrained by received opinion "or the wish of ministers to receive advice

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72 Q 35.

73 Q 130.

74 The Government.

75 Q 130.

76 RSE.

77 The Government.

78 Lord May.

79 Q 37.

80 RCUK.

that they would prefer".[81] Lord May said "One of the great advantages of all CSAs being outsiders, and I believe they should be ... is that they do not have to worry, consciously or unconsciously, about the future".[82] The Royal Academy of Engineering (RAEng) said that: "in general it probably helps to have someone with a different cultural background, so not imbued with the civil service ethos through and through",[83] and Professor Sir John Beddington said:

> "I would have real concerns if the vast majority of Chief Scientific Advisers were not being appointed independently, from the external community ... I cannot say I would be unhappy if all Chief Scientific Advisers were appointed externally. I think that arguably might be an ideal ... Science and engineering move so fast that if you have a significant role with science and engineering, and I do include social science in that, it would be quite difficult to retain expertise within government in these areas so that an internal appointment would be adequate. I just do not think it would".[84]

43. In contrast, Lord O'Donnell, (then) Head of the Civil Service and Cabinet Secretary, said "the values of the civil service are honesty, objectivity, integrity and impartiality. It is our job to be completely independent and to give objective advice to ministers. The idea that someone has to come in from outside, you cannot rely on civil servants to give independent advice, I find very insulting".[85] Dr Richardson (HMT CSA) added that "providing independent, objective, impartial advice to ministers is absolutely a key part of being a civil servant, and if any civil servant were not doing that they would be falling short",[86] and Ms Willis (DfE CSA) said "our ministers and our senior policy colleagues would not thank us if we were just giving them one side of the story".[87]

44. Professor Roger Kain, Vice-President of the British Academy, and the RAEng also suggested that there might be circumstances where an internal appointee could be the best person for the job, but ordinarily the best candidate would be found outside the civil service.[88] Lord O'Donnell said that he would typically expect to look outside the civil service to recruit a CSA due to the limited number of scientists within the civil service possessing the skills required for the role.[89]

45. We have concluded that there are essential characteristics which are necessary to the effective discharge of the functions of a CSA and that the most important of these is standing and authority within the national and international scientific community. **From this starting point, we considered whether recruitment of a candidate who is able to demonstrate the characteristics described in Recommendation 1 (paragraph 37) necessarily excludes internal candidates and entails**

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81 BGI.

82 Q 161.

83 Q 102.

84 Q 125.

85 Q 192.

86 Q 152.

87 Q 36.

88 Q 102.

89 Q 203.

appointment of either an external candidate or a candidate with a substantial and recent background based outside the civil service. We have concluded that it does and recommend accordingly. In arriving at this conclusion, we intend in no way to denigrate the skills, professionalism and expertise of the civil service nor do we doubt their integrity and impartiality. Our view is based simply on our analysis of the particular nature of the role of a CSA. As for the point raised about "traction", we believe that this can be addressed by the appointment of an experienced and skilled secretariat or deputy CSA—we note, for example, Professor Sir Robert Watson (Defra CSA) said that his deputy helped him gain "traction" within Defra[90]—and by the comprehensive induction and mentoring programme recommended by GO Science.[91] "Traction" can also be assisted by the institutional arrangements associated with the post.

46. Our conclusion that a CSA should be an external appointment in order to ensure that he or she has the requisite authority to exercise what we have described as internal influence as well as external influence (see paragraph 31) is reinforced by the evidence we received in relation to one particular area of policy formulation, namely free schools. Nick Gibb MP, Minister for Schools in DfE, agreed that policy should be based on evidence because "if they are not based on all the evidence available they will not go in the direction you expect them to go in ..."[92] and he described the evidence which had been considered in the formulation of the policy.[93] However, Professor Pamela Sammons, Senior Research Fellow in Education and Professor of Education at the University of Oxford, questioned the claimed benefits of the free schools policy given the "relatively narrow and unrepresentative evidence base".[94] These circumstances have led us to query whether an externally appointed CSA may have been better placed to challenge the proposed policy. We make a similar point in relation to the downgrading of the MoD CSA in paragraph 78 below.

Terms and conditions

Part-time or full-time?

47. There is great variation in the number of hours that CSAs are contracted to work. The previous BIS CSA worked two days a work and the new BIS appointment is contracted to work three days a week, whereas the HO CSA is employed full-time.[95] Dr Richardson (HMT CSA) does not have specific time dedicated to the CSA role but rather combines this work with the substantive posts of Chief Microeconomist and Director of Public Spending.[96] Similarly, Professor Dame Sally Davies (DH CSA) combines the posts of Director General of Research and Development, CSA, Chief Medical Officer (CMO) for England and Chief Medical Adviser to the UK

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90 Q 37.

91 Op. cit. *Chief Scientific Advisers and their Officials*.

92 Q 225.

93 Q 215, letter sent in evidence to the Committee from Nick Gibb MP.

94 Professor Pamela Sammons.

95 Questionnaires, http://nds.coi.gov.uk/content/Detail.aspx?ReleaseID=422503&NewsAreaID=2.

96 HC 1461–i Q 4.

government.[97] Earl Howe, Parliamentary Under-Secretary of State and Government Spokesperson, DH said that Professor Dame Sally Davies "combines those roles *ad personam* with the agreement and approval of Sir John Beddington. We do not necessarily anticipate that the two roles will be joined in perpetuity".[98] Ms Willis (DfE CSA), Professor Whitty (Dfid CSA) and Rebecca Endean (MoJ CSA) all combine the post of CSA with sizeable management posts: Director of Research and Analysis, Director of Research and Evidence Division, and Director of Analytical Services. As such, they control budgets and line-manage teams of scientists and analysts.[99] The Dfid CSA works in this combined post the equivalent of four days a week, whereas the DfE and MoJ CSAs are full-time posts.[100]

48. Professor Bernard Silverman (HO CSA) argued that a considerable amount of time should be given to the post: "I think four or five days a week means that you are around, you are known and you can get more traction that way".[101] Dr Richardson (HMT CSA) said of HMT's arrangements:

> "I am certainly not going to pretend that there are no disadvantages. Clearly, if I were a full-time Chief Scientific Adviser I would have more time to spend on the role, but the inverse of that is that because I already have a substantial policy role I see a great deal of reports and am involved in a great deal of debate where I think the overlaps are potentially quite strong. So I am firmly embedded in issues on which the need for an evidence-based scientific approach is very great".[102]

49. We accept the force of the arguments in favour of CSAs working a significant number of days a week in that capacity. These arguments do not, however, imply necessarily that CSAs should be full-time appointments. On the contrary, there are good reasons—closely connected with our conclusions about the essential personal characteristics of CSAs—why CSAs should not be full-time. David Willetts MP, Minister for Universities and Science, BIS expressed this point well: "at the moment we are still inclined to have our Chief Scientist a part-time post; some time inside Whitehall advising us but also time to be connected with the external science community".[103] CASE also recommended that CSAs should have "a concurrent placement in the science and engineering community".[104] Serco recommended that CSAs undertake "secondment from government into industry for periods to specific roles ... in places like AWE [Atomic Weapons Establishment] and NPL [National Physical Laboratory]" as this would allow "valuable experience" to be gained.[105]

50. It is important that CSAs should have the opportunity to maintain and develop links with the scientific and industry communities and continued research, for example, helps CSAs to keep their knowledge and networks up-

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97 DH Questionnaire, http://www.dh.gov.uk/en/Aboutus/MinistersandDepartmentLeaders/ChiefMedicalOfficer/index.htm.

98 Q 211.

99 The Government.

100 Questionnaires.

101 Q 55.

102 Q 133.

103 Q 233.

104 CASE.

105 Q 246.

to-date. For this reason we recommend (in paragraph 54) that CSA appointments should be part-time.

51. We have considered how many days a week a CSA should work in that capacity, bearing in mind the weight and workload of the post and also the argument about the need to gain "traction". We have further considered the "significant organisational risk", identified in the BIS SEA Review, arising from reliance on one person working two days a week to provide challenge and assurance across a whole department.[106] We have concluded that at least three days a week, exclusively dedicated to the functions of a CSA, are necessary if CSA functions are to be carried out effectively and we recommend accordingly (in paragraph 54).

Length of appointment

52. Not only are there variations across departments about the number of days CSAs work, but also in the nature of the tenure of their posts. Some are fixed term contracts (FTCs), two are secondments and others are permanent posts (see Table 2 below). For the same reasons that we concluded in favour of CSAs being part-time, we conclude that CSAs should be appointed for a fixed period, with the possibility of renewal (see paragraph 54).

TABLE 2

CSA tenure[107]

Dept	Tenure
BIS	FTC
DCLG	FTC
DCMS	*Vacant*
DECC	Secondment
Defra	FTC
DfE	Permanent
Dfid	Secondment
DfT	FTC
DH	Permanent
DWP	Permanent
FCO	FTC
HMT	Permanent
HO	FTC
MoD	FTC
MoJ	Permanent

[106] Op. cit. *SEA Review of BIS*.

[107] Questionnaires, op.cit. MoD: *CSA Candidate Brief*.

53. We considered what the duration of the appointment term should be. We acknowledge that there is a tension between, on the one hand, CSAs having sufficient time to learn how to operate effectively within departments and, on the other, the value of fresh appointees with current links to scientific and industrial communities and the risk of a CSA becoming "so much of a team player that you cease to have the kind of independence to provide the ... challenge that you should be providing" mentioned by Professor Wiles (former HO CSA).[108] BP Plc suggested that CSAs would probably require at least a year to become familiar with departmental processes.[109] Dr Richardson (HMT CSA) and Ms Willis (DfE CSA) also commented that external appointees could take time to become familiar with departments and their systems.[110] We have concluded that appointments should be for three years, with the possibility of renewal.

54. **We recommend that:**

    (a) Subject to paragraph (b) below, CSAs should be employed by their departments on a part-time basis to afford them the opportunity to maintain their links with academia, or industry, or both.

    (b) Exceptionally, some CSAs are required to undertake major management or professional functions. In these circumstances it is likely that their appointments will need to be full-time. None the less, provision should be made to enable them to maintain their links with academia, or industry, or both.

    (c) CSAs should work exclusively in their role as CSA for the equivalent of at least three days a week.

    (d) CSAs should be appointed for a three year period, with the possibility of renewal.

