HOUSE OF LORDS

SCIENCE AND TECHNOLOGY SELECT COMMITTEE

Nuclear follow-up

Oral and written evidence

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Professor David MacKay, Chief Scientific Adviser, Department of Energy and Climate Change (DECC) – Oral evidence (QQ 1-16)

Evidence Session No. 1. *Heard in Public.* *Questions 1 - 16*

TUESDAY 23 JULY 2013

Members present

Earl of Selborne (Acting Chairman)
Lord Dixon-Smith
Baroness Hilton of Eggardon
Lord Jenkin of Roding (Co-opted)
Lord O'Neill of Clackmannan
Lord Oxburgh (Co-opted)
Lord Patel
Lord Peston
Lord Rees of Ludlow
Baroness Sharp of Guildford
Lord Wade of Chorlton
Lord Willis of Knaresborough

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Examination of Witnesses

Professor David MacKay, Chief Scientific Adviser, Department of Energy and Climate Change (DECC)

Q1 The Chairman: Welcome, Professor MacKay. Thank you for rejoining us. We remember with appreciation the evidence you gave to us in the earlier meetings of the Committee. This, as you know, is a one-off session to review progress since we reported and the Government responded. We are obviously very sorry that the Minister was unable to accompany you today. We will write to the Minister to express our disappointment, and I suspect that we will ask him to join us at a future date, because there will inevitably be some questions that you will feel are not quite within your remit. There are certain issues which I know you can help us with a lot, and we look forward to you helping us. Perhaps for the record, I should announce first of all that we are being broadcast, so when making observations we need to bear that in mind. Perhaps you could introduce yourself for the record.

Professor David MacKay: I am David MacKay. I am Chief Scientific Adviser to the Department of Energy and Climate Change. I am also the Regis Professor of Engineering at the University of Cambridge.

The Chairman: Thank you. Do you want to start by making a statement, or shall we go straight into the questions?

Professor David MacKay: I am quite happy to go straight into the questions. Thank you.

The Chairman: Perhaps I can start by noting that our report recommended that DECC be designated as the lead department in developing a nuclear policy and the research and development road map. Indeed, the Government agreed that DECC should take lead responsibility of the strategy, in collaboration with BIS, which after all has responsibility for the research councils. That seemed to be acceptable to all. The strategy needed to be developed in collaboration with the Government Office for Science and other departments. Could you tell us how indeed this interface between the departments has been managed?

Professor David MacKay: Our approach to the co-ordination between the various public bodies is based on the precedent of the other low-carbon innovation areas, where there are already many bodies in the landscape, such as the Energy Technologies Institute, the TSB, the research councils, DECC, BIS and several others I could name. Rather than creating a completely independent structure, we are now going for the approach of building on the partnership between those bodies, which is called the Low-Carbon Innovation Co-Ordination Group. Within that group we are making a nuclear sub-group. That group is being chaired by DECC and GO Science jointly, and it will engage especially with the TSB, the ETI and the research councils, all of which have activities in the nuclear R&D sector.

The Chairman: Clearly, having a Minister who is in both DECC and BIS helps the exercise.

Professor David MacKay: Yes indeed.

The Chairman: Is this replicated at official level? To what extent do officials work together at the next tier?

Professor David MacKay: We had very good working relationships, especially between DECC, BIS and GO Science during the programme board's work to support the Beddington review, and I am very confident that that good working relationship will continue under this new programme board relationship in the Low-Carbon Innovation Co-Ordination Group.

The Chairman: Could you clarify to whom the National Nuclear Laboratory is reporting in government?

Professor David MacKay: To DECC.

The Chairman: And that will remain so?

Professor David MacKay: I believe so, yes.

The Chairman: If I were to ask you who the champion is in government for matters nuclear, presumably that is the Minister, is it?

Professor David MacKay: I think that is right, yes.

Q2 Lord Wade of Chorlton: You talk about this nuclear group. What exactly does it do? Who will lead it? How does it know when it is successful? What is it going to achieve?

Professor David MacKay: The initial remit of this programme board is to set up the other two bodies which the Government announced they would create in response to the Beddington review: namely, the NIRAB and the NIRO—the Nuclear Innovation Research Advisory Board and the Nuclear Innovation Research Office. Once those two bodies are set

up, the official-level group will have the job of being the interface between all the public bodies that actually spend R&D money on nuclear, and those two bodies: the board and the secretariat in NIRO.

Lord Wade of Chorlton: If somebody says to it, "Within so many days, we want to see a nuclear power station on that site, that site and that site, and we want to see so much percentage", that is not just anybody's responsibility?

Professor David MacKay: The responsibility for the immediate building of the next generation of nuclear power stations lies within DECC in the Office for Nuclear Development. The remit of the three bodies that I just mentioned—NIRAB, NIRO and the LCICG sub-group for nuclear—is definitely to oversee the maintenance of capability and research and development for nuclear, to make the case and to deliver the money to support that R&D.

Lord Jenkin of Roding: We are all hanging fire waiting for the agreement between the Government and EDF on the strike price and contract terms for Hinkley Point. Are you aware that the Treasury is now leading this, and that Lord Deighton is actually conducting the negotiations directly with the company, supported by your Permanent Secretary?

Professor David MacKay: I am afraid I have no knowledge of that.

Lord Jenkin of Roding: It is a rather important development. I have had a long meeting with Lord Deighton, he said on confidential terms, and I find that reasonably encouraging.

Professor David MacKay: My understanding is that the negotiations that have been led by DECC officials are going extremely well, and that there is a very positive relationship with EDF.

Lord Jenkin of Roding: Then I am bringing you up to date. It is in fact being led by the Treasury and by the Minister for Commercial Affairs.

Professor David MacKay: I do not have anything to add to that.

Q3 Lord Willis of Knaresborough: May I just take us back to what this initial inquiry was about? It was really about research into nuclear power and nuclear waste. I am very keen that we do not lose sight of that, Professor MacKay. I do not think that this group has anything to do with the commercial sensitivities of a new power station, but I do believe that it will continue to fight for a resource for research in this field. Can you say definitely that that is high up on the agenda?

Professor David MacKay: Yes. That is absolutely going to be the remit of the three bodies that we are creating: NIRAB, NIRO and the official-level working group.

Lord Oxburgh: Who actually spends in this new structure? I take it that it is NIRO that has the budget for research. Is that right?

Professor David MacKay: I do not think that that is right.

Lord Oxburgh: Could you explain how the money flows, because then we might get a better understanding? I have to say that our impression is of extreme complexity when we were looking for something rather simple.

