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From the Physical Secretary and Vice-President Professor JE Enderby CBE FRS

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Response to the consultation on potential projects for the third round of Foresight

I am pleased to provide a final response to the current consultation on potential projects for Foresight. On 1 October the Royal Society gave Dr Craig, the Director of Foresight, views it had gathered on the 12 proposed projects. We also offered advice on these and other potential projects to Foresight staff at a meeting at the Society on 4 October. In this letter I will focus on some of the points made, with some additions.

It is not clear to me what role industry had in the choice and formulation of projects in this round. The Foresight Directorate has discussed potential projects with government departments and universities, but without considerable industrial involvement there is unlikely to be much more effective networking or significant extra or redirected investment by industry. Foresight projects should have a work plan that includes the likely sources of industrial funding, or contributions to funding, should industry wish to progress aspects of the work in a transparent manner. This can help focus thinking even if industry does not implement later work. Foresight projects will often provide useful background information for those determining public funding priorities, but the results should not determine public funding of research.

It will be very important to clarify whether the aim of any project is to identify opportunities for new science, and/or opportunities for capitalising on established science. This will help in the choice of projects, as well as the way in which they are conducted.

Potential projects must be judged against a number of criteria. Most importantly, projects should be multidisciplinary, with an appropriately broad spectrum of participants, to achieve progress that would not have been achieved otherwise and to minimise the chance of monopolising by particular interests. However, they must not be so broad that nothing definite



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can be achieved. The potential projects, exemplified by those below, have been considered in the light of these principles.

Following our discussions with Foresight staff October, I will comment further on just five of the 12 original projects. *Energy for the Future* would require a broad remit to examine current and potential energy gaps, sources and delivery systems. Analysis of energy gaps would need to truly address sustainability and energy footprints. Energy sources should include proper evaluation of fusion (the case for it requires critical examination), safer fission and oceanographic sources such as tidal power.

There is a sense in which no disease is untreatable, so the title of *Untreatable Infectious Diseases* should, at the very least, be changed to *Infectious Diseases*. The remit should be wide, including diseases in developing countries and co-evolution genetics (biological control); an initial focus on detection, as discussed at our meetings, could well be appropriate. I am aware that members of the Foresight team will shortly be meeting with our Science Policy staff to discuss this project in the context of our studies on biological weapons. I hope this will provide useful additional information.

It is not clear that some of the other suggested topics meet the criteria. *Creative Leisure* is, unusually among the topics for this round, industry based; but it is not obvious that it would usefully harness science. *Knowledge Exploitation* would require significant care to achieve more than a debate. *Land Use* is an example of a project that is probably too broad.

During the consultation, after our two meetings with Foresight staff, two new topics were added to the web site: *New Wave Technology* and *Personal Security*. *New Wave Technology* is an example of a project that could, without great care, be too broad to be fruitful. There is scope for focusing on particular points of the spectrum, but it would be very difficult to plan and execute a project that was balanced, adequately focused and brought together interests that would not otherwise have interacted or could not readily do so.

We have already made suggestions for additional projects; I will focus on just three:

the probable slowing of the increase in computing power (*The End of Moore's Law*) is a great opportunity and although it relates to a specific sector it has wide implications and is vital. (Some background is in "Innovations in microprocessing", Royal Society Policy Document 11/02, April 2002, www.royalsoc.ac.uk/policy .) To progress rapidly in this area it will probably be necessary to use thinking from different fields;

Intelligent, Sensitive Sensors could have wide applicability. Areas include combating chemical and biological terrorism (especially at ports of entry), pollutants (e.g. endocrine disruptors) and health monitoring (including for infectious diseases – extending the scope of that potential project). Multiple sensors with wireless linkage could be beneficial; and

Movement of people could involve modelling that used demographics and human behaviour to provide insight for work in travel and transport, land use and the spread of infectious diseases.

Finally, I must emphasise that Foresight projects should stimulate and inform thinking but they should not be used as a basis for making decisions on the funding of publicly financed research. The published reports, though valuable, may not reflect the forefront of science in that area, nor the best direction to take. They cannot determine the merits of funding that field relative to other fields that have not been studied in the same way.

Yours sincerely

John Sinden