55. As we have already mentioned, there are, at present, a small number of CSAs who combine their role as CSA with other significant departmental roles (see paragraph 47). Having concluded that CSAs should work at least three days a week exclusively in their capacity as CSA, we question whether combining such significant roles in this way can be appropriate. In raising this issue, we mean no criticism at all of the current incumbents. **We recommend, however, that the GCSA and Head of the Civil Service, at the earliest opportunity, review these arrangements in consultation with the relevant Secretaries of State and departmental Permanent Secretaries.**

Recruitment practice

56. The third category of practical recommendations for ensuring the selection of suitable candidates concerns the composition of the recruitment panel.

57. The GCSA sat on the interview panel for the DECC and HO CSA posts but not for the DfE and HMT CSA posts.[111] Lord O'Donnell commented on

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[108] Q 5.

[109] BP Plc.

[110] Q 35, Q 130.

[111] Q 83, http://www.egovmonitor.com/node/32813, Q 49, Q 125.

this variation: "I am very strongly of the view that, first of all, you should have the Head of Profession, so John Beddington should be on the panels for all of them. That is what we do for Heads of Profession across the professions".[112] GO Science advise that the GCSA should sit on or chair CSA recruitment panels.[113] Lord O'Donnell further recommended that an external person should sit on each panel. We note that the MoD did not include an external scientist on their recent CSA recruitment panel but did include the GCSA.[114] We agree with the evidence we received and **recommend that the GCSA (as Head of Profession for Science and Engineering across government) should sit on all CSA interview panels. We also recommend that an external scientist should sit on these panels.**

[112] Q 204.

[113] Op. cit. *Chief Scientific Advisers and their Officials*.

[114] Op. cit. *CSA Candidate Brief*.

CHAPTER 3: ENGAGEMENT WITH THE POLICY PROCESS AND DEPARTMENTAL EVIDENCE QUALITY ASSURANCE

58. In this chapter we consider our findings with regard to the essential characteristics of the institutional arrangements for CSAs (as opposed to their personal qualities and skills). We have looked, in particular, at the timing of CSA involvement in the policy process, access to ministers, disagreement with policy decisions, grading, membership of departmental Boards, and quality assurance of evidence and its use.

Engagement with the policy process

59. The Government submission highlighted their commitment to "ensuring policy makers have access to the best science and engineering advice" to allow them to make well-informed decisions.[115] The IoP praised CSAs as effective in bringing science to the forefront of government policy decisions and drew attention to the focal point that they provide for science in government.[116] Professor Sir John Beddington also commended CSAs for their work in the policy area, and said: "I do not believe there are issues that I have encountered anyway where policy is driving the evidence-base".[117] Box 2 below sets out examples of obstacles which CSAs can face in offering advice and challenge to departmental policy.

BOX 2

Examples of obstacles to CSAs influencing policy

The following examples demonstrate some of the obstacles CSAs can face in offering advice and challenge to departmental policy.

- Professor Collins, former CSA to BIS (formerly Department for Business, Enterprise and Regulatory Reform) and DfT, described offshore wind as an occasion when he had lacked access to decision makers and, as a result, had been unable to contribute engineering advice to the relevant discussions.[118]
- Professor Wiles, former HO CSA, discussed difficulties he encountered regarding ID card policy. He said he was not consulted as part of the policy formulation process before an announcement was made about the policy: "The first I heard about ID cards was on the Today programme". As a result, he was unable to offer evidence regarding error margins related to biometrics and the existing technology before the policy was announced.[119]

In addition:

- Professor Sir John Beddington, GCSA, described continued DH and NHS funding of homeopathy as a failure and said it was "crazy". He argued that there was no scientific basis for this funding and said that he had expressed this opinion publically on numerous occasions.[120]

115 The Government.

116 IoP.

117 Q 115.

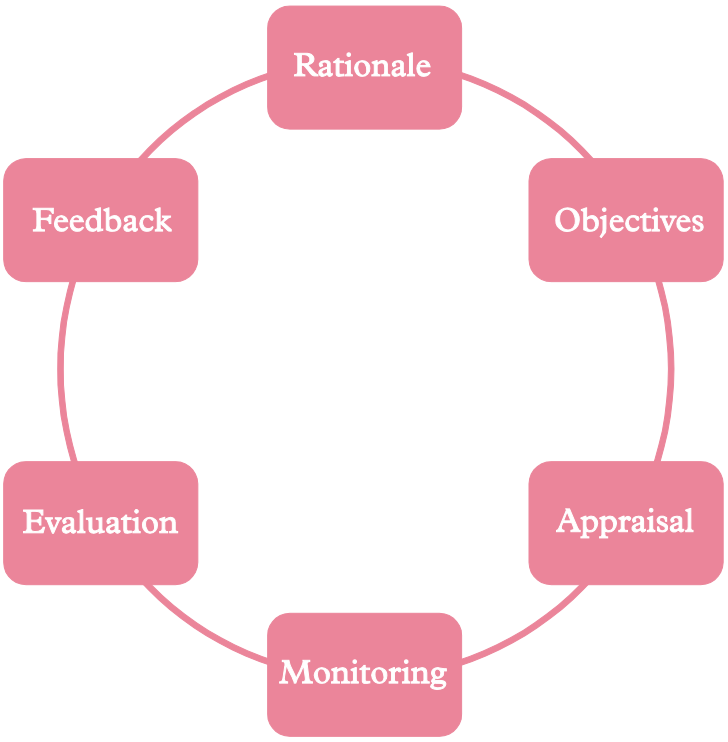
118 Q 11.

Early consultation

60. The policy process outlined by the Government's guide on evaluation for policy makers, *The Magenta Book,* summarises the stages involved in policy formulation. A depiction of the policy cycle is set out in Figure 1.

FIGURE 1[121]

The Policy Cycle



Professor Collins, former CSA to BIS and the DfT, described how only involving CSAs at later stages in the process risked their input being "too late to have a significant influence on the outcome of policy decisions".[122] Professor Sir John Beddington supported early involvement of CSAs: "one thinks about the antithesis of developing policy and only then getting science and analytical advice; that would manifestly be inappropriate".[123] Professor Wiles (former HO CSA) said, in his experience, some ministers were very keen for input on issues involving "research-based evidence", while others wanted advice to support a policy's implementation.[124] He saw it as his role "to ensure" that officials took scientific advice and advised that the challenge function was only likely to be effective and accepted at the early stages of policy development.[125] The IoP and ITS UK agreed that CSAs needed early involvement in the policy process, and the Wellcome Trust suggested that "in-house experts" could play an important role in helping shape the right questions to ask when sourcing evidence for policy and

[119] Q 13.

[120] Q 115.

[121] Cabinet Office: *The Magenta Book; Guidance for Evaluation*, April 2011.

[122] Q 10.

[123] Q 123.

[124] Professor Wiles.

[125] Ibid.

ensuring proper interpretation of advice.[126] The BIS SEA review said that early engagement would allow departments to access relevant networks more effectively.[127] The MoD SEA review recommended early involvement of science and technology advice in strategy, policy and procurement decisions, to ensure cost-effectiveness of decisions, such as, for example, avoiding costly late changes to procurement decisions.[128] The DWP SEA review similarly recommended continued early and sustained engagement by scientists with the policy process to ensure value-for-money and delivery of objectives.[129] Given the weight of evidence in favour of CSA engagement with the policy process at an early stage, the comments by Earl Howe were reassuring: "we are very aware that early warning, early insight, is essential to the CSA function".[130] However, Professor Sir Robert Watson (Defra CSA) and Ms Willis (DfE CSA) described how the timing of their involvement in the policy process varied depending on the topic.[131]

Involvement throughout the policy process

61. According to the Government submission, not only should "scientific input to policy making ... happen as early in the process as possible", there should be "ongoing engagement".[132] Dr Tyler and Dr Doubleday also argued that CSA involvement should be throughout the process.[133] Dr Richardson (HMT CSA) commented that "there are interventions throughout the process, and quite often the most successful forms of intervention are about getting either the right person into the right role, or getting the person in the role to think about the subject in the right way, long before any individual piece of advice starts being written".[134] Lord O'Donnell shared this broader view: "it is about infiltrating the whole system—get in early. Do not wait for a policy to come along and say, 'I want to have my independent say on this policy'. Frankly, it is way too late".[135] The BIS SEA review recommended CSA involvement throughout the policy process to source external expertise to help, for example, frame questions and test assumptions.[136]

62. The Defra submission defined "evidence" broadly to include "reliable and accurate information that Defra can use to inform sound decisions in developing and implementing policy. It includes economics, statistics, natural and veterinary scientific information, social research, operational research, engineering, analysis, advice, monitoring and surveillance".[137] The IoP suggested that some departments consulted CSAs only on "sufficiently scientific'' topics. The DfT SEA review said that use of science and engineering varied throughout the department and that it had found

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126 IoP, ITS UK, Wellcome Trust.

127 Op. cit. *SEA Review of BIS*.

128 GO Science: *SEA Review of MoD*, September 2011.

129 GO Science: *SEA Review of DWP*, January 2012.

130 Q 211.

131 QQ 31–32.

132 The Government.

133 Dr Tyler and Dr Doubleday.

134 Q 151.

135 Q 191.

136 Op. cit. *SEA Review of BIS*.

137 Defra contribution to the Government submission.

examples of "big ticket items where adequate engagement with SE [science and engineering] had not taken place in a timely manner, to the detriment of business plans or policy".[138] This led the review panel to suggest a "formal requirement to set out how the SE evidence-base has been taken account of and integrated with other types of evidence throughout the policy process [which] should facilitate early engagement with SE expertise".[139] The HO SEA review found consistent "lack of appreciation of the value and importance of scientific evidence among (especially senior) officials".[140] These assessments have led us to conclude that there needs to be a mechanism in place for formalising CSA involvement in the policy process.

63. Professor Sir Robert Watson (Defra CSA) said that:

> "... written policy briefs are incredibly important. I rarely personally produce them myself—the policy teams do—but I would review them before they go to ministers and the Secretary of State. I occasionally write my own personal notes to the Secretary of State … but my main role is to make sure that the papers going forward from an evidence plan point to these questions: what do we know? What do we not know? What is controversial? What is uncertain? What are the implications of the uncertainties? So, when the Minister or the Secretary of State reviews that policy paper they understand how robust, or how not robust, the evidence dimension is".[141]

Professor Whitty (Dfid CSA) told us: "I see all submissions that go to ministers in case something slips through, and I would expect to be involved either formally in ministerial meetings or generally, actually often more usefully, informally in earlier meetings—either Tim Wheeler [deputy Dfid CSA] or I—on anything where science is likely to have a significant impact on what the policy should be".[142] Lord Taylor of Holbeach, Parliamentary Under-Secretary of State, Defra, said that evidence must be part of submissions:

> "if we have submissions, they clearly include the evidential element in order for us to determine what we should be doing and we can call on scientific input at the time when we are discussing this matter or talking about things with the specialist team within the department. So I find that the system does work pretty well, as long as it is integrated at official level as well as at ministerial level".[143]

Earl Howe also recognised the importance of CSA input into submissions: "it is important from our point of view as ministers that the submissions that we see have input from the CSA. That happens on a routine basis and Dame Sally [DH CSA] herself regularly sends submissions".[144] Similar to Professor Whitty (Dfid CSA) and Professor Sir Robert Watson's (Defra CSA) sight of policy submissions, Professor David MacKay, DECC CSA,

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138 GO Science: *SEA Review of DfT*, July 2010.