Professor David MacKay: I anticipate that the main bodies that fund nuclear R&D will continue to do so. Those are the research councils, the Technology Strategy Board, DECC and BIS. They are the major bodies that have been giving significant funding, especially in the last year. I believe that the structure we are setting up will continue to have that nature and

those bodies will be the bodies that lead the funding. NIRO itself will need a budget for its staff, and perhaps it will do a small amount of R&D itself, but that is still to be resolved. We are imagining that part of the resource for NIRO itself will come from academia and from industry. Again, that is a detail that we are currently working on.

Lord Oxburgh: You mentioned four bodies that are putting money in at present. Will they each determine what they want to spend it on?

Professor David MacKay: This is what the Low-Carbon Innovation Co-Ordination Group is for. Each of these many public bodies has its own mission and its own definition of how it should spend its money.

Lord Oxburgh: Precisely.

Professor David MacKay: Obviously it is in the national interest that they should co-ordinate what they are doing with each other. We use many analogies to describe what we are doing. We think of it as a relay race where we are partners together. At different stages in technology development, we think of it as a jigsaw puzzle and we make sure that the pieces fit together well and that we do not leave gaps. NIRAB will be the senior-level group that oversees and comments on the work of those public bodies.

Lord Oxburgh: It can comment on them but it has no control over them?

Professor David MacKay: That is correct.

Lord Oxburgh: So we do not necessarily have a coherent programme?

Professor David MacKay: It will be the task of the co-ordination group itself to ensure that we have coherence. The working relationship between those bodies has been extremely good in the last year. I would quite like to let you know what we put together on additional funding while we were doing the Beddington review. Would you be interested to hear the good news story?

Q4 Lord O'Neill of Clackmannan: I have a question following on from Lord Wade's questions. I am a wee bit concerned that although you are still defining functions in appointing people, I am not clear about them. We have heard a figure of 18 gigawatts of nuclear generation by 2025. Is any timetable being set for research for the fourth generation of reactor? If there is, who is going to be responsible for making sure that that is not necessarily achieved but approached in a constructive manner? Is this being actively considered, and if so by whom?

Professor David MacKay: I think the planning of generation IV research and research into other next generation options is exactly the remit of NIRAB, NIRO and the official support group.

Lord O'Neill of Clackmannan: Which one will have the responsibility? If there are three people, they will all say that it is the other one or the other two. I think we need to be a wee bit more specific in this area about what the target is and who will be to blame if we do not get there—let us put it bluntly like that.

Lord Dixon-Smith: Let us put it bluntly like this. This has been my impression: there are four bodies; who is the referee?

Professor David MacKay: Perhaps NIRAB is going to play the role of referee: the external expert critic group that can really say whether they are doing a good job. You can certainly imagine other ways of organising a nation's research and development in low-carbon

technologies. As I said earlier, we already have many bodies in the landscape looking after low-carbon innovation and research and development. I think we do quite a good job now. We have worked really hard over the last three years on the Low-Carbon Innovation Co-Ordination Group. You could ask just the same question about, say, offshore wind costs: who is responsible for ensuring that they come down? The answer would be no one body: it is a partnership between the Energy Technologies Institute, DECC, the Carbon Trust—

Lord O'Neill of Clackmannan: With respect, there is a wee bit of difference between nuclear reactors and windmills. We are talking about orders of financial magnitude that require a greater degree of clarity than you are offering us at the present moment.

Professor David MacKay: I certainly agree that you could imagine other models. The current model is as I described: to not reform the Technology Strategy Board, the Energy Technologies Institute, DECC and BIS.

Q5 Lord Jenkin of Roding: My question follows on very well from the last exchanges that you have been having, Professor. Are you aware that neither NIRO nor NIRAB exist?

Professor David MacKay: I am certainly aware of that. One of our tasks in this area is to get them to exist. Our target date for NIRAB to exist was by the end of 2013, and that is still the target that we are aiming for. NIRO, I believe, will exist before that.

Lord Jenkin of Roding: Are you aware that there was supposed to be finance for these bodies, that the NNL has now decided to take to its board next week the proposal that it should use its existing funds to set up NIRO, and that it hopes to have got that under way in August and will be advertising for staff?

Professor David MacKay: Yes, we are delighted with the proactive attitude that the NNL is showing. Of course, the oversight of NIRO will be for the government departments as well, and we are in discussion to make sure that we have a good outcome.

Lord Jenkin of Roding: And do you know who is responsible? At the moment, the question of NIRAB is being held up by your department because, to put it crudely, it is afraid that if it goes ahead it will fall foul of the Government's rules for the Public Appointments Committee and it is anxious to avoid that.

Professor David MacKay: We are working on delivering the objective by the end of 2013.

Lord Jenkin of Roding: But who is responsible? You made the point just now that Dr Howarth and his board are now taking the initiative on NIRO without apparently any extra money from DECC to do it.

Professor David MacKay: That is right, and we are delighted at how proactive the NNL is being in their partnership with DECC.

Lord Jenkin of Roding: For goodness' sake, surely DECC should be absolutely in the forefront of taking this forward. I have been left with the very clear impression, which you have confirmed, that the NNL is simply taking this into its own hands because it knows that it has to get ahead with it. If it does not, nothing will happen.

Professor David MacKay: We have regular meetings with the NNL. We meet it monthly to discuss this work programme.

Lord Jenkin of Roding: At what level?

Professor David MacKay: At official level.

Lord Jenkin of Roding: At official level, yes, but it is a pity, Chairman, that we do not have the Minister here, because one wonders whether the Minister is available or aware?

The Chairman: This might be a question that we wish to put to the Minister on another occasion. Lord Rees?

Lord Rees of Ludlow: My question has been asked already.

The Chairman: Sorry. Lord Jenkin again.

Lord Jenkin of Roding: Right at the heart of the report that we produced was that there needs to be very clear, firm leadership for a substantially enhanced research and development programme. How far has that got?

Professor David MacKay: I would like to describe what we have already done in the last financial year, which I hope is a positive story about the direction of travel. In the last financial year, the research councils' investment increased to £16 million compared to a level of only £1 million for fission research in 2005. In addition to this, at the time of our announcing the nuclear industrial strategy, we committed to funding of £15 million from BIS and DECC for the national nuclear user facility. We also committed £12.5 million towards the construction of the international Jules Horovitz research reactor, which is being built in France. That was money from DECC's innovation portfolio. There was £18 million of funding across 36 nuclear R&D projects from a Technology Strategy Board competition, and that funding is anticipated to leverage a further £13 million of private sector investment. Finally, £38 million of funding went to the Nuclear Advanced Manufacturing Research Centre to support the manufacturing industry. That was from the regional growth fund. We were very conscious that we needed to show the direction of travel that we are aspiring to. Your question is: where is the money for the future? As you know, money is tight, so we cannot answer your question about whether we have put in place an ongoing funding stream of £20 million to £50 million per year. The answer is that we are not there yet, because funding is tight. In the latest spending review, DECC put the business case to the Treasury for long-term additional funding for nuclear. It looks unlikely that DECC's budget will be able to support what we have in that business case. Nevertheless, the total of what I just described to you in the last financial year is significantly more than £20 million to £50 million.

