29-30 Tavistock Square
London WC1H 9QU
Tel: 020 7679 4995 Fax: 020 7916 8528
info@sciencecampaign.org.uk
www.sciencecampaign.org.uk

Campaign for Science and Engineering in the UK

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# Maintaining coherence in science policies as circumstances change

Response to the Conservative Party Policy Task-Force on
Science, Technology, Engineering and Mathematics

1. The Campaign for Science & Engineering is pleased to submit this response to the Conservative Party's review of science policy. CaSE is a voluntary organisation campaigning for the health of science and technology throughout UK society, and is supported by over 1,500 individual members, and some 70 institutional members, including universities, learned societies, venture capitalists, financiers, industrial companies and publishers. The views of the membership are represented by an elected Executive Committee.

2. In 2005, we produced a document called *Science Policies for the Next Parliament: Agenda 2005-2010,* which is available to download at http://www.sciencecampaign.org.uk/documents/2005/CaSE0503.htm, and a copy of which is included with the hard copy of this memorandum. It sets out some of the areas in which we believe there is a need for policy attention, and we have added only brief comments on the themes outlined in the call for evidence.

## The scope for a national strategy for STEM

3. By far the most important role of a national strategy would be to coordinate the many and varied activities of Government. At present, STEM is distributed across a large number of departments, with several having significant scientific responsibilities. These include not just the DTI and DfES, but the Regional Development Agencies, the National Health Service, and even the DCMS, which sponsors major scientific institutions like the Science Museum, the Natural History Museum and the British Library; funds £18 million of research and development annually; and is responsible for areas like the Olympics, where sport science will be crucial in helping the UK win medals.

4. While most of these scientific activities of Government are valuable in themselves, the lack of coordination is harmful. So while the Chancellor is saying that he wants Britain to be the best place in the world for science, the Higher Education Funding Council for England actually *reduced* the proportion of funding given to teaching science and engineering in the universities.

**The relative importance of applied science and blue skies research**

5. Both are hugely important. Blue skies research is the seed corn from which all later ideas come, and in recent years, the freedom of researchers in universities (the traditional home of blue-skies research) has been severely curtailed, as more and more money comes with strings attached or hypothecated to what politicians and civil servants believe to be the latest scientific fashions.

6. Much of that is fair; after all, the science budget has risen extremely rapidly, and politicians are entitled to take more interest in what is being done with taxpayers' money. The problem is that the process has happened by stealth, without any proper checks and balances. For example, the science budget now comes with ring-fenced pots for areas like 'the rural economy,' which in the past would have been the responsibility of DEFRA's predecessors. Although this is a wholly new approach to the science budget (it had *never* happened until the past few years), it has occurred without anyone much appearing to be concerned.

7. The effect is that the relatively small proportion of money that used to be available for genuinely blue-skies research is no longer protected.

8. But applied research is equally important, and in general always be responsible for more of the total funding available. Unfortunately, the new rules about full economic costing, while admirable for publicly-funded research, have driven up the cost to industry of investing in university research.

9. The UK needs to work much harder at making itself an attractive place for private companies to invest in science and engineering research and development. At least in part, that means a much greater focus on science education and training.

**The key research areas that need to be developed**

10. CaSE has a policy of not getting involved in debates about which scientific areas should be promoted over others. In general, however, it is a mistake for politicians to try to 'pick winners'. The most productive approach is to allow as broad a range of science to flourish as possible, directing resources towards the most exciting scientific proposals rather than towards predetermined subject areas. Nobody could have predicted that the work done by Watson and Crick on the structure of DNA would be of any use (in fact, they were told not to do it), and any government that had tried to identify "areas that need to be developed" at the time would not have included this work. The country would have lost out as a result.

**The most effective mechanisms for the successful exploitation of STEM**

11. One of the most positive elements of science policy in recent years has been the drive to ensure that the UK gets the maximum benefits of exploiting its research. Initially, rather crude measures were used, such as the raw number of spin-out companies created from the science base. But we have come to realize that a more complex landscape of methods is necessary, including the licensing of new technologies and the more immediate outright sale of intellectual property.

12. But by far the most important element of knowledge transfer is the movement of trained people. A significant factor in the economic benefits generated by science is the skill set contained within the students and researchers who pass through the science base.

**The relative effectiveness of input funding versus Government procurement**

13. Some areas, such as blue-skies research, can only really be guaranteed support if there is a clear mechanism for the public sector to channel funds directly into them.