139 Ibid.

140 Office of Science and Innovation: *Science review of the HO and MoJ*, December 2007.

141 Q 34.

142 Q 79.

143 Q 217.

144 Q 219.

described how DECC's evidence panel could insist that policy teams obtained his sign-off for impact assessments of certain policies.[145] Professor Collins (former BIS and DfT CSA), however, expressed concern over the "lack of ... a formal process in policy creation that the CSA shall be involved and it shall be discussed".[146] This concern was supported by the BIS SEA review which found that "the BIS culture is one where SE evidence is not yet routinely viewed as integral to strategy, policy and decision making".[147] Institutionalising CSA submission sign-off would be one way of "'main-streaming' ... SE into central departmental procedures and processes" as recommended by the BIS review, and implementing the recommendation made to DfT that approval processes for policies should require science and engineering input.[148]

64. **We share the view of those witnesses who argued that CSAs should be involved early and throughout the policy process. CSA involvement in the policy submission sign-off chain would be a useful method for ensuring that this happened. We recommend therefore that in all departments CSAs should be consulted by policy officials early and throughout the policy process, and that all CSAs form part of the departmental policy submission sign-off chain.** These arrangements should be assured as part of the proposed annual assessments by the GCSA discussed in Chapter 4.

Access to ministers

65. A significant number of witnesses, including the GCSA, identified access to ministers and senior officials as fundamentally important to the effective functioning of CSAs.[149]

66. Lord May said: "the most important thing in my experience is that any CSA, departmental or [G]CSA, has direct access to the appropriate Secretary of State or Prime Minister, and of course also to the relevant Permanent Secretary".[150] This view was shared by the British Academy: "the resource that is most important for CSAs is the resource of access, and without access to ministers, senior departmental officials and the relevant academic communities ... then it is not going to work properly".[151] Professor Wiles (former HO CSA) said: "sometimes you are denied when you think you ought to have access, and I think we have probably both [he and Professor Collins] had experience of that, but I think part of the job of a CSA is to make sure they kick the door down, frankly".[152] Table 4 summarises the answers received to Lord Willis' Questions for Written Answer about the frequency of scheduled meetings between CSAs and ministers in the last year. There is a marked variation.

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145 Q 57.

146 Q 11.

147 GO Science: *SEA Review of BIS*, October 2010.

148 Op. cit. *SEA Review of BIS*, *SEA Review of DfT*.

149 CASE, Dr Tyler and Dr Doubleday, HPA, ITS UK, RSE, Q 6, QQ 99–100, Q 112, Q 219.

150 Q 160.

151 Q 99.

152 Q 6.

TABLE 3[153]

Frequency of CSA scheduled meetings with ministers

Dept	Number of meetings between CSAs and ministers in the past year[154]
BIS	Regular
DCLG	In the course of duties
DCMS	*Vacant*
DECC	20
Defra	Regular and frequent
DfE	16
Dfid	19
DfT	4 (up to May 2011)
DH	Weekly, if not daily
DWP	68
FCO	Regular
HMT	Regular
HO	17
MoD	Regular
MoJ	Regular

67. Getstats, the Royal Statistical Society's campaign for statistical literacy, argued that a CSA is "*primus inter pares*: the potency of the role will depend on the concatenation of political forces, personality, the standing of Number Ten relative to other departments and so on".[155] Professor Sir Mark Welland, MoD CSA, said: "in my regular meetings with ministers and the Secretary of State, I have a very open relationship, which means that I am prepared to stand up and challenge any assumptions that I feel the department is able to respond to".[156] Professor Sir John Beddington said that these relationships were essential and cited the negative example of the BIS SEA review finding, which he paraphrased as: "there was little enough motivation with some policy officials to actually ensure that what was potentially excellent advice from the then incumbent Brian Collins went through".[157] In contrast, Professor Sir Robert Watson (Defra CSA) said that in Defra "the Permanent Secretary, the DGs and the Secretary

153 Op. cit. Lord Willis' Questions for Written Answer.

154 The Questions for Written Answer on which Table 3 is based were answered by departments in the period 20 June–13 July 2011, and we assume that the replies refer to the twelve month period immediately prior. Departments were asked "how many occasions during the past year they [CSAs] have had meetings with ... the minister to whom they have direct responsibility?" The exceptions to this are DECC and HO. These departments were asked specific questions about meetings during the period 31 May 2010 to 1 June 2011.

155 Getstats.

156 Q 148.

157 Q 113.

of State and her ministers care about evidence. They want to know inconvenient truths. They want to know the truth and the inconvenient truths".[158]

68. CSAs need to have good relationships with ministers and senior policy officials, and access is the first step to developing these relationships. **We recommend that CSAs should have a right of direct access to ministers to ensure that they can challenge effectively at the highest level. By direct access we mean that CSAs should be able to see ministers at the prompting of the CSA and as often as judged necessary by the CSA.** The subject of access to Permanent Secretaries is addressed by our recommendation about grading below (see paragraph 76).

Disagreement with policy decisions

69. An issue closely connected with the standing of a CSA within a department concerns what CSAs should do if they disagree with policy decisions.

70. Some witnesses placed great emphasis on openness and transparency. The RSC wanted CSAs' advice to be available publicly, setting out how it was used, and the government to publish reasons for rejecting advice that influenced research spend.[159] The Wellcome Trust said that transparency required clarity from departments about how and when evidence is used in forming policy and also necessitated explanation when evidence is not followed.[160] The IoP said that CSAs ought to receive explanations if ministers reject advice and suggested that ministers should, "if appropriate", include these in a public statement.[161] The RSE said that advice should be published routinely, along with government responses.[162] *The GCSA's Guidelines on the Use of Scientific and Engineering Advice in Policy Making* recommend that ministers explain their reasons for policy decisions publicly, "particularly when the decision appears to be inconsistent with scientific advice".[163]

71. Other witnesses argued that the most appropriate forum for expressing disagreement was within a department. Professor Wiles (former HO CSA), for example, said:

> "In my experience, there is no acceptance among ministers or Permanent Secretaries that such advice should be given publicly. I think that is seen as extremely disruptive in Whitehall, and I have to say I have some understanding of that, because if you are going to develop policy in government, there has to be a process by which ministers and advisers can talk out of the public gaze before they come to some kind of conclusion. I am not sure how helpful the idea that a CSA in the middle of that programme was going to toss in a public set of advice would be mad, quite frankly".[164]

Professor MacKay (DECC CSA) also expressed reluctance to disagree in public: "I feel I do my job best if I retain the confidence of ministers. In the past, I used to speak very freely in public and I enjoyed giving frank views,

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158 Q 28.

159 RSC.

160 Wellcome Trust.

161 IoP.

162 RSE.

163 Op.cit. *The GCSA's Guidelines on the Use of Scientific and Engineering Advice in Policy Making.*

164 Q 8.

but now I hold those views back more and express them very strongly within the Department, where I feel I am listened to and respected".[165]

72. Professor Wiles (former HO CSA) acknowledged that there were circumstances where a CSA should "go public", and gave an example of a former GCSA doing so:

> "I think there is a matter of political judgment here, to be honest. There are issues when a CSA or the Government's Chief Scientific Adviser might think it proper to go public because such an issue is of such importance. Sir David King did that with climate change. I think he was quite right to do so; it was a major issue and I think he was correct to do that, but there were endless issues in the Home Office that frankly were not at the level of importance, and I am not sure what point would have been served".[166]

Lord Taylor of Holbeach took a similar line: "Bob Watson [Defra CSA]'s own position on that is that he accepts that scientific evidence is not the policy making—that is a matter for ministers—but he has told me, and I would agree with him, that if that scientific evidence is being misused, then he has a responsibility as Chief Scientist to speak out".[167] Earl Howe said:

> "... if there were to be a situation where scientific advice had been ignored or misused, then one could imagine there was an overriding public interest in that fact being made known. As a generality I absolutely concur with Nick [Gibb MP, Minister for Schools, DfE] that a minister should feel that the advice they are getting from several quarters, whatever quarters, of the department, should be there for them to assimilate and take a judgment on without fear that somebody is going to pipe up and say that they do not feel that sufficient weight has been given to that advice, whatever it may be. So I think it does depend on the circumstances".[168]

Lord O'Donnell suggested that, exceptionally, CSAs could express disagreement in a manner similar to Permanent Secretaries expressing disagreement with a ministerial decision in their capacity as Accounting Officer.[169]

73. Whilst we acknowledge the importance of the principle of transparency, we recognise the force of the argument that CSAs need to build and maintain trusting relationships with ministers and senior policy officials, and that expressing disagreement in public could damage these relationships. **In order to assist CSAs in expressing disagreement with policy decisions, we recommend that a set of guidelines for CSAs be developed by the GCSA and Head of the Civil Service, similar in content and aim to** *The Principles of Scientific Advice to Government* **and** *The GCSA's Guidelines on the Use of Scientific and Engineering Advice in Policy Making***.**[170] **These guidelines should contain a protocol for CSAs to follow in circumstances where they disagree with ministers or civil servants regarding a departmental policy decision.**

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[165] Q 59

[166] Q 9.

[167] Q 232.

[168] Q 232.

[169] Q 205.