Q6 Lord Jenkin of Roding: Let me give you a specific example. We all went up to Sellafield and saw the phase 3 hot laboratory site. It was still on a care and maintenance basis, and that could not continue. Therefore, the Committee recommended very firmly that the money should be found in order to commission that hot laboratory, because without it a lot of the work that is done at Sellafield and elsewhere could not be done. Are you aware that the NNL is now, with the blessing of the shareholder executive, beginning to bring this up to being commissioned on the basis that the money will eventually come?

Professor David MacKay: Absolutely.

Lord Jenkin of Roding: It is simply saying, "Look, unless we do this, we are simply going to lose out". The NNL is taking the lead on this.

Professor David MacKay: I am aware of this, and I often discuss the phase 3 asset with the NNL. We recognise the very strong business case for that asset to be used, but the actual decision to go ahead and commission it has a financial cost, and the NNL and DECC are discussing ways of ensuring that that cost is covered.

Lord Jenkin of Roding: But are you aware that, with the blessing of the shareholder executive, the NNL is spending the money and was told that it did not need to declare any dividends out of its commercial profits?

Professor David MacKay: I have had frequent discussion with the NNL about ways of getting this asset into the use that it was intended for.

Lord Jenkin of Roding: You leave the impression—and this has become more and more apparent to me since our report and since the Beddington advisory board report—that nothing is being done by DECC, which gave a list of spending. How little of that is actually relevant to the work of the National Nuclear Laboratory? The answer is really very little.

Professor David MacKay: The Jules Horovitz reactor, when it is working—it is expected to be commissioned in 2016—will create materials that very naturally will have as their first port of call the NNL. We have put the NNL in charge of our relationship with the Jules Horovitz reactor consortium. A significant chunk of the £15 million for the national nuclear user's facility went to the NNL. To be precise, we paid for a focused ion beam system for higher activity materials. That was installed at the NNL in March 2013. We paid for an x-ray microtomography unit, and that, I believe, was delivered in May 2013. So several of those assets are at the NNL or have a strong relationship to it.

Lord Willis of Knaresborough: I have just a follow-on question. I actually agree that there is a significant increase in resources, although, as Lord Jenkin commented, the specific laboratory at Sellafield is a real worry to us. I wonder whether, for the benefit of the Committee, you could send us a note that breaks down the figures you have given us, for instance over timescales. There are significant increases on what we have, and it would be useful to know what they are. Secondly, would it be possible to say what the response has been through BIS and the universities through HEFCE about any grants that have come forward in terms of dual funding for nuclear research? Do you have those figures as well?

Professor David MacKay: I would be happy to send a note as you requested.

Lord Willis of Knaresborough: Could you put that together so that we have a rounded picture of how much money is going into research?

Professor David MacKay: I do not have the exact answer to your second question, but the headline number for the latest year is that the research councils' funding increased to £16 million in that financial year.

Lord Peston: I have a question in the same area, but not specifically on this.

Q7 Lord Rees of Ludlow: I want to ask about the NNL and ask you to speak rather more broadly as someone who I know is well aware of international comparisons and the difference between our situation today and 20 years ago. Do you not agree that we are thinking on far too small a scale? We know that £2 billion a year is being spent on clean-up, and we fret about £15 million for R&D for research councils, et cetera. Do you not think that we need something that is more like a restored national laboratory in order to pull our weight in these areas?

Professor David MacKay: Yes, I agree with you. Alongside the nuclear industrial strategy that we published in March, the Government announced plans to restructure the operating model of the National Nuclear Laboratory and to restate its mission to give particular emphasis to a role in supporting UK national programmes. The NNL is already developing strategic partnerships and has an increased level of international engagement. It is working with the European Space Agency, with DECC support, to work on separating americium for

making thermal batteries for spacecraft. It is exploring the potential for the development of thorium fuel cycles with international partners, and as I said before it is managing the UK's involvement with the international Jules Horovitz research reactor.

Lord Rees of Ludlow: It is all fairly small-scale stuff, and it assumes that we will never be more than minor players in any area other than fuel cycle, waste, maintenance and safety.

Professor David MacKay: Yes. I would like to view what I have just described as first steps towards a growing and changing role for the NNL, and I certainly hope that the UK will play a strong role in international relationships.

Lord Rees of Ludlow: But would you agree that there needs to be a real step change in the level of support for something like the NNL?

Professor David MacKay: Yes, I agree. If we want to be comparable with the national nuclear laboratories of other countries, a step change is the right way to talk about it.

Q8 Lord Patel: I also have questions about international involvement. What are we doing? Have we joined the generation IV international forum? What progress has been made in influencing our role in EURATOM?

Professor David MacKay: On generation IV, formally we have not changed our level of involvement yet, but a lot of activities are happening, and that is even more important than whether we label our activities as active involvement in generation IV or not. I have a list here of international engagements that are happening now. I already mentioned the Jules Horovitz research reactor programme. That, I think, will very nicely underpin a growing relationship with the French, the CCA, on their generation IV work on sodium-cooled fast reactors and other generation IV reactors. There is continued engagement between the NDA and Hitachi on the potential for the PRISM reactor to provide a credible alternative for plutonium management, and the NDA is also engaging with Candu Energy on a similar proposal for a Candu 6 reactor as a plutonium disposal route. There is engagement with the US Government on their small modular reactor programme, and we think that the UK's expertise in advanced manufacturing is a particular strength that could be exploited. I mentioned the NNL's work with international partners on both thorium and americium earlier. Finally, we have work with India on non-proliferation aspects of the thorium fuel cycle. That is being funded via the UK research councils' energy programme.

Lord Patel: And EURATOM?

Professor David MacKay: Yes. Our engagement with EURATOM is being strengthened at the moment, so we are fully participating in its work and in several EU fora relating to nuclear R&D.

Lord Patel: In which of all these is there a real tangible involvement as opposed to meetings or communications?

Professor David MacKay: I think it is right to characterise many of those interactions as meetings and less as work. That is what you do first before things really get to involvement. These things take time.

Lord Patel: So we are at the beginning of a cycle?