14. But in terms of creating innovation in the economy, Government procurement remains one of the greatest underused assets. A tiny fraction of Government's procurement budget would still dwarf the current science budget. In many other countries, notably the USA, large Government procurement contracts come with a requirement to ensure that some proportion of the money is subcontracted to small, innovative companies. This ensures both that the Government is drawing on a wide range of novel expertise in maximizing what it gets for its money, and that this extremely valuable sector of the economy is being stimulated.

15. Schemes such as the one that operates in the USA are financially neutral for the public purse, but represent a very significant proportion of the money being used to support science and innovation. Introducing something similar would probably generate the single biggest benefit in promoting innovation for the least cost and effort that any Government could expect.

**The methods and mechanisms of attracting and retaining students/ leading experts**

16. It may seem facile to point it out, but in a global market for talent, the UK has to pay the going rate if it wishes to attract and retain the best people. At present, scientists in the public sector are underpaid, but the costs of rectifying that would not be an outrageous burden on the public purse.

17. Two years ago, CaSE brought together a group of experts from the universities, the private sector, charities and government. Dealing only with STEM subjects, they estimated that the extra money needed to make university salaries competitive would be less than 3% of the Government's overall expenditure on research and development.
The report is available at:
http://www.sciencecampaign.org.uk/documents/2004/SBS0407.pdf

18. Personal remuneration is not the only thing that matters. Researchers and academics also need to know that they will have access to the best facilities, will be given the freedom to pursue exciting lines of inquiry without having to justify them against a bureaucratic strategy, will not be bogged down in unnecessary paperwork masquerading as accountability, and will be able to teach enthusiastic students who want to learn. At present, it is hard for public sector employers realistically to promise these things.

19. In terms of attracting the best students, we have to offer the best quality courses at reasonable prices. The continued financial pressures on the university system are making this difficult.

**The role of the public sector research establishments**

20. One of the areas of the scientific economy that has largely been lost in the past thirty years have been the laboratories that bridged the gap between the curiosity-driven research that typifies the output of the public sector and the practical application needed to feed the economy. Some of these were the big R&D laboratories of the corporate sector, while others were publicly-owned.

21. The public sector institutions have been privatised or merged with the universities. The private sector has outsourced much of its research to small companies and universities; it concentrates on product development in-house and no longer feels able to afford speculative applied research.

22. No doubt there are many ways of filling the gap between blue-sky research and product development, but this should be a major role for the PSREs.

**The remit, organisation and management of the Research Councils**

23. As we set out briefly under the heading of applied and blue-skies research, the Research Councils have suffered from what is now called 'mission creep,' but there has been no explicit recognition of the changes. In the past, they were simply expected to find, and fund, the best science. Now they are expected to second guess the scientific community by producing 'strategic themes' or 'priority areas,' and to take so many other things into consideration, that they are unrecognizable from the Research Councils of the past.

24. CaSE does not doubt that some of these changes have been made with the best of motives. Some of them have happened to ameliorate the effects of the obvious deficiencies of other parts of Government. But if the Research Councils are to continue having this changed role, and indeed to be subject to more such changes in the future, this should be explicit, and should be recognized in their structures.

25. Although we see the argument for having a single Research Council, to avoid the possibility of interdisciplinary work falling into the gaps between them, we do not believe the costs of reorganization could really be justified, since the new body would immediately have to set up subject-based sub-groups and panels to deal with its workload, and these would have the same inherent difficulties as are present in the current structure.

26. However, we do believe there remains significant scope for diverting more money towards front-line science, by cutting out the duplication of administrative and support functions (such as personnel) and by closer working together on schemes such as those aimed at promoting knowledge transfer. The recent report of the House of Commons Science & Technology Committee highlighted that even within individual Research Councils, there was a bewildering array of initiatives. Multiplied across the Councils, this is creating an unnecessary

bureaucracy that could be streamlined, both in the interests of effectiveness and in the interests of financial efficiency.

**The impact of EU and international research and collaboration in STEM**

27. The importance of international links cannot be stressed enough. However good we are at research in the UK, we only perform about 5% of the world's science. To compete in the fiercely competitive global economy, we need to have access to the other 95%.

28. On the whole, the EU has not proved the most positive of players. Its determination to push ahead with the European Institute of Technology, despite strong arguments that the vast sums of money could be better used, is just one example of a decision that is unlikely to deliver scientific value for money for taxpayers. There has also been sustained criticism of the Framework frunding programmes, summarised in various reports of which the Task-Force will be aware.

29. Several international reviews of UK research have taken place, giving us a snapshot of the views that the rest of the world holds about British science. They show that while we have many strengths, we also have significant weaknesses that make international collaboration more difficult to achieve than it might otherwise be.

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