



Engineering and Physical Sciences
Research Council

2008 International Review of Materials Action Plan Consultation Template

Please complete and return this form to materialsintreview@epsrc.ac.uk by
31 October 2008.

Please clearly identify the specific action(s) to which your comments refer.

| Submitted by | Submitted on behalf of (organisation) | E-mail address |
|------------------|-----------------------------------------------------------------------------------|-----------------|
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1. Specific comments on particular action points including justification

A1: The RSC welcomes this recommendation asking for ring-fenced funding for synthesis and new materials development, but is disappointed that the EPSRC does not address the recommendation in this action point. The £866M referred to is for responsive mode across the entire EPSRC remit for 2008/2011 including Platform and Programme grants.

Also, it has been made clear by EPSRC contacts that responsive mode funding is likely only to go to projects aligned with EPSRC's priority areas, which appears to contradict the express view of the Chief Executive and the Director (Research base). This highlights the communication problems between the EPSRC and the Community.

The RSC feels that if the view expressed by EPSRC contacts is true, it would be extremely detrimental to the discipline. It is accepted that there is market pull, which leads to research push, but equally research push can lead to market pull. If ever-increasing sums are devoted to the priority areas through managed and responsive mode mechanisms, then truly innovative work outside of these areas is in grave danger of not being funded, compromising the science base.

The RSC believes that EPSRC's policies need to ensure that UK science and engineering is truly competitive internationally and would draw attention, by comparison, to a 59% increase in the funding of responsive mode, basic research in China between 2004 and 2007.

Insofar as examining the health of the discipline is concerned, RSC would welcome the opportunity to cooperate in the monitoring process in partnership with other professional bodies such as IoP and IOM3.

A2: The RSC is concerned that there is contradiction between A1 and A2. A healthy UK science and engineering base must be driven by a portfolio of activity that is led by strong, responsive mode. This does not preclude some focusing of activity, but EPSRC must be aware that entire research communities cannot all refocus to priority areas proposed by EPSRC, nor is it desirable that they do. The reality is that EPSRC priorities change, which means that the community is best placed to respond to new challenges

with a broad base that is fit and healthy. In particular, the RSC is concerned that priority areas could have an unfortunate impact on the careers of young academics whose work does not fit well with priority areas, in terms of them finding it very difficult to secure an initial academic appointment and/or funding once in post.

The RSC is also concerned about metrics for better exploitation, and is not convinced that good exploitation (=industry focused) metrics necessarily equate to excellent science - it is the latter that the RSC believes that EPSRC should measure and against which it should be judged. Indeed, there is often a significant time lag between doing a piece of work and exploiting it commercially. Here RSC would draw attention to the work of Andy Goldberg, who recognised the difference between 'idea-preneurship' and entrepreneurship and set up Medical Futures to bring the two together.

In short, the RSC believes that those with expertise in Materials can, should and will contribute to the priority areas, but fears that too much emphasis in these areas would result in established networks of people being funded disproportionately.

A3: The RSC is very supportive of the online equipment database and of national service agreements in place in certain areas, for example microscopy. It is clear that both initiatives are successful and a valuable step forward. However, there are concerns that a number of other national facilities are being discontinued, such as computing.

It is important to recognise that not all national services are the same and that some, for example EPR in Manchester, do provide for a very specialist need in specialist experiments using a technique that is not widely found. This is contrasted with, for example, high-resolution, high-field NMR spectroscopy. The new Physical Sciences umbrella provides an opportunity to approach this issue anew.

The RSC is also concerned about the perceived mismatch in expectations and timescale for equipment funding supported by fEC income streams to HEIs. HEIs have many millions of pounds of equipment in various states of repair, much of which is in need of replacement. fEC has been in place for a relatively short period of time and HEIs are still learning how best to cost the facilities. This short timescale also means that Universities will need time to accumulate 'an fEC war chest' of funds to address replacement of more routine equipment.