Q9 Lord Rees of Ludlow: I want to go back to the question of whether our scale of activity is adequate, and to ask whether you think that unless we scale things up we will not get an adequate flow of really bright people wanting to go into this area. We were told by

the Minister two years ago that he needed people to provide a watching brief in these areas, and we responded by saying that that is not a very exciting career path if all you do is provide a watching brief on exciting developments elsewhere. I would therefore like to ask you, partly from your academic experience, whether you think we need to have this step change in order to ensure that we have really good people going into this field to manage safety, waste disposal and all those things, even if they do not themselves develop new types of reactor.

Professor David MacKay: Yes, I agree that an important part of attracting good people is for there to be a credible plan for the future, so I do hope that the funding of significantly more than £60 million that we put together in the last year is a sign of the aspiration for a long-term programme.

Q10 Lord Peston: I would like to turn to the economics of some of this, if I may. Perhaps I may preface my question by saying—I hardly believe it myself now—that 50-odd years ago I wrote the very first paper in the Treasury on choice of investment in generating stations, with specific reference to the nuclear question. Part of my remit was to persuade senior officials, given the length of life of these projects, that we had to take the long view, which meant doing it via a discounted cash flow or discounted present value basis. Obviously we had never heard of climate change, wind power or any of those things, and our criterion was simply least-cost electricity generation. That was my task, so I did it, as it were. As you know, the basis of the answer for nuclear was that it would provide the baseload and everything else would do the rest. Our criterion was least cost. Reading our paper, and reading other things from your department, my question is: does anyone in your department or in any other department at the present day have any interest in doing the same calculation of the least-cost electricity generating structure that would give us the basemark for everything else that we could relate it to? Is any work still being done of that sort?

Professor David MacKay: Yes, certainly. We look at the levelised costs of all the technologies that are likely to be in our future portfolio, so DECC has an evidence base on those levelised costs.

Lord Peston: So compared with my day, you would include other things as costs, such as those to do with climate change, or disbenefits if you like, which as I say we did not; we simply had the product of its outcome. Do you have a solution to the problem that I could never have: that the discounted present value of the waste, given that it appears so far in the future, is approximately zero?

Professor David MacKay: Your first question was about including other costs, such as the environmental costs and carbon costs. The standard way in which DECC does that is to have an understanding of what the approximate price for carbon emissions needs to be in 2050, consistent with the international ambitions for climate change action, so appropriate discounting can be priced in when comparing different electricity-generation technologies.

Your second question was about the way the discounting affects the cost of dealing with waste. Certainly if you compare the lifetime cost, without discounting, of, say, storing a chunk of waste for hundreds of years with the alleged discounted net present cost, there can be enormous differences of a factor of eight or so between the undiscounted cost and the discounted cost. Whether discounting is the right way to treat matters that span generations is a very important intellectual question. Climate change spans generations. Similarly, various forms of waste have extremely long-time horizons as well. So I do feel uncomfortable with the uniform application of a single discounting methodology in these areas.

Lord Peston: I understand that. You will be interested to know that I got all my analysis completely wrong, because I thought that the important variable was the discount rate. It turned out that the important variable was the price of oil and so on. It is amazing how easily you can get things wrong. Do you belong to the school of thought that a lot of the climate change theorists belong to—by "you" I mean the department—that you should not discount the future? There are plenty of climate change theorists on record as saying that the sort of things that we are talking about should not be discounted.

Professor David MacKay: Rather than speaking for DECC, I would prefer to say what I believe—

Lord Peston: Personally then.

Professor David MacKay: —which is that if you use a standard discounting rate of 3.5% or 3%, you end up perhaps with the indefensible consequence that you can put off dealing with things and throw them on to future generations because that is cheaper. That could then be repeated year after year, with everyone rashly saying, "Oh yes, I should just put this cost on to future generations because that is the cheapest thing to do." That does not make sense. I think there is a strong argument for not using that standard discounting model when thinking about alternative ways of dealing with long-lived waste.

Similarly, on climate change, using standard discounting means in essence that you do not care about the planet in 200 years' time. We should care about future generations, so I am not comfortable with using 3% discounting for climate change.

Lord Oxburgh: Can I go back to where that question started, which on costs? To what extent have you modelled the possibility of using nuclear generation flexibly, as indeed the French do, for load following, because in the scenarios that are coming up that looks as though it will be more important than we might have considered it to be a little time ago when it was simply a matter of regarding nuclear as baseload. Have you costed that, because clearly there are cost consequences?

Professor David MacKay: Yes. My engineering team is looking at the entire balancing issue. To a first approximation, using nuclear power stations for balancing services reduces their lifetime output of electricity and thus slightly increases the cost of nuclear, but it does provide a valuable service to the rest of the system. We are looking closely at the French model. We think that this is also a good motivation for continued R&D on small modular reactors, because those might lend themselves even more to load following and be easier to finance than the very large power stations that are currently on the drawing board.

Lord Oxburgh: Thank you.

Q11 Lord Jenkin of Roding: You mentioned a little while back the question of PRISM and the possibility of Candu reactors becoming relevant to this country, and you have just talked about small modular reactors. Who is actually doing the research that will enable anybody to make any decisions about this?

Professor David MacKay: DECC has been paying the NNL to do desk studies to inform government policy-making on these next generation options.

Lord Jenkin of Roding: At the moment, one gets the impression that next generation simply means the generation IV reactors in a narrow sense. The NNL is very keen, I am told, to do this wider research; it is all part of the research into the fuel cycle, which it regards as one of its areas of expertise, but it is not being given the finance for it.

Professor David MacKay: We have been paying money from DECC to the NNL so that it can do desk studies that are relevant to our understanding of these issues.

Lord Jenkin of Roding: But it has been described to me as a drop in the ocean compared with what is needed.

Professor David MacKay: I would like to view it as the first step of a step change.

Q12 Lord O'Neill of Clackmannan: I have a question about the resources. Is DECC trying to make sure that when EURENCO is sold, it could get some of that money for nuclear research purposes? You have said that in two instances there have been good business cases but insufficient resource. Surely if the EURENCO sale goes through, money of a nuclear character will be available? Is the department pursuing that?

Professor David MacKay: I am not sure that money has a nuclear character. It has many other complicated characters, but I am not aware of any hypothecation of the EURENCO proceeds for this particular agenda.

Lord O'Neill of Clackmannan: It would be helpful though.

Professor David MacKay: We think we have a strong business case for the investment, yes.

Lord O'Neill of Clackmannan: On the ONR, the legislation seems to be going through, so I think we can take it that that is almost a fait accompli, but when it becomes an independent statutory body in every respect, what ambitions do you and your colleagues have for the ONR perhaps playing a wider role internationally?