[170] http://www.bis.gov.uk/go-science/principles-of-scientific-advice-to-government, op. cit. *The GCSA's Guidelines on the Use of Scientific and Engineering Advice in Policy Making.*

Grading

74. The Royal Society emphasised that CSAs must be "suitably senior" to ensure access to decision makers.[171] Professor Wiles (former HO CSA) agreed: "I am afraid the civil service in general is rather status-obsessed and, therefore, what position in the hierarchy a CSA plays does speak quite importantly to how the department sees the CSA and what the CSA is allowed to do, frankly".[172] Lord O'Donnell said: "I do not think that you should get over-obsessed about grades" but conceded: "I think you are right about the [grade] culture and it is a culture that I would like to change and have tried very hard to change".[173] Professor Sir John Beddington said that his "preference is that they are able to engage at the highest level".[174] For CSAs to challenge and inform departmental policy making they not only require access to the relevant meetings at the right time, but also the authority to ensure that their advice is given due consideration. Lord O'Donnell's point that "it is up to them [CSAs] to be influential, be credible and be the kind of person whose advice is sought by minister"[175] is apposite and this is why we have set out the personal qualities CSAs should be able to demonstrate. However, institutional arrangements can also be used to promote the status of CSAs.

TABLE 4

Grades and Salaries of CSAs[176]

Dept	Grade	Actual Pay Floor (—Ceiling)
BIS	SCS2	£72,000
DCLG	SCS2	£60,000–£64,999
DCMS	*Vacant*	*Vacant*
DECC	SCS3	£105,000–£109,999[177]
Defra	SCS3	£135,000–£139,999
DfE	SCS2	£85,000–£89,999
Dfid	SCS3	*Not disclosed*
DfT	SCS2	£31,740–£97,500
DH	SCS3	£225,000–£229,999
DWP	SCS2	£130,000–£134,999
FCO	SCS3	£49,200
HMT	SCS2	£85,000–£89,999
HO	SCS2	£120,000–£124,999

171 Royal Society.

172 Q 14.

173 QQ 187–188.

174 Q 111.

175 Q 190.

176 www.data.gov.uk, op.cit. MoD: *CSA Candidate Brief*.

177 This is an approximate salary offered by DECC as they do not publish salaries for secondments.

Dept	Grade	Actual Pay Floor (—Ceiling)
MoD	SCS4	£112,000
MoJ	SCS2	£85,000–£89,999

75. Professor Sir Robert Watson (Defra CSA) argued that sufficient authority to influence policy making meant that CSAs should "absolutely be at the DG [Director General] level, or Permanent Secretary in a couple of cases".[178] Professor Wiles (former HO CSA), on the other hand, said: "I personally would like to see it rather more officially acknowledged that the CSA does not have an obvious place in that hierarchy, precisely because they need to be able to get wherever in that hierarchy they need to go".[179] We have sympathy with Professor Wiles' point. The workload, the weight and functions of the post (in particular, the challenge function) and also the need to attract the right calibre of candidate, however, has left us in no doubt that CSAs should be assigned a very senior grade within the department.

76. We recognise that each department has its own organisational structure and so we should not be overly prescriptive in specifying a grade for CSAs. **However, we recommend that all CSAs should be graded at either Permanent Secretary level or the level immediately below Permanent Secretary (that is, Director General or departmental equivalent) to ensure that they have the authority and ability to work across the whole department.**

77. The importance of CSA grade was highlighted in evidence we received about the downgrading of the MoD CSA post. Professor Sir John Beddington expressed concern about being able "to get somebody of the right quality, who would command the right respect, in the external community" and "whether [at the revised grade] in fact you would command sufficient respect within the MoD itself, which is almost by definition a fairly hierarchical organisation".[180] Lord May said:

> "First of all, if you downgrade them you are less likely to get really good people, and if you downgrade them it is going to be more awkward. If they are to be appointed at board level, they ought to be people of at least the quality of the excellent Civil Service people for whom that is a high grade in a very competitive structure. If you are going to appoint people lower down, you might just as well not bother to do it".[181]

Lord Levene of Portsoken, in his recent report on reform of the MoD, said the downgrading of the CSA post from Permanent Secretary was "in line with practice in Other Government Departments", and recommended the transfer of the chairmanship of the Investment Approvals Committee to the DG Finance and transfer of "some nuclear issues to DG Security Policy".[182] Professor Sir Mark Welland said: "given the background of significant

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[178] Q 37.

[179] Q 14.

[180] Q 116.

[181] Q 182.

[182] Lord Levene of Portsoken: *Defence Reform An independent report into the structure and management of the Ministry of Defence*, June 2011.

restructuring in defence, it was inevitable that my post was looked at", and explained that other posts had been downgraded.[183] Lord O'Donnell said "I think that what is really important is international credibility of the person in that place".[184]

78. The CSA post in the MoD has been downgraded from Permanent Secretary level to Director General (the equivalent in military terms of a downgrade from a four star to a three star post). Whilst we have concluded that, generally, a CSA can discharge his or her functions effectively at Director General level, we share the view of a number of witnesses that, in the particular circumstances of the MoD, the re-grading is likely to make it more difficult for the CSA to exercise influence both within the department and in the broader scientific and commercial communities, particularly in relation to international scientific communities and other governments.

Departmental Board membership

79. The Ministerial Code ("the Code") describes the role of Boards as follows:

> "Secretaries of State should chair their departmental Board. Boards should comprise other Ministers, senior officials and non-executive board members [NEBMs], largely drawn from the commercial private sector and appointed by the Secretary of State in accordance with Cabinet Office guidelines. The remit of the Board should be performance and delivery, and to provide the strategic leadership of the department".[185]

Different departments have different terms of reference for their Boards but, overall, they provide leadership for departmental business and act as "advisory bodies to support and challenge ministers and accounting officers".[186] The Code recommends that Boards should be "concentrating on advising on strategic and operational issues affecting the department's performance as well as scrutinising and challenging departmental policies and performance, with a view to the long-term health and success of the department".[187]

80. HMT and CO's *Corporate governance in central government departments: Code of good practice*, July 2011, recommended that all Boards adopt the practice of including NEBMs. According to this code of practice, the role of NEBMs is to provide challenge and support to the Board in relation to issues such as performance, operational issues, effective departmental management, operational business plan, recruitment of senior executives, audit and risk assurance, nominations and governance.

81. We heard a variety of evidence about whether CSAs should be members of departmental Boards.

82. Professor Sir Robert Watson (Defra CSA) argued that "it is critical to be a member of the management Board ... I need to understand what the vision for the department is and help shape the vision; I need to understand what

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[183] Q 141.

[184] Q 187.

[185] CO: *Ministerial Code*, May 2010.

[186] HMT and CO: *Corporate governance in central government departments: Code of good practice 2011*, July 2011.

[187] Op. cit. *Ministerial Code*.

the financial situation of the department is and what the human resources for the department are. Unless I understand all those, I cannot do my job as a Chief Scientific Adviser".[188] Professor Wiles (former HO CSA) said:

> "what you lack if you are not on the Board is potentially an early sight of new policies being developed and new ideas being developed, although not necessarily, because that does not necessarily happen on the Board, so being on the Board does not guarantee that even if you are. More important, if you are on the Board, I think, is that you have regular and sustained contact with the senior management team of the department and, therefore, you, even if informally, know a great deal more about things that may be happening".[189]

83. The Royal Society, CASE and the IoP also supported CSA membership of departmental Boards.[190] Lord May regarded Board membership as desirable to ensure that CSAs have access to Secretaries of State.[191] Sir Kevin Tebbit argued that Board membership was "vital" and Jeremy Evans said that Board membership enabled CSAs "to challenge and to offer contrary advice, looking particularly at the evidence-base that is leading to those policy debates and decisions. They are also in a position effectively to record a different point of view, if they disagree, and to make sure that the relevant ministers have heard it and that it is on the record".[192] Iain Ferguson, Lead NEBM, Defra, said that Defra's Board regularly discussed evidence for policies and that these discussions would benefit from the CSA's involvement.[193]

84. Francis Maude MP, Minister for the Cabinet Office, stated in evidence to the Commons Public Accounts Select Committee in January 2011 that:

> "Sometimes, it seemed to us, a bit of an artificial distinction is made between policy on the one hand and delivery on the other, as if they're wholly separate things and, of course, that's not the case. For a start, officials are intimately involved. On the suggestion that ministers do policy and officials bear away the policy and execute it, first, officials are intimately involved in the development of policy—crucial to it, central to it—and, secondly, there isn't a separation; there's a continuum between policy and delivery, and there should be a whole sort of iterative process, where the two feed off each other, and you should not have a process where there's no pushback on policy if the effect of a policy is that it's very, very difficult or expensive and risky to implement it".[194]

This would seem to be an argument for CSAs attending Board meetings since it would provide an opportunity for them to contribute to any policy discussions held at Board level (which would be valuable even if the Board does not have responsibility for the final approval of policy). A number of SEA reviews—HO, Defra and DWP, for example—emphasised the

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188 Q 37.

189 Q 8.

190 Royal Society, CASE, IoP.

191 Q 173.

192 Q 238, Q 241.

193 Iain Ferguson.

194 Oral evidence taken before the House of Commons Public Accounts Committee on the subject of accountability, 19 July 2011, HC 740-i, Q 3.

importance of CSAs engaging with high-level strategic decision making within their departments. This further suggests that CSAs need to operate at Board level.[195]

85. Other witnesses, however, argued that CSAs did not require Board membership. Earl Howe said that "a seat on the departmental Board is not essential necessarily for a CSA, as long as there is adequate access to ministers and senior policy makers".[196] Lord O'Donnell said that policy was not approved at Boards and so CSAs did not require membership of Boards.[197] Professor Collins (former BIS and DfT CSA) said: "The access to the influential committees is crucial, and if it is the Board, then it is the Board. In my experience, that does not necessarily always have to be the case if you can manage the influence some other way, but it comes down to personal relationships and how well you can get under the skin of policy directors' agendas early enough to make a difference".[198] Dr Julian Braybrook, Director, Measurement Research Strategy, LGC Science and Technology, said: "acting in an advisory role does not necessitate them sitting on the departmental Boards. I think the Boards have a different function".[199] Professor MacKay (DECC CSA) told us:

> "I am not on the departmental Board but I am still on several other significant committees that are very important in DECC's functioning, in particular the Approvals Committee and the Strategy Board, which oversee all the policy areas and delivery programmes of the Department. I am also on the evaluation Board and the evidence panel, which oversees the acquisition and use of all evidence and analysis in the Department".[200]

The MoD CSA is a member of the Investment Approvals Committee in MoD, the senior body responsible for considering major investment proposals.[201]

86. We recognise the importance of CSA involvement in key departmental committees. However, the evidence suggests that policy is discussed at Board level, although we accept that it is not approved in this forum as policy approval is a Ministerial responsibility. This, plus the fact that CSAs have departmental evidence assurance, oversight and challenge functions (similar to NEBMs) and that they need to be aware of department plans, strategic directions and business cycles in order to be prepared to meet evidence needs, has persuaded us that CSAs should be members of departmental Boards. **We recommend, therefore, that, in addition to membership of key departmental committees, the post of CSA should carry with it a seat on the departmental Board on the grounds that membership would:**

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195 Op. cit. *Science review of HO, SEA Review of DWP* and Office of Science and Innovation: *Science review of Defra*, December 2008.