However, it is not clear that the resource generated by fEC contains an appropriate inflation-proofing and an allowance for the advances in instrumentation that consequently increase costs, immediately identifying a funding gap. The RSC notes that A3 includes a review of guidance to applicants and await the publication of the results, hoping that the points above will be factored in to considerations.

In further addressing the question of fEC, we would note the very negative effect that fEC has had on the support of UK academia by UK (or any other) industry. The cost of one PDRA in the UK is now equivalent to the cost of two in the USA (e.g. MIT), three in the EU or ten in China. So unless the case is compelling to work with a specific group or academic in the UK, industry will go where it can get best value for money.

A4: The RSC concurs with EPSRC's response.

A5: The RSC agrees that IPR guidelines are clear and well understood.

A6: The RSC does not believe that new companies can be created in response to grant applications (as suggested in the recommendation), nor can they be formed specifically following a successful grant report. Nonetheless, spin-out and exploitation are being addressed and this is properly the domain of the TSB. However, it is felt that a problem for spin-out companies arises when they begin to attract venture capital, as those

investing appear always to seek return in a 2-3 year time frame. It would be of great value if TSB could not only assist in forming the spin-out in the first place, but could also further bridge the gap between creation of spin-out and the entry of venture capital. This would allow inventions/products to be better developed and give them a greater chance to generate short-term returns on venture capital invested.

Insofar as industry involvement is concerned, two things are noted. First, anecdotally there is widespread feeling in the community that referees based in industry do not always contribute at the highest level in reviewing grant applications. There are many 'medium' levels of confidence expressed and it is clear that in many cases, these referees are not as familiar with the research areas as one would hope. The RSC understands the wish of EPSRC to involve end users in the process and supports that principle, but many would question its real value in many instances. Secondly, it is felt that in the area of proposals that come under the Materials umbrella, the community understands well the need for industry involvement and it is our experience that the vast majority of proposals are submitted with explicit industrial support.

A7: The RSC feels that the recommendation is perhaps unrealistic. Disruptive technologies are often those not most easily identified by roadmapping and other such activities, and are also not those most easily promoted by top-down initiatives. What is necessary here are mechanisms that will enable rapid development and subsequent exploitation of potentially disruptive technologies when they arise, which requires a good dynamic between EPSRC, its researchers and TSB and pro-active and well-informed KTNs that can move to provide support. As such, the RSC feels EPSRC has done its best to answer the recommendation.

A8: This is quite properly the domain of the TSB.

A9: Refer to the response to A3.

A10: The RSC refers the EPSRC to the response to A3, but in addition note the necessity for facilities such as the Harwell Research Complex, currently under construction. These facilities will enable scientists to undertake research activities in close proximity to central facilities in a large central laboratory. This new initiative will enable research groups that rely on the large scale facilities to undertake long term substantive research programmes in close cooperation with STFC staff in a unique environment in the UK. However, the RSC also believes the ability to fund specific, large kit in localised laboratories for specialist use should be retained where it is needed.

A11: The RSC believes that the training of new materials scientists and engineers is critical; it dominates our short to mid-term strengths and affects our long-term leadership and direction. The RSC also agrees that this particular action point is beyond the remit of EPSRC and feels that other learned societies, such as the IOM3 and RAEng should lead in the implementation of this recommendation. RSC will willingly provide support if requested.

A12: The RSC believes this is primarily related to those who have taken EngD and offers no comment.

A13: The RSC could not agree more with the recommendation and believe that the UK is being starved of some first-rate talent. However, overseas fees are so embedded in HEI finances, that it is not clear what the short-term effect would be if overseas fees were reduced. However, in this regard the RSC notes with dismay the cessation of the UK scheme that part supported overseas students, the Overseas Research Student Awards Scheme (ORSAS).

A14: The RSC believes that current measures, as articulated in response to A4, are adequate.

A15: The RSC is strongly committed to working closely with the EPSRC to implement this recommendation alongside other professional bodies. The RSC has established expertise in this area and feels it has a significant amount to contribute.