Professor David MacKay: The ambition is that first and foremost the ONR will continue to do the excellent job that it is doing of regulating the UK nuclear industry, but the Energy Bill contains a provision that will enable it, with its intended new independent statutory status, to use its expertise to provide services outside the scope of its principal UK remit at a commercial rate in the UK or internationally. I understand that this is something that Members of this Committee strongly support.

Lord O'Neill of Clackmannan: Given that under Michael Weightman tremendous respect was gained for the ONR, particularly in the post-Fukushima work which he undertook and the confidence that was expressed in the reports, how active is the department in helping to ensure that such work could be available? One hears about projects in the Middle East where, for example, the countries concerned do not have a regulatory tradition, shall we say, and it might be better to have an independent regulator rather than an in-house one who would be provided by one of the other countries that is building its nuclear fleet.

Professor David MacKay: I think DECC is pushing for this provision in the Energy Bill exactly because of the aspiration that the ONR can use its specialist knowledge to assist another country to assess the safety of its reactor fleet.

Lord O'Neill of Clackmannan: I am really getting at whether that is actually being done at the moment in anticipation of the legislation going through. Are people going around the Middle East, for example, offering the services of the ONR?

Professor David MacKay: I do not know the answer to that. That is certainly the aspiration and the way we should be going.

Lord O'Neill of Clackmannan: I have one last point about the ONR and its activities. Could you perhaps give us an update on what is happening with the Nuclear Safety Advisory Committee at the moment?

Professor David MacKay: I am afraid I do not have any information for you on that, but I can ask for help from my team and write to you.

Lord O'Neill of Clackmannan: Righto.

The Chairman: If you could follow these points up, we would be most grateful.

Q13 Lord Willis of Knaresborough: I am grateful to you, Professor MacKay, for giving me a solution for every time I have not done a job that my wife wanted doing. I can say, "Well, I have done the first steps—you know, thought about it".

On first steps, the radioactive waste management directive has now working since 2007, and six years later it needs to make some gigantic steps. In fact, it is making none at all, given Cumbria County Council's decision, and it seems to have come a halt. What is happening now? What is being done following that decision?

Professor David MacKay: The Government remain committed to their overall policy of geological disposal.

Lord Willis of Knaresborough: That is the first step.

Professor David MacKay: Yes. The commitment remains to geological disposal for the long-term safe and secure management of higher activity radioactive waste. Now, in response to the decisions in west Cumbria, we are reviewing the site-selection aspects of the MRWS programme. We had a call for evidence that ran until June this year, and we intend to launch a public consultation on a proposed revised site selection process later this year.

Lord Willis of Knaresborough: The radioactive waste management directorate is still going to be in charge of all that, is it?

Professor David MacKay: Yes, in partnership between DECC and the NDA.

Lord Willis of Knaresborough: There was a concern that its director, Neil Smart, has already left to join Sellafield. Does that mean that there is a bit of a crisis in retaining good staff because there is no future?

Professor David MacKay: I am not aware of any crisis. I have had a meeting with some members of the team and I have confidence in their ability.

Lord Willis of Knaresborough: When we went to Sellafield, the thing that struck me most, other than the imminent closure of the MOX plant, were the lagoons with this rotting waste—there seemed an urgent necessity to do something about that. I feel—but perhaps you will give me confidence—that this is not being treated with the urgency that is needed to find a resolution. We seem to be going round and round the same houses. How near are we to getting a solution where we bury and deal safely with some of this waste?

Professor David MacKay: Dealing with the waste is a very high and serious priority for the senior leadership in DECC. We engage very strongly with the NDA, which is tasked with delivering the job. There have been several programmes in the last couple of years in which the NDA has looked at ways to accelerate its work programme. That work has identified

ways of significantly speeding up the retrieval of waste from the facilities that have the highest hazards and of reducing the lifetime cost of dealing with the waste.

Lord Willis of Knaresborough: But there is no timescale at all.

Professor David MacKay: All this work has very detailed timescales, which the NDA manages.

Lord Willis of Knaresborough: As a result of this one-off—and for when we meet the Minister—it would be useful to have those timescales, so that we have an idea of them. Finally, what is happening to the plutonium waste? If it is going to be used in a new type of MOX plant, which I gather is one of the possibilities, how much research is going into that and who is doing it? What other ideas are there for the use of the stocks of plutonium, of which we have significant amounts?

Professor David MacKay: The lead option for dealing with the plutonium is to make a MOX plant, to put the fuel into a light water reactor, thus getting some energy from it, and then dispose of the spent fuel. The other options that seem the most credible to me—I mentioned them earlier—are the PRISM reactor and the CANDU proposal. The NDA is actively engaging with the proponents and the providers of those alternative technologies. In terms of the research work to underpin a MOX reactor, my feeling would be that there is probably not a significant amount of research needed on the MOX route, since it is a proven technology that is working okay in France, so it would be a question of replicating the best practice from there.

Lord Willis of Knaresborough: Do you feel that significant resources are going into this area of research in order to have those answers?

Professor David MacKay: As I said, I do not think that there is a particular research need; it is a proven technology used in France, so we believe that the MOX route is deliverable without a significant need for R&D.

Lord Willis of Knaresborough: Even though our MOX plant failed.

Professor David MacKay: Our MOX plant failed, which was I think because of an ambitious and extremely innovative design approach, but it was an example of innovation that did not succeed, sadly.

Q14 Lord Jenkin of Roding: May I come back to this question of dealing with the radioactive waste safely or MRWS? The Office for Nuclear Development announced last week a system of compensating communities that host nuclear reactors; it mentioned a figure of £1,000 per megawatt over 40 years from when the nuclear power stations begin operating. Some people have interpreted that as saying, "What about a nuclear repository?" One of the mistakes that was made the last time—it led Cumbria to make the decision that it did—was that no one knew what the benefits would be. Indeed, on a previous occasion when I was discussing this with the Minister and I said what I thought the benefits ought to be, he said, "That's a very good idea, but don't ever say anything publicly about it." Clearly, the whole thing fell apart and Cumbria decided that it did not want to go on to the next stage of the process, so the Government have had to start again. Are you aware of any work now being done to take this forward on the footing of being able to fulfil the Government's requirement in their nuclear planning policy document that they have to be satisfied that there will be a satisfactory way of dealing with nuclear waste?

Professor David MacKay: As I said, there is going to be a public consultation this year on what to do next in the waste management process. I cannot tell you what will be in that

consultation, but I would be very surprised if it does not contain a significant element on community benefits.

Lord Dixon-Smith: I am not sure whether Professor MacKay is the man to answer this, but to me—I am a local government man—this is a political decision and a national decision; it cannot be anything else. It is not relevant to lower-level authorities. Of course one of them somewhere is going to have to have the benefits or disbenefits as a consequence of the decision, but the idea that they should be in a position where a matter of fundamental national importance can be delayed seems to me completely irrational—that is the only way I can describe it. That is why I am very sorry that your political master, as you might say, is not here to answer the question.