196 Q 211.

197 Q 189.

198 Q 14.

199 Q 241.

200 Q 55.

201 Q 141, the Government. Formerly, the CSA chaired the Investment Approvals Board. This Board was replaced by the Investment Approvals Committee as part of the restructuring of MoD.

- **enable oversight of the department and knowledge of its future plans;**
- **provide an opportunity to challenge policy with evidence;**
- **provide a mechanism to assure the use of scientific evidence across their department; and**
- **give CSAs the authority to work across the department.**

Internal quality assurance of evidence

87. We received a range of evidence about the work of CSAs to quality assure evidence and promote use of reliable evidence in policy making across their department. Professor MacKay (DECC CSA) said: "I see my role as being to help ensure quality assurance of all the evidence and analysis that is being used in DECC".[202] This function is described by GO Science as core, and this was evident in the departmental questionnaires.[203] Dr Richardson (HMT CSA) said part of his remit was "ensuring that throughout the organisation the people writing advice understand the evidence base from which they are operating".[204] Lord O'Donnell said: "Great chief scientists will make science and evidence-based policy work across the whole of the department".[205] The BIS SEA review identified inconsistency in quality and approach to the use of science and engineering evidence in policy development and decision making.[206] The DfT review recommended "a systematic and proportionate process for quality assurance of the SE evidence it uses".[207]

88. GO Science have encouraged departments, supported by the CSAs, to implement a process for Science, Technology, Engineering and Mathematics (STEM) Assurance to ensure: "science and engineering contributes (as part of an integrated evidence base) to sound policy decision making; and this evidence is robust, relevant and high quality".[208] These processes are distinct from the SEA reviews which seek to test departmental arrangements for use and assurance of science and engineering advice and evidence in that they are internal assurance processes whereas SEA reviews are conducted by external assessors. The effectiveness of CSAs in quality assurance is an issue to which we return in the next chapter and will, in part, be addressed by our proposal for annual assessments (see Recommendation 19 below (paragraph 121)).

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[202] Q 55.

[203] Op. cit. *Chief Scientific Advisers and their Officials*, Questionnaires.

[204] Q 151.

[205] Q 190.

[206] Op. cit. *SEA review of BIS*.

[207] Op. cit. *SEA review of DfT*.

[208] Op. cit. *Chief Scientific Advisers and their Officials*.

CHAPTER 4: SUPPORT AND RESOURCES FOR CSAs

Resources required by CSAs

89. The Wellcome Trust argued that CSAs must have the capacity and resources to source the best evidence and advice to inform the policy making process.[209] The Royal Society said that CSAs should have a discretionary research budget to address policy concerns and for horizon-scanning.[210] They also said that "challenge requires a bit of independence, and therefore some budget".[211] RSE, ITS UK and LGC agreed, and argued that resources were also necessary to enable CSAs to fill strategic gaps in research and to test studies.[212] The British Academy expressed a similar view.[213] Professor Wiles (former HO CSA) said that "if you have the ability to not just give advice but commission research in order to give advice, then that obviously makes a difference".[214]

90. Professor Collins (former BIS and DfT CSA) described the difference resources made when he compared the provision he had in DfT and BIS: "the resources that I had in DfT to enable me to gather further evidence that was independent of what was happening in the department as a whole were somewhat limited, but I did have some. In BIS, I had next to nothing, which limited very much what I could do with real cash to do real funded research from my own unit".[215] In contrast, Professor Sir Robert Watson (Defra CSA) said: "I … have a simple £1 million that I can use for whatever I want to challenge—it is small but incredibly valuable" and so can "challenge where I think there are significant uncertainties".[216] Professor Sir Mark Welland (MoD CSA) also described having "complete latitude, and the budgets to back it, where I feel that we need to challenge or provide an extra level of scrutiny, or even if I have an inkling that I want to try something different, so I will always use that".[217] A HO science review recommended the CSA have a fund for cross-cutting research, "blue skies" projects and sourcing strategic data.[218] Professor Sir John Beddington was convinced that "of course, one should have some discretionary spending".[219] Professor Wiles (former HO CSA) made the case for CSAs having control of some resources. He described how "you need to hold a budget, because if you do not hold a budget, you cannot move resources around in response to different demands because it gets embedded in businesses that will not give it up".[220]

91. CSAs are required to provide advice on areas of science and engineering in which they are not expert and therefore require the budgetary resources to

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209 Wellcome Trust.

210 Royal Society.

211 Q 100.

212 RSE, ITS UK, LGC Ltd.

213 Q 99.

214 Q 18.

215 Q 10.

216 Q 46.

217 Q 148.

218 Op. cit. *HO science review*.

219 Q 126.

220 Q 5.

gather this advice. For example, they may need to assemble a group of relevant experts in a seminar. CSAs are also asked to offer advice on an area where there is not a significant, reliable evidence base and so will need resources to commission additional research and test existing research. **We recommend that all CSAs are allocated a dedicated, ring-fenced fund by their departments to enable them, where they judge necessary, to commission research or to convene groups of experts. The size of the fund should be determined in consultation with the GCSA and should be evaluated as part of the proposed annual assessments by the GCSA (see Recommendation 19 below (paragraph 121)).**

Consultation of CSAs regarding departmental research spend

92. Four CSAs have budgetary responsibility for departmental research spend; others contribute to the research prioritisation and planning process of their department.[221] Following Lord Sainsbury's report commissioned by HMT, *The Race to the Top: A review of Government's Science and Innovation Policies*, October 2007, the (then) Government agreed that "Departments should consult the GCSA and HM Treasury, in advance, of any potential cuts to research budgets or expenditure, including those that have implications for the funding of cross-cutting research".[222] This commitment was reaffirmed by the present Government. GO Science recommend that departments involve their CSAs in "strategy and budget decisions to ensure that they are evidenced-based and that sufficient resources are dedicated to evidence and research".[223] There were contrasting views on whether this required CSAs to manage departmental research budgets. Table 5 below, from GO Science, details the responsibilities of CSAs regarding science, research or evidence budgets.

TABLE 5

CSA control of budgets[224]

Dept	CSA responsibility for science, research or evidence budget
BIS	No
DCLG	No
DCMS	*Vacant*
DECC	Only part of budget is directly under CSA control. Other Director Generals have independent evidence and research budgets.
Defra	Although budgets are delegated to Senior Responsible Owners for policy programmes and ongoing activities, the CSA has an overview and responsibility to ensure evidence investment is managed strategically across the department.
DfE	Yes

221 DfE, DH, and MoD questionnaire responses, Q 53, the Government.

222 Op. cit. *Science and Engineering in Government*.

223 Op. cit. *Chief Scientific Advisers and their Officials*.

224 Supplementary evidence from GO Science following a one-off evidence session with Sir John Beddington about science spending on 24 May 2011 [http://www.parliament.uk/hlscience].

Dfid	Yes
DfT	No
DH	Yes
DWP	No
FCO	No. (The FCO does not have a dedicated research and development budget).
HMT	HMT is currently looking at how the CSA function will best be delivered.
HO	Main science budget delegated through the Directors with the external research budget at business areas such as UK Border Agency Migration and Border Analysis, Office for Security and Counter Terrorism, the Economics and Resource Analysis Group, and the Centre for Applied Science and Technology.
MoD	Yes
MoJ	CSA is accountable to departmental Board for research spend.

93. The HPA argued that CSAs should determine research budgets and strategic directions because they are familiar with departmental policy priorities.[225] CASE also said that CSAs should have oversight of departmental research and development budgets.[226]

94. Not all witnesses favoured CSAs control of departmental research spend. The IoP agreed that CSAs have a good understanding of departmental research but argued that there was no case for a department-wide rule on controlling research spend.[227] The Academy of Social Sciences recommended close involvement of CSAs in the prioritisation of departmental research spend,[228] and the Wellcome Trust supported this view.[229] The Royal Society said that CSAs need not control or manage the entire departmental research budget but recommended that CSAs should ensure that research spend is well stewarded.[230] GO Science said CSAs should be involved in strategy and budget decisions "to ensure that they are evidence-based and that sufficient resources are dedicated to evidence and research".[231] The Government submission raised the question of whether CSAs could provide independent challenge to departmental research spend impartially if they are responsible for managing the science budget.[232]

95. Several CSAs described the role they had played in the spending review.[233] Ms Willis (DfE CSA) said: "I provide advice to ministers about both our

225 HPA.

226 CASE.

227 IoP.

228 Academy of Social Sciences.

229 Wellcome Trust.

230 Royal Society.

231 Op. cit. *Chief Scientific Advisers and their Officials*.

232 The Government.

233 Q 56, Q 24.

forward-looking analytical priorities and our research programme, and I was actually involved in the spending review process in terms of collating the evidence and in discussions with Treasury about how those finances should be allocated".[234] Professor Sir Robert Watson (Defra CSA) said he had

> "... pushed forward very hard that we should not salami-slice the evidence budget, that we should be quite strategic by effectively setting up a framework of high, medium and low priorities, also arguing that we should not allocate all the money for the four years ... given that we did not know what policy priorities would change, what evidence priorities would change, what the research councils would be doing, or even what some of the international research would be".[235]

Professor Whitty (Dfid CSA) said: "I was involved in all the areas in my own division; also I was part of the cross-Government challenge group within the Treasury"; and Professor MacKay (DECC CSA) said he led DECC's "bid for resources for the Science and Innovation Group in DECC".[236]

96. We have already commented on the way in which different departments have different arrangements for the management of science. As a result, some departments manage research spend centrally and in others it is managed by policy teams. In these circumstances, we do not consider a requirement that all CSAs control their departmental research budgets to be appropriate. We also acknowledge the reservations expressed by the Government about the ability of CSAs to scrutinise the science budget independently in circumstances where they also manage it. Nevertheless, CSAs have a valuable contribution to make to the process for prioritising and allocating research spend. **We recommend therefore that CSAs, where they do not manage departmental research spend, should have a formal role in decision making about departmental research spend, in line with the GO Science recommendation.**

Staff to support CSAs

97. Given that most CSA posts are part-time, and our recommendation that CSAs ought to be employed on a part-time basis, a good team of staff and deputies is essential—a point made to us by, for example, Engineering the Future.[237] Professor Collins (former BIS and DfT CSA) said: "you need the appropriate level of skilled resource around the CSA";[238] and Professor Silverman (HO CSA) told us that, in his experience, "having a very strong internal support team ... makes a big difference".[239] The BIS SEA Review said that the BIS CSA require a deputy, as a priority, "to enable effective, sustainable delivery against the role's objectives".[240] Table 6 sets out the staff support teams for CSAs in each department. Once again, the variation is marked.