A16: The RSC supports the idea of a two-way transfer of results and people and hopes that the new KTA mechanism will provide a flexible and effective framework in which this can occur, although it is noted that these new accounts are very likely to be localised in relatively few Universities. For the time being however, the highly successful nature of KTPs is noted and the RSC believes that they are an extremely effective vehicle as a key part of a strategy to address the recommendation.

A17: The RSC notes that while EPSRC refers to A1 in its response, it also flags programme and platform grants. Whilst in some cases the RSC believes these are valuable vehicles, EPSRC's intention to deliver a significant proportion of its grant monies through these approaches is already distorting the system and, arguably, compromising EPSRC's commitment to excellence. More than that, it inevitably concentrates large resources in the hands of a few, well-established individuals/groups. The RSC feels that investing large amounts of money into established groups can lead to long-term complacency and discourages others from working in that area. The RSC does not believe that this is in the best interests of EPSRC's funded portfolio of work.

A18: The RSC concurs with the EPSRC's response and would like to emphasise that it is keen to work closely with the EPSRC to help implement this recommendation.

A19: As stated in the action point, the RSC has produced a report entitled 'Chemical Science Small Businesses - Realising the Potential' and has considerable expertise and contacts in this area. The RSC is committed to progress in this area and welcomes the opportunity to work with the EPSRC in the implementation of this recommendation.

A20: The RSC is concerned in general about undue reliance on metrics of any sort and agree that suitable metrics do not exist to evaluate innovation, especially given the timescales involved on which to measure economic impact - easy at the level of trained people into industry, but not easy to link the output of a piece of EPSRC work to the breakthrough made 20 years later.

A21: The RSC questions how effectively this can be done in the light of the response to A20.

A22: RAE (and soon REF) does this to a good degree, but again the RSC does not feel able to support undue reliance on metrics. However, the RSC notes the thrust of this recommendation, which is articulated consistently throughout by the International Review Panel, which questions the perceived need for large groupings in order to undertake world-class research.

A23: The RSC believes that the recommendation articulates a feeling that advances required by industry often require more incremental developments of the kind that EPSRC would not normally support. More than that, much high-quality work does not find short or even medium-term industrial uptake.

The RSC further welcomes EPSRC's statement that its commitment to funding the best research is "without compromise", but does feel that this may well contradict the increasing emphasis on its stated priorities.

2. How could the action point(s) be developed to address the specific recommendation(s)?

The RSC believes that many action points are in the hands of EPSRC, but urge that the community and the relevant learned societies are involved more in discussions about priorities and funding emphasis. The RSC looks forward to working with the EPSRC to implement many of the recommendations outlined in the action plan.

It is noted, however, that the work previously funded under the Materials Programme within EPSRC is now much more widely dispersed in its new structures and that Materials also falls across several existing KTNs. The RSC believes that this presents a significant challenge in delivering and monitoring an effective Science and Engineering base in Materials and trusts that a proper, horizontal view can be taken to integrate Materials activity across the breadth of the EPSRC remit and into its borders with other Research Councils.

The RSC also believes that a major thrust of the Panel's recommendations concern protection of curiosity-driven research from individuals in areas that do not align with EPSRC priorities. Only a major commitment here can work to preserve and advance the excellence of the country's research base for long-term benefit.

Finally, the RSC also understands the pressure on EPSRC to minimise its operating costs and the pressure that so many grant applications from individuals places on them. This is an inevitable consequence of the increasingly commercial attitude required of HEIs and the pressure on all academics to secure funding bearing overheads. In addressing the symptoms, the RSC is concerned about the effects on the community, patterns of funding and maintenance of the UK's enviable academic traditions. Somehow, a debate needs to be initiated which begins to address the cause of these issues.

3. Who are the appropriate owner(s) for the actions referred to above?

The RSC believes that EPSRC have identified appropriate 'owners' in each case, but would urge them increasingly to work with learned societies and the community itself both in addressing this review and in the shaping of future policy.