The Chairman: Would this not be a good question for us to put to the Minister?

Lord Dixon-Smith: It is a question that we have to put to the Minister, Lord Chairman.

Q15 Lord Rees of Ludlow: I want to ask a more general question. Lord Peston went back 50 years, which reminded me of a very memorable speech given by your previous Minister, Chris Huhne, who a couple of years ago gave a survey of the entire British record in nuclear power. He called it, at the beginning of his speech, "the most expensive failure of post-war British policy-making". You will recall that he ended his speech by quoting Winston Churchill's famous remark about the Americans—they will always do the right thing having exhausted all the alternatives. He said that he hoped that, likewise, having made "pretty much every mistake human ingenuity could devise", the UK nuclear power policy would be successful from now on. Do you think that that was a fair assessment and would you like to comment on it?

Professor David MacKay: One role for me and my team in DECC is to try to ensure that we are taking the best decisions for the long term and thinking about the whole energy system. It is hard work. There are many aspects of this, not just nuclear—you can easily think of another half a dozen technologies where careful thinking has to happen. We are doing our best and hopefully guiding things in the right direction, but it is hard work.

Q16 Lord Oxburgh: Professor MacKay, would you agree with the general statement that, if responsibility rests with the committee, it rests with no one? You have described a structure that depends exclusively on committees.

Professor David MacKay: You may be right, but it is a model that, I think, can be made to work well as long as there is strong engagement at working level and senior level between the bodies. Ultimately, responsibility lies with the Ministers, who charge those bodies with the spending of the public's money.

Lord Oxburgh: But who change at about six-monthly intervals.

Professor David MacKay: True.

Lord Oxburgh: My second question is quite different. Do you feel that the balance of funding between NNL and NDA is right?

Professor David MacKay: The level of money going into R&D via the NDA is certainly much larger than the flow going through the NNL at present. It is a good question, but I am not a nuclear expert. Bodies such as NIRAB, which is being formed, are probably better placed to give good strategic advice on that question than I am.

Lord Oxburgh: Will it be invited to advise on that question?

Professor David MacKay: I think that that would be exactly its role—to give that sort of expert steer.

Lord Oxburgh: Can you ensure that?

Professor David MacKay: I will endeavour to do so, yes.

The Chairman: Well, Professor MacKay, unless any of my colleagues has any other supplementary question that they wish to put to you, I think that we have run through the list of questions. Of course, when the list of questions was prepared, we were expecting the Minister to be here to help field some of the questions, so we are most grateful for the way in which you have answered them—we recognise that some of them are way beyond your remit. I think it is fair to suggest that we will ask the Minister to give evidence to us, although it will have to be in October now. It is clear that there are a number of issues, particularly how the champion at ministerial level works—the question that I put to you earlier—and how in practice Ministers can make sure that the committee structure that you described delivers the focus that our reports suggested was needed. We are most grateful. You have helped us a lot, so thank you very much for joining us today.

Department of Energy and Climate Change (DECC) – Supplementary written evidence

This supplementary memorandum has been prepared by Professor David MacKay, Chief Scientific Advisor, Department of Energy & Climate Change (DECC).

During my appearance before the Select Committee on Science and Technology on 23 July, I committed to providing further information on the following matters:

1. Update on the ONR's Nuclear Advisory Committee:
   The Office for Nuclear Regulation have pursued a process to recruit members to a Chief Nuclear Inspector's Advisory Panel. They will be writing to you directly, in due course, to provide an update on that process.

2. Breakdown of NNL spend which I mentioned, including timescales:
   I informed you of two spends to the NNL, the breakdowns are noted below:
   a. *"The Jules Horowitz reactor", the spend was £12.5m and this was all in FY1213.*
   b. *"A significant chunk of the £15 million for the national nuclear user's facility", the spend with NNL was £1.67m in FY1213. This consisted of a focused ion beam system for higher activity materials which was installed at the NNL in March 2013, and an x-ray microtomography unit which was delivered in May 2013. Additional funding is expected in FY1314.*

   For your additional information, there has been some further DECC spend with NNL:
   a. *FY1112 – future nuclear scenarios R&D £85k.*
   b. *FY1213 / FY1314 – early national nuclear R&D programme £1.256m.*
   c. *FY1213 / FY1314 – contribution to UK subscription to OECD/NEA (Organisation for Economic Co-operation and Development/Nuclear Energy Agency) Halden Reactor Project.*

3. What the response has been through BIS and the universities through HEFCE about any grants that have come forward in terms of dual funding for nuclear research:
   DECC are not able to answer this question exactly as the HEFCE funding is not broken down by subject. However, last year's Review of the Civil Nuclear R&D Landscape in the UK did break down funding by subject, and covered all UK Universities undertaking nuclear research. This report covered FY1011 but an updated report is expected every 3 to 5 years.

Table 4.1: UK Government expenditure on nuclear R&D 2010/11

Total fission (£29m)[14]	Total BIS (£18.1m)[13]	EPSRC (£11.7m)
		STFC (£2.6m)
		NERC (£1.8m)
		TSB (£2.0m)
	Total DECC (£10.9m)	NDA[15] (£10.9m)
Total fusion (£33m)[10]	Total BIS (£33.0m)[11]	EPSRC (£33.0)
Total other (£4m)[10]	Total DH (£3.7m)	HPA (£1m)
		FSA (2.7m)
	Total Defra (£0.3m)	EA (£0.3m)

[1]

DECC also submit data which is published by the International Energy Agency on the total UK government spend (including through research agencies) on nuclear research and development. The following three tables present the data for 2011/2012, 2010/2011? and 2009/2010 respectively. The 2011/2012 data are not yet published but the IEA will be publishing them in the coming months. All numbers are in millions of pounds.

4	**NUCLEAR FISSION and FUSION (sum of rows 41 and 49)**	**45.136**	**43.820**
	41 Nuclear fission	**13.232**	**11.916**
	42 Nuclear fusion	**31.904**	**31.904**
	49 Unallocated nuclear fission and fusion		

UK Government nuclear R&D spend in millions of pounds for financial year 2011/2012.

4	**NUCLEAR FISSION and FUSION (sum of rows 41 and 49)**	**70.071**	**50.726**
	41 Nuclear fission	**17.554**	**16.566**
	42 Nuclear fusion	**34.160**	**34.160**
	49 Unallocated nuclear fission and fusion	**0**	**0**

UK Government nuclear R&D spend in millions of pounds for financial year 2010/2011.