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234 Q 24.

235 Q 24.

236 Q 56.

237 Engineering the Future.

238 Q 16.

239 Q 55.

240 Op. cit. *SEA Review of BIS*.

TABLE 6

Staff supporting CSAs[241]

Dept	Deputy CSA	Details of other staff who support CSA
BIS	Yes—PB1, position vacant	G7, SEO, 0.4FTE EO
DCLG	No formal deputy CSA role but a G7 functionally performs this role.	1 PA
DCMS	*Vacant*	*Vacant*
DECC	Yes—PB2	Private Office of 3 staff. CSA is also Director General of a Group of 48 staff
Defra	Yes—PB2	An HEO and an EO in the CSA's private office offer direct support. Many other staff across the Department support the CSA as part of their work.
DfE	No, but there are 5 deputy analytical directors across the department.	None
Dfid	Yes—PB1	1 G7, 1 EO and 1 AO
DfT	Yes—PB1	In discussion
DH	No	All policy teams, including Research and Development, support Professor Dame Sally Davies in her role.
DWP	Yes—Grade 6	1 SEO, 1 EO
FCO	No formal deputy CSA. D6 (G7 equivalent) Head of Office functionally performs this role.	Full-time D6 (G7 equiv.) Head of Office. 0.5FTE PA
HMT	*Information not provided as the post has only*	*Information not provided as the post has only recently been created*

241 Supplementary evidence from GO Science following a one-off evidence session with Sir John Beddington about science spending on 24 May 2011 [http://www.parliament.uk/hlscience].

Dept	Deputy CSA	Details of other staff who support CSA
	recently been created	
HO	No	Director of Social Sciences, the Director of Science, Engineering and Technology, and a Secretariat of 12 staff including 1 G6, 4 SEO, 2 HEO, 1 HSO and 4 EO.
MoD	No formal deputy CSA role but they have senior scientists and engineers going down through all ranks from the CSA.	Science and technology policy advice staff under two PB2 senior civil servants.
MoJ	No	Deputy Directors depending on issue under consideration.

FTE	Full Time Equivalent
PB2	Senior Civil Service Pay Band 2
PB1	Senior Civil Service Pay Band 1
G6	Grade 6
G7	Grade 7
SEO	Senior Executive Officer
HEO	Higher Executive Officer
EO	Executive Officer
AO	Administrative Officer

98. CSAs require significant staff support if they are to be able to monitor, evaluate, challenge and advise on the full range of work undertaken by their departments. **We recommend that each department should evaluate whether the departmental CSA has adequate staff to give the CSA the capacity to discharge his or her functions effectively. The adequacy of the staff provision for each CSA should form part of the proposed annual assessments by the GCSA (see Recommendation 19 below (paragraph 121)).**

Effective networks within the scientific community and industry

99. The Royal Society, British Academy and Engineering the Future argued that National Academies can (and do) provide advice and access to networks which would be useful to CSAs in gathering evidence to support their department's work and to enable CSAs to challenge departmental policy.[242] The RAEng, for example, said they had: produced pieces on water security, nuclear lessons, a road map for Infrastructure UK; hosted roundtables; offered deep expertise; and met with CSAC.[243] The GCSA said that Academy engagement was an area he had worked to develop.[244] Engineering the Future emphasised the low cost of using their resources, and those of the other Academies, to obtain advice.[245] The British Academy considered co-operation between CSAs and National Academies to be essential to allow relevant academics to contribute to policy formulation.[246] The Government drew attention to the importance of work done by the CSAC to engage with the external scientific communities including the National Academies. They also noted that a significant number of CSAs are Fellows of the National Academies.[247]

100. One area for development identified during the inquiry was CSA links with industry. According to LGC, some CSAs were better connected with industry than others.[248] Serco commended current industry links but said they could still be improved upon and specifically suggested that "advisory committees from industry can help along those lines and we would recommend those and their expansion".[249] Serco said: "an example of advice being offered was around Fukushima, where we provided substantial advice across Serco Assurance, NNL [National Nuclear Laboratory], NPL and AWE; all offered advice into the Government Chief Scientific Adviser on that, which enabled him to offer independent advice into the Government".[250] In our report on public procurement, published in 2011, we recommended that CSAs should take responsibility for their department's links with industry, to promote innovative procurement solutions.[251] The MoD SEA review identified scope for improved departmental links with

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242 Royal Society, British Academy, Engineering the Future.

243 Q 91.

244 Q 108.

245 Engineering the Future.

246 British Academy.

247 The Government.

248 Q 242.

249 Q 236.

250 Q 235.

251 Science and Technology Committee, 1st Report (2010–12): *Public procurement as a tool to stimulate innovation* (HL Paper 148).

industry, particularly small and medium-sized enterprises, to discuss issues, share information about needs and problems, and to develop procurement solutions.[252] Professor Collins (former BIS and DfT CSA) suggested that CSA links with industry were mutually beneficial: he gave the example of aiding a collaboration between the automotive industry and university research bases.[253] Professor Sir John Beddington, in written evidence, said: "in the longer term, we aspire to ensure that we include scientists and engineers in the private sector (with hindsight, perhaps a better term than industry in this context) where they might be best placed to offer advice of value to those in government. There is already a lot of positive engagement to report". He then gave examples of engagement with industry by SAGE, SEA reviews, water and food research groups, Foresight, CST and the GCSA.[254] These positive examples are encouraging, and we look forward to observing the development of links with industry similar in strength to those with the Academies.

101. **We commend CSAs and CSAC, under the leadership of Professor Sir John Beddington, for building effective working relationships with the Academies and encourage them to continue building on these relationships. The relationship between CSAC and industry is also important. We recommend that, as a priority, CSAC should develop similar links with industry.**

Work of CSAC

102. CSAC is chaired by the GCSA and its members include departmental CSAs, CSAs from devolved administrations and the BIS DG for Knowledge and Innovation. CSAC discusses science and engineering issues across government. It also

- "provides collective advice to ministers;
- discusses and facilitates implementation of policy on science and engineering;
- identifies and promulgates good practice in science and engineering including their use in government decision making, particularly in the context of policy making;
- facilitates communication on particular high profile science, engineering and technology issues and those posing new challenges for government";
- provide[s] a networking forum for departmental CSAs to share good practices across government and maximise the collective expertise of the CSA network to identify and resolve cross departmental problems; and
- provides a two way communication channel with the GCSA and GO-Science and GO-Science stakeholders within and outside of government.[255]

RCUK praised CSAC for bringing together cross-departmental research issues.[256] Professor Collins (former BIS and DfT CSA) said CSAC was an important voice of scientific advice.[257] Professor Wiles (former HO CSA) and

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252 Op cit. *SEA Review of MoD*.

253 Q 11.

254 Letter from Professor Sir John Beddington.

255 Op. cit. *Chief Scientific Advisers and their Officials*.

256 RCUK.

257 Q 2.

Professor Sir Mark Welland (MoD CSA) described the support they had received from CSAC and how it was a useful source of advice.[258] Lord May commended CSAC and, in particular, Professor Sir John Beddington, for developing the group as a source of problem-solving advice among CSAs.[259]

103. Professor Wiles (former HO CSA) gave an example which demonstrated what CSAs working together through CSAC could achieve. Following the terrorist attacks in the United States on 11 September 2001, CSAC, under the leadership of Sir David King, the GCSA at the time, wrote to HMT making the case for a cross-Whitehall counterterrorism research and development programme and budget. This request was granted and the budget was spent on relevant counterterrorism research. He said that the research could not have been funded at short notice through departmental research and development budgets, and involved the co-operation of a number of departments (including DfT, DH, HO and MoD).[260]

104. **We commend Professor Sir John Beddington and CSAC for their cross-departmental work to date**. We received, however, only limited evidence of CSAC offering collective opinions and of examples of CSAC working together, although we acknowledge this may reflect the fact that much of their collaboration is arranged informally. CSAC is a valuable resource and a potentially powerful exponent of science (including social science) and engineering advice within government. **We would encourage the GCSA, as part of his oversight of science and engineering advice to government, to take steps to ensure that the full range of expertise within CSAC is used effectively, to continue to promote cross-departmental collaboration through CSAs, and to inform the scientific community, and wider public, of these efforts**

Range of expertise across CSAC

105. CSAC comprises all departmental CSAs and provides an opportunity for them to share their experience and contacts with each other. Professor Sir John Beddington described the current range of expertise represented in CSAC as "really quite wide".[261] Some witnesses, however, expressed concern about under-representation in two areas: engineering and social sciences.

Engineering

106. The RAEng praised Professor Sir John Beddington for his efforts to improve CSA links with the engineering community. They described an increased "willingness of many CSAs to call on the additional advice and experience that is available through the National Academies", although they noted that only certain CSAs requested engineering advice.[262] Engineering the Future argued that departments ought to consider creating Chief Engineering Adviser (CEA) posts to advise on project deliverability and feasibility,[263] a view shared by CASE.[264] The RAEng said they were less concerned about creating CEA posts urgently because of increased CSA engagement with the engineering community.[265]

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[258] Q 2, Q 154.

[259] Q 175.

[260] Q 13.

[261] Q 108.

[262] Q 91, Q 86.

[263] Engineering the Future.

[264] CASE.

[265] Q 97.