GROUP IV: NUCLEAR FISSION and FUSION (sum of rows IV.1 and IV.2)	**35.042**
IV.1 Nuclear Fission	**16.092**
IV.1.1 Light-w ater reactors (LWRs)	**0.000**
IV.1.2 Other converter reactors	**0.000**
IV.1.3 Fuel cycle	**3.000**
IV.1.4 Nuclear supporting technology	**6.643**
IV.1.5 Nuclear breeder	**0.000**
IV.1.6 Other nuclear fission	**0.000**
IV.2 Nuclear Fusion	**18.950**

UK Government nuclear R&D spend in millions of pounds for financial year 2009/2010.

17 September 2013

[1] A Review of the Civil Nuclear R&D Landscape in the UK, BIS/13/631; https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/168039/13-631-a-review-of-the-civil-nuclear-r-and-d-landscape-review.pdf

Rt Hon Michael Fallon MP, Minister of State for Business and Energy, Department for Business, Innovation and Skills (BIS) and Minister of State for Energy, Department of Energy and Climate Change (DECC) – Oral evidence (QQ 17-32)

Evidence Session No. 2 *Heard in Public* *Questions 17 - 32*

TUESDAY 10 DECEMBER 2013

Members present

Lord Krebs (Chairman)
Lord Dixon-Smith
Baroness Hilton of Eggardon
Lord Jenkin of Roding (Co-opted)
Lord O'Neill of Clackmannan
Lord Oxburgh (Co-opted)
Lord Patel
Baroness Perry of Southwark
Lord Peston
Lord Rees of Ludlow
Earl of Selborne
Baroness Sharp of Guildford
Lord Wade of Chorlton
Lord Willis of Knaresborough
Lord Winston

Examination of Witness

Rt Hon Michael Fallon MP, Minister of State for Business and Energy, Department for Business, Innovation and Skills (BIS) and Minister of State for Energy, Department of Energy and Climate Change (DECC)

Q17 The Chairman: I welcome the Minister of State for Energy and the Minister of State for Business and Energy in the same individual. Thank you for coming to join us for this session. This is our third attempt to meet you and we are pleased that on this occasion we have succeeded in arranging a session with you. As you know, this is a follow-up to our inquiry on nuclear R&D capabilities that was published a couple of years ago and we are very keen to hear from you how things have progressed in the intervening period. I should say that this session is being televised for those who have noticed, and I would like to invite the Minister to introduce himself briefly for the record.

Michael Fallon MP: Thank you, Lord Chairman. My name is Michael Fallon. I am Minister of State in the Department of Energy and in the Department for Business.

Rt Hon Michael Fallon MP, Minister of State for Business and Energy, Department for Business, Innovation and Skills (BIS) and Minister of State for Energy, Department of Energy and Climate Change (DECC) – Oral evidence (QQ 17-32)

The Chairman: Thank you very much. I would like to kick off and it may be that the opening question evolves into a range of different areas, but if I refer back to our inquiry in 2011, we noted there was an absence of leadership and strategic thinking in government in this area, which has resulted in a lack of co-ordination of nuclear R&D activities and the perception among international partners that the UK is no longer a serious player in the field. We were struck by the extraordinary discrepancy between the view, on the one hand, of some senior government officials and the Secretary of State and, on the other, those of independent experts from academia, industry and nuclear agencies, the regulator and the Government's own advisers. We are keen to know whether this lack of co-ordination, accountability and clarity has changed in the intervening period.

We were presented by DECC with a diagram here that is extremely confusing. It does not help us. It has a lot of acronyms in it, but it does not explain who is accountable to whom, where the ultimate responsibility lies or who is providing the money. There are no connections at all between government departments on the diagram. I would like to hear from you how the nuclear strategy is being co-ordinated and how the interface is being managed, who is in charge of delivering the nuclear strategy, who is accountable and how decisions are made. That is an opener.

Michael Fallon MP: That is quite an opener, Lord Krebs. Thank you very much for it and let me begin by apologising for not having been able to meet the Committee before now. I do try to be accountable and I think this is my second appearance in front of a Lords Committee this week, with another one to go tomorrow. I try to be accountable but sometimes diary scheduling has made that impossible. I am glad we are meeting now.

Your report was a catalyst—something of a wake-up call to government generally and to the Department of Energy to make a better assessment of where we are in nuclear research and development, to work out where we want to be in 2050 and to map out how we get there. That is the work we have been engaged in since your report was published two years ago and part of that is putting a new structure in place. Another important part of it is ensuring there will be and has already been a quantitative step up in funding available for nuclear research and, overall, making sure there is a proper strategy.

Yours was a very big opening question. You referred to a lack of this and a lack of that. I am much more concerned, as the Minister for nuclear, with where we are now and what we can do to get to where we want to be.

You referred to the structure and you have had the diagram with the structure. I think the structure, with respect, does show you how the Whitehall departments fit into the low-carbon co-ordinating group: the departments are on the right and there are other government departments involved. Of course, DECC and BIS are the leading ones, but there are others involved such as the department of the environment and the Scottish Government. There are other people with a very direct interest in this. They come together at a Whitehall level in the nuclear section of the Low Carbon Innovation Co-ordination Group, which has been meeting fairly regularly since the summer.

The strategy is led. It is accountable to me as a Minister and I am accountable to you in Parliament, but our principal adviser on the strategy is NIRAB, the Nuclear Innovation and Research Advisory Board. We have agreed the structure and membership of that board. I shall shortly be inviting a number of individuals to join it. The board will be chaired by Dame Sue Ion. That is an announcement I wanted to make to your Committee first. That is an announcement being made today. She is a former director of research at BNFL and is

probably quite well known to your all in the nuclear industry. I expect that board to meet for the first time at the beginning of the year.

That board will be serviced by NIRO. That is the small circle underneath it. That is the Nuclear Innovation Research Office, which will provide a secretariat to the board and will assist in better co-ordinating nuclear research and development across the UK. I have signed a contract with Gordon Bryan who will be the official leading that work. To start with it will be hosted in the National Nuclear Laboratory at Warrington, but it will build out from a core team and will provide the co-ordination and the logistical support for the advisory board.

That is the structure that we have put in place. There may be questions a little later about funding, but that essentially is the new structure that we are putting in place and it will be up and running from the very beginning of the new year.

The Chairman: Thank you very much. I will turn to Lord Jenkin of Roding in a moment, but could I just ask: in this diagram, where does the NIC fit? That is one of the things we have been told about: the Nuclear Industry Council.

Michael Fallon MP: I co-chair the Nuclear Industry Council with the Secretary of State for Energy and Lord Hutton from this place. The Nuclear Industry Council is a partnership between industry and government. It is not a government body. It is one of the partnerships under the industrial strategy where industry and government work together on long-term issues for the industry; for example, ensuring that the skills base is rebuilt, that issues of supply chain are tackled, that the export strategy for the nuclear industry becomes more coherent.