107. **We welcome the GSCA's commitment to promote engagement with the engineering community and note that the GCSA is Head of both the Science and Engineering Profession. We welcome also the recent appointment of engineers to the post of CSAs to BIS and DfT.**[266]

Social sciences

108. The Academy of Social Sciences argued that social science insights were "crucial to ensuring that policy makers understand the nature of social problems, both current and emerging, and can design policies which are well-targeted, appropriate and work as intended".[267] The British Academy described the role social sciences could play in shaping policy:

> "... from the perspective of the humanities and social sciences, we see that challenge coming through a very narrow lens, a lens essentially of science, technology, engineering, medicine, economics and statistics. Now, those are all very important areas but the term science and engineering seems at the moment to not exclude but marginalise the humanities and social science in relation to advice and expertise: culture, history, language, psychology, and political science. One can think of a number of the huge global challenges that are being faced, climate change for example, where the measurement and the understanding of that is a matter for physical and natural science, but if there is to be some affecting of it then that involves behaviour and culture and understanding of the human condition if it is to be mitigated". [268]

109. The Academy of Social Sciences said that there was a risk that social science contributions to policy making were not being considered or identified because of the absence of social scientists (other than economists) in CSAC.[269] The British Academy argued that having broader social science representation would help government understand policy questions better because they would offer insight into, for example, behaviour and attitudes.[270] The Economic and Social Research Council (ESRC) said that there had been an expertise imbalance within CSAC, as they considered the majority of CSAs to be natural or physical scientists.[271] The Royal Society said that, where appropriate, greater social science representation in the group would be welcome. [272] Professor Sir Robert Watson (Defra CSA), Professor Wiles (former HO CSA) and Professor Sir John Beddington all identified gaps in social science representation.[273]

110. To remedy this deficiency, ESRC suggested that departments should widen their recruitment criteria to make CSA posts more accessible to candidates with social science, and arts and humanities backgrounds.[274]

111. Professor Wiles (former HO CSA) offered an alternative solution: "for departments that are largely reliant on social science research, which, after all, is

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266 Professor John Perkins and Professor Rod Smith.

267 Academy of Social Sciences.

268 Q 86.

269 Academy of Social Sciences.

270 British Academy.

271 ESRC annex to RCUK submission.

272 Royal Society.

273 Q 51, Q 17, Q 109.

274 ESRC annex to RCUK submission.

the majority of departments, then I think there is a serious question about why they do not have the equivalent of CSAs for social science".[275] Professor Sir Robert Watson (Defra CSA) said that in some departments "we do need to up our game on the social research" and expressed concern that "the highest level social researcher in government is a Deputy Director ... You have DG [Director General] level for economics but you literally go all the way down to a Deputy Director for social research, so I do believe we are underplaying it".[276]

112. The British Academy went further and recommended the appointment of a Chief Social Scientist at Permanent Secretary level, arguing that an appointment at this grade was necessary to ensure access to decision makers.[277] The Academy of Social Sciences considered the appointment of a Chief Social Scientific Adviser as vital to securing independent and effective social scientific advice to ministers and policy makers. [278] Professor Sir John Beddington also made some arguments in favour of a Chief Social Scientist:

> "Following his [Professor Wiles'] departure, as head of the Government Social Research Service, an appointment of two people was made ... and they are actually working pretty well, in a sense, as Heads of Profession. They link in through the rest of the Government Heads of Profession through the Heads of Analysis group ... That being said, I do believe that there is a case for very carefully considering whether we should have a Chief Social Scientist in government ... Is there any difference between not having a Chief Chemist or not having a Chief Social Science Adviser? I think there is a case to be made both ways but I pose this as an issue ... If I were to say what would be ideal, I do think a Government Chief Social Researcher would be helpful. I think it would improve things, not just as a figurehead but actually to be able to be involved".[279]

113. Nick Gibb MP, Minister for Schools, however, challenged this view: "it is difficult to say you ought to have somebody on the Board or a Chief Social Scientist. What is the purpose of having such a senior appointment? Is it so that they can overrule decisions by ministers? That is the danger of elevating these positions to that height". [280] We find Mr Gibb's comments surprising.

114. The social sciences have a critical role to play in the formulation and evaluation of policy. As a result, in a recent report on behaviour change,[281] we made a number of recommendations about improving mechanisms for enabling input from the social sciences into policy making. The recommendations included the following: "at the earliest opportunity, the Government appoint a Chief Social Scientist who reports to the Government Chief Scientific Adviser and is an independent expert in social science research to ensure the provision of robust and independent social scientific advice".[282] In response, the Government said that they would give "careful consideration" to the proposal, "weighing up the potential benefits against any

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[275] Q 17.

[276] Q 51.

[277] British Academy.

[278] Academy of Social Sciences.

[279] Q 109.

[280] Q 225.

[281] Science and Technology, 2nd Report (2010–12): *Behaviour Change* (HL Paper 179).

[282] Ibid.

potential costs" and that, "in the meantime", they agreed that "more should be done to join up better the work of the Chief Scientific Advisers and Social Scientists within departments on behavioural science".[283] **We welcome the Government's positive, albeit tentative, response to our recent recommendation in our report on behaviour change that they should appoint a Chief Social Science Adviser. Given the all-pervasive importance of social science advice to policy making in all departments, we remain of the view that at the earliest opportunity the Government should appoint a Chief Social Scientist, reporting to the GCSA, to ensure the provision of robust and independent social scientific advice. The Chief Social Science Adviser should meet the same criteria we propose for CSAs in Recommendation 1 (paragraph 37 above).**

Challenge from external advisory bodies

115. Five departments with CSAs have a form of external scientific advisory body which challenges their department's overarching management and use of scientific evidence. Defra, HO and MoD have Scientific Advisory Councils (SA Councils), Dfid and DECC have Scientific Advisory Groups (SAG). Table 7 summarises the advisory bodies associated with departments.

TABLE 7

Departmental Scientific Advisory Bodies[284]

Dept	Overarching external advisory bodies
BIS	No
DCMS	Science and Research Advisory Committee
DCLG	No
DECC	Science Advisory Group
Defra	SA Council
DfE	No
Dfid	Informal Research Advisory Group
DfT	No
DH	No
DWP	No
FCO	No
HMT	No
HO	SA Council
MoD	SA Council
MoJ	No

[283] CO: *Government Response to the Science and Technology Select Committee Report on Behaviour Change*, September 2011.

[284] Questionnaires, the Government.

The GCSA and CASE recommended that all departments establish SA Councils to support and challenge departments in their use of science.[285] We took oral evidence from the chairmen of three departmental science advisory bodies: the DECC SAG, the MoD SA Council and the Home Office Scientific Advisory Committee (HOSAC).[286] Whilst assessing the value of such bodies is not within the scope of this inquiry, there are two aspects of the evidence we received to which we wish to draw attention. First, we note that HOSAC is chaired by the Permanent Secretary of the department, Dame Helen Ghosh. When questioned about whether she felt able to provide independent challenge to the department's work, Dame Helen indicated that she was open to the Committee suggesting that the arrangement be revised.[287] We recommend (below) that it should be. Secondly, we were concerned that the DECC SAG had not discussed nuclear research and development, a key element of the remit of DECC. [288] This led us to question how it prioritises its workload. Timeliness of work was identified as an area for improvement by the MoD SEA review. This review also recommended that the terms of reference of its SA Council should be re-defined to focus on strategic, forward-looking and cross-cutting issues.[289]

116. Given the limited evidence we received about departmental scientific advisory bodies, we are not in a position to offer proposals for improvement generally. **We recommend, however, that the GCSA, GO Science and the Head of the Civil Service undertake an evaluation of departmental scientific advisory bodies with overarching responsibility (as described in paragraph 102), consider whether they offer the most effective mechanisms for external critique and review of departmental use of science, and make proposals for improvement. We consider the chairmanship of the Home Office Scientific Advisory Committee (HOSAC) by the departmental Permanent Secretary to be inappropriate. We recommend that, instead, the chairman should be an external, expert appointee.**

Departmental performance

117. The GO Science Science and Engineering Assurance (SEA) reviews are due to conclude, in their current form, by the end of the 2011–2012 financial year.[290] These reviews measure departmental science arrangements against the following criteria:

    (a) "strategy, policy making and delivery should be effectively informed by science and engineering;

    (b) government as a whole, and individual government departments, should take a strategic approach to the prioritisation, accessing, resourcing and delivery of science and engineering;

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285 CASE, Q 127.

286 QQ 247–277. HOSAC is named a Scientific Advisory Committee but carries out the function of a Scientific Advisory Council in that it oversees use of science across the whole department.

287 Q 252.

288 Q 257.

289 Op. cit. *SEA review of MoD*.

290 The Government.

(c) all science and engineering used by government should be robust, relevant and high quality;

(d) science and engineering [evidence] should be made publicly available unless there is clear justification for not doing so;

(e) the implications of science and engineering for society should be fully considered, engaging the public whenever appropriate, using good practice;

(f) government should ensure effective knowledge transfer, innovation and pull through of its research to the economic development of new technologies and services; and

(g) departments should ensure that they have the science and engineering capacity and capability to manage and deliver the above sustainably and effectively".[291]

The Government have not yet announced how they will replace these reviews. We find this a matter of concern given the number of issues identified by the reviews about departmental use of science, some of which have been mentioned in this report. GO Science's most recent comments on the SEA reviews were that: they are "working with CSAs and other key players to design the next phase of this programme in order to help departments continue to improve their use of science evidence and so that the future programme can have maximum impact. The new programme is likely to retain the essential elements of challenge of the current programme, but will do so with a process that makes fewer resource demands of departments".[292] This approach is more reassuring than a suggestion made in 2008 and in the Government submission that these reviews should simply be a "light touch self-evaluation".[293] The SEA reviews serve a valuable purpose in allowing external peer assessment of departmental arrangements for use and management of science, and we welcome their continuation. The annual assessments of CSA performance, discussed below, are intended to supplement them rather than replace them. It is important that external assessment of departments' use of science continues through some form of SEA review. We were surprised to find little evidence of steps taken by departments to address issues identified in SEA reviews. In order to improve the transparency of these reviews and to demonstrate what impact they are having, **we recommend that departments should publish follow-up reports on steps they have taken to address issues identified in SEA reviews**

Reporting lines and oversight

Personal performance assessment

118. Each department has different arrangements for oversight of the work of their CSA. Some CSAs report to Permanent Secretaries, others to DGs; some are reviewed by a scientific advisory body (such as a Scientific Advisory Council), whilst others are not.[294] Table 8 summarises CSA reporting lines.

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[291] GO Science: *Science and Engineering Assurance (SEA) Framework*, January 2012.

[292] Op. cit. *Chief Scientific Advisers and their Officials*.

[293] Op. cit. *Science and Engineering in Government*, the Government.

[294] Questionnaires.

TABLE 8

CSA reporting lines[295]

Dept	Reports to
BIS	Permanent Secretary
DCLG	Director General
DCMS	*Vacant*
DECC	Permanent Secretary
Defra	Permanent Secretary
DfE	Director General
Dfid	Director General
DfT	Director General
DH	Permanent Secretary
DWP	Director General
FCO	Permanent Under Secretary
HMT	Director General
HO	Permanent Secretary
MoD	Permanent Under Secretary
MoJ	Director General

Professor Sir John Beddington explained: "in terms of formal reporting, none of the Chief Scientific Advisers report to me, I have no line-management responsibilities for any of them ... I do have meetings pretty regularly with the Chief Scientific Advisers and what you might call fireside chats or critical-friend discussions and so on".[296] Former CSAs identified performance assessment as an area which required improvement: Professor Collins (former BIS and DfT CSA), for example, said: "to be honest, I think the assessment of my performance was almost totally omitted. There was very little engagement in terms of oversight of what I was doing"; and, according to Professor Wiles (former HO CSA): "what was not so well done in that context was an assessment of how well I was doing as a CSA".[297]

Annual assessments of CSAs by the GCSA

119. We were given some examples of good practice with regard to assessment of personal performance. Professor Silverman (HO CSA) described how he involved the GSCA in his 360° appraisal,298 and Professor MacKay (DECC CSA) and Professor Sir Robert Watson (Defra CSA) commended the work

295 Questionnaires, op. cit. MoD: *CSA Candidate Brief*.

296 Q 120.

297 Q 19.

298 Q 80.

of their scientific advisory bodies in challenging them and holding them to account.[299] We would, however, wish to see a rigorous and consistent approach—across all departments—to meeting the performance assessment deficit to which Professor Collins (former BIS and DfT CSA) and Professor Wiles (former HO CSA) alluded.

120. To this end, therefore, we propose that CSAs should be subject to an annual assessment of their work by the GCSA. The assessment should review the extent to which the CSAs have discharged effectively their science advisory and challenge functions. It should include an assessment of their leadership role in promoting the best use of science within policy decision making and whether mechanisms have been established to achieve that end. It should also include an assessment of whether the department is providing the right level of resourcing to support the CSA in the effective discharge of his or her functions. We envisage that these assessments would run in parallel with the standard departmental appraisal cycle. Whereas the Permanent Secretary would have formal responsibility as reporting officer within the department, we take the view that responsibility for the assessments should rest with the GCSA. Our reasons are threefold: the GCSA is Head of Profession for Science and Engineering; he has the support for this type of work from GO Science; and the GCSA is well placed in terms of access to the Prime Minister, Cabinet, senior officials and CSAs to enable him to address concerns identified. We acknowledge that our proposal departs from the conventional appraisal model of a single reporting officer. We would not, however, wish to propose a central cadre of CSAs under the line-management of the GCSA but support the current arrangement whereby CSAs are, first and foremost, departmental appointments. For this reason, our proposal is that the GCSA's assessments should feed into the appraisal report of the Permanent Secretary.

121. **We recommend that the GCSA should undertake annual assessments of the performance of CSAs, to feed into the annual appraisal report undertaken by the Permanent Secretary. We recommend that the assessments should cover the following:**

- **development and maintenance of effective links by the CSA with the relevant science and industrial communities;**
- **frequency and efficacy of CSA engagement with the policy process;**
- **CSA efforts to promote the value of the use of quality scientific evidence across his or her department;**
- **contribution of the CSA to the work of CSAC and consultation with other CSAs on relevant issues;**
- **sufficiency of CSA's staff and budget;**
- **the CSA's work to provide scrutiny of departmental research budgets; and**
- **external critique offered to the CSA's work.**

[299] Q 82, Q 43.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

Functions and recruitment of Chief Scientific Advisers

Cross departmental variation in management of science

122. Each department has a different organisational structure and arrangement for the management of science: some departments manage research and evidence gathering in a central team, others manage it within policy programmes. This variation in arrangements for the management of science across departments, alongside the different remit of each department, has led us to conclude that some flexibility should be afforded to departments to allow them to tailor the CSA post to their individual needs (paragraph 27).

123. There are a number of "essential characteristics" which we have concluded must be present, irrespective of a department's structure and science management arrangements, if a CSA is to discharge his or her core functions effectively. These include personal characteristics of a CSA (see Recommendation 1 below) and characteristics of the institutional arrangements in relation to the post itself (see Recommendations in Chapters 3 and 4 below) (paragraph 28).

Essential personal characteristics of CSAs

124. **The primary essential characteristic of all CSAs is that they must have standing and authority within the scientific community, nationally and internationally. This will, amongst other things, help ensure that the CSA is able to access a wide range of expertise. In addition, a CSA should be able to demonstrate the following:**

- **an ability to engage in effective dialogue with internal and external stakeholders, including academia, industry and the wider public;**
- **an ability to work in and manage a multi-disciplinary team;**
- **an understanding of the policy environment;**
- **an ability to evaluate evidence and to weigh up conflicting evidence from a wide range of disciplines; and**
- **an understanding of project delivery.**

We recommend that all departmental recruitment processes for CSAs should be designed to ensure that candidates selected possess these characteristics (paragraph 37). (Recommendation 1)

Importance of external recruitment

125. **We considered whether recruitment of a candidate who is able to demonstrate the characteristics described in Recommendation 1 necessarily excludes internal candidates and entails appointment of either an external candidate or a candidate with a substantial and recent background based outside the civil service. We have concluded that it does and recommend accordingly (paragraph 45). (Recommendation 2)**

Terms and conditions

126. **We recommend that:**

    (a) Subject to paragraph (b) below, CSAs should be employed by their departments on a part-time basis to afford them the opportunity to maintain their links with academia, or industry, or both.

    (b) Exceptionally, some CSAs are required to undertake major management or professional functions. In these circumstances it is likely that their appointments will need to be full-time. None the less, provision should be made to enable them to maintain their links with academia, or industry, or both.

    (c) CSAs ought to work exclusively in their role as CSA for the equivalent of at least three days a week.

    (d) CSAs should be appointed for a three year period, with the possibility of renewal (paragraph 54). (Recommendation 3)

127. There are, at present, a small number of CSAs who combine their role as CSA with other significant departmental roles (see paragraph 47). Having concluded that CSAs should work at least three days a week exclusively in their capacity as CSA, we question whether combining such significant roles in this way can be appropriate. In raising this issue, we mean no criticism at all of the current incumbents. **We recommend, however, that the GCSA and Head of the Civil Service, at the earliest opportunity, review these arrangements in consultation with the relevant Secretaries of State and departmental Permanent Secretaries (paragraph 55). (Recommendation 4)**

Recruitment panel

128. **We recommend that the GCSA (as Head of Profession for Science and Engineering across government) should sit on all CSA interview panels. We also recommend that an external scientist should sit on these panels (paragraph 57). (Recommendation 5)**

Engagement with the policy process and departmental evidence quality assurance

Engagement with the policy process

129. **We share the view of those witnesses who argued that CSAs should be involved early and throughout the policy process. CSA involvement in the policy submission sign-off chain would be a useful method for ensuring that this happened. We recommend therefore that in all departments CSAs should be consulted by policy officials early and throughout the policy process, and that all CSAs form part of the departmental policy submission sign-off chain (paragraph 64). (Recommendation 6)**

Access to ministers

130. **We recommend that CSAs should have a right of direct access to ministers to ensure that they can challenge effectively at the highest level. By direct access we mean that CSAs should be able to see ministers at the prompting of the CSA and as often as judged necessary by the CSA (paragraph 68). (Recommendation 7)**

Guidelines in the event of disagreement

131. **In order to assist CSAs in expressing disagreement with policy decisions, we recommend that a set of guidelines for CSAs be developed by the GCSA and Head of the Civil Service, similar in content and aim to** *The Principles of Scientific Advice to Government* **and** *The GCSA's Guidelines on the Use of Scientific and Engineering Advice in Policy Making***. These guidelines should contain a protocol for CSAs to follow in circumstances where they disagree with ministers or civil servants regarding a departmental policy decision (paragraph 73). (Recommendation 8)**

Grading

132. **We recommend that all CSAs should be graded at either Permanent Secretary level or the level immediately below Permanent Secretary (that is, Director General or departmental equivalent) to ensure that they have the authority and ability to work across the whole department (paragraph 76). (Recommendation 9)**

133. The CSA post in the MoD has been downgraded from Permanent Secretary level to Director General (the equivalent in military terms of a downgrade from a four star to a three star post). Whilst we have concluded that, generally, a CSA can discharge his or her functions effectively at Director General level (see Recommendation 9), we share the view of a number of witnesses that, in the particular circumstances of the MoD, the re-grading is likely to make it more difficult for the CSA to exercise influence both within the department and in the broader scientific and commercial communities (paragraph 78).

Membership of departmental Boards

134. **We recommend that, in addition to membership of key departmental committees, the post of CSA should carry with it a seat on the departmental Board on the grounds that membership would:**

- **enable oversight of the department and knowledge of its future plans;**
- **provide an opportunity to challenge policy with evidence;**
- **provide a mechanism to assure the use of scientific evidence across their department; and**
- **give CSAs the authority to work across the department (paragraph 86). (Recommendation 10)**

Support and resources for CSAs

Research spend

135. **We recommend that all CSAs are allocated a dedicated, ring-fenced fund by their departments to enable them, where they judge necessary, to commission research or to convene groups of experts. The size of the fund should be determined in consultation with the GCSA and should be evaluated as part of the proposed annual assessments by the GCSA (see Recommendation 16 below) (paragraph 91). (Recommendation 11)**

136. **CSAs have a valuable contribution to make to the process for prioritising and allocating research spend. We recommend therefore that CSAs, where they do not manage departmental research spend, should have a formal role in decision making about departmental research spend (paragraph 96). (Recommendation 12)**

Staffing

137. **We recommend that each department should evaluate whether the departmental CSA has adequate staff to give the CSA the capacity to discharge his or her functions effectively. The adequacy of the staff provision for each CSA should form part of the proposed annual assessments by the GCSA (see Recommendation 16 below) (paragraph 98). (Recommendation 13)**

Links with academies and industry

138. **We commend CSAs and the Chief Scientific Advisers Committee (CSAC), under the leadership of Professor Sir John Beddington, for building effective working relationships with the Academies and encourage them to continue building on these relationships. The relationship between CSAC and industry is also important. We recommend that, as a priority, CSAC should develop similar links with industry (paragraph 101). (Recommendation 14)**

CSAC and cross-departmental collaboration

139. We commend Professor Sir John Beddington and CSAC for their cross-departmental work to date. We would encourage the GCSA, as part of his or her oversight of scientific advice to government, to take steps to ensure that the full range of expertise within CSAC is used effectively, to continue to promote cross-departmental collaboration through CSAs, and to inform the scientific community, and wider public, of these efforts (paragraph 104).

Engineering

140. We welcome the GSCA's commitment to promote engagement with the engineering community, and note with approval that the GCSA is Head of both the Science and Engineering Profession. We also welcome the recent appointment of engineers to the post of CSAs to BIS and DfT (paragraph 107).