Issues that lie between industry and government are managed by the Nuclear Industry Council, which meets three times a year. I chaired the most recent meeting last month. Of course, when NIRAB gets going it will have the right of access to the Nuclear Industry Council and will be able to speak at its meetings.

Q18 Lord Jenkin of Roding: Minister, there was some surprise at, but, in some circles, welcome for, the fact that you were appointed both as the Minister in BIS where you are retaining, I gather, most of your previous responsibilities and became the Minister for Energy. The feeling was that there have been difficulties between the two departments and many people saw your appointment as a way in which this might be resolved. Are you aware that, in fact, this has not happened; that those who have to deal with the departments are still quite unclear—indeed, the Chairman asked this question—of where the responsibility lies. The question has two aspects, one of finance and one of accountability, and they are not the same. I remember you telling me on one occasion, "DECC may not have the money, but BIS has. We have the research department". It is not clear. We will come later to the question of a nuclear research programme and who is going to do it. Who is responsible and accountable for that and where is the money going to come from?

Michael Fallon MP: Let me be clear. I am the Minister responsible for nuclear issues. I am directly accountable for them and I am accountable to both Houses of Parliament for them, but there is an interest in both those departments in nuclear industries and I was invited by the Prime Minister to co-chair the Nuclear Industry Council almost a year ago, long before my move to the Department of Energy. For example, I also co-chair the Offshore Wind Industry Council because there are big industrial interests alongside the direct nuclear interest. There is considerable and very useful overlap between the two departments. I do not recognise your suggestion of difficulties between the two departments.

So far as funding is concerned, of course the Department for Business has funding for the research councils and has the Technology Strategy Board. I also look after a number of other financial instruments such as the Regional Growth Fund, which in itself can be brought to bear where necessary on other sectors, some of which are energy-related. It is very useful to have a Minister working across the two departments. With respect, I find outside that industry itself is not too bothered which funding stream a particular grant comes from or whatever so long as the grant is there. They are not particularly bothered which Minister is coming to the meeting as long as the Government are there and I hope we can resolve these things. In the Nuclear Industry Council we sit alongside each other, from BIS, from DECC and from the industry.

Lord Jenkin of Roding: Are you not aware that there are elements in this—perhaps I could mention the National Nuclear Laboratory, which I know will be one of them—who do not yet know with whom they are dealing? They find it very confusing. Are you not aware of that?

Michael Fallon MP: I am not aware that they find this confusing.

Lord Jenkin of Roding: Well, I am telling you.

Michael Fallon MP: I am the Minister responsible for nuclear policy and I am the person they should be talking to.

Lord Jenkin of Roding: That is a good message. I will tell them.

Michael Fallon MP: They can read the evidence.

The Chairman: Lord Jenkin, I would like to invite you to continue to ask more about NIRAB and NIRO. I think the Minister has, to some extent, talked about that.

Q19 Lord Jenkin of Roding: Yes. I am delighted to hear—I was not aware—that Sue Ion is going to chair NIRAB and we certainly very much look forward to your announcement about the appointment and its getting under way. This is a very important element that came out of the Beddington group report.

Turning to NIRO, this is almost seen as a body, as you rightly said, that will be managed by NNL at Warrington. Are you aware that they been interviewing candidates for the chairmanship of NIRO and are looking for support for when it will eventually be brought into existence? You rightly explained that they are interdependent in the sense that NIRO is there to serve NIRAB, but we have heard less about that than we have about NIRAB. Can you fill us in a bit?

Michael Fallon MP: I am not quite clear what your question means. Could you repeat it?

Lord Jenkin of Roding: I am sorry. We discussed this at some length with David MacKay when we saw him previously.

Michael Fallon MP: Yes, in July.

Lord Jenkin of Roding: At that stage, this was all at a very early stage. We now know, as you have told us, that NIRAB will very shortly, we hope in the new year, be brought into existence. The question is: when will NIRO be brought into existence?

Michael Fallon MP: NIRO is starting already. We have made the appointment of the director, Gordon Bryan, with—

Lord Jenkin of Roding: They are interviewing. They have identified and put names to the department.

Michael Fallon MP: I have appointed the director, Gordon Bryan, who has taken up his position with immediate effect. It is his job to provide the secretariat for NIRAB when it holds its first meeting in January, so they have to get moving straight away.

Lord Jenkin of Roding: It will be managed by National Nuclear Laboratory at its office in Warrington?

Michael Fallon MP: It will be hosted by the National Nuclear Laboratory. That is where the core of the office will be.

Lord Jenkin of Roding: We will want to see how that develops. It is obviously absolutely key to the whole question.

Michael Fallon MP: It is and I hope, Lord Jenkin, you will welcome that we have followed through on the Beddington work and—as David MacKay told you we would set it in place—we now have the framework in place. We have the office and we have the advisory board. The office is already operational but the board will be operational from the beginning of next month.

The Chairman: Where is the funding for NIRO and NIRAB coming from?

Michael Fallon MP: The funding comes from a range of different sources. Some again from BIS, some from DECC, and I can give you more details in writing about that. I have a number of financial announcements to make about additional research on the nuclear side, but essentially both these offices will be funded from the two departments.

The Chairman: If you could give us the detail in writing that would be very helpful.

Michael Fallon MP: Sure.

Lord Jenkin of Roding: Could I just ask: that does not include any money for research programmes—is that right?

Michael Fallon MP: No, that is not right. There is money for research and I will be announcing—

Lord Jenkin of Roding: I am sorry. I did not catch the answer.

Michael Fallon MP: If you want to ask me about the amount of money we are making available for research, I am very happy to go into that in some detail as I have another announcement to make on that.

Q20 Lord Jenkin of Roding: The money you have just referred to as for funding NIRAB and NIRO—that does not include money for research programmes?

Michael Fallon MP: No, the research money is separate from that. That is money simply for the administration.

Lord Winston: Can we get some clarification? Is that money streamed through the research councils?

Michael Fallon MP: The new money we are making available for research?

Lord Winston: Yes.

Michael Fallon MP: Some of it is coming through the Technology Strategy Board. Some of it is coming through the DECC budget. Some of it is coming through BIS. It comes from a number of sources.

Lord Winston: But not from EPSRC?

Michael Fallon MP: Not directly from EPSRC, no.

Lord Willis of Knaresborough: I would like to know how much we are talking about.

Michael Fallon MP: The current financial year had some £16 million from the research councils and some £80 million from new investment in various projects. That is in the current financial year. That includes some £15 million for the National Nuclear Users Facility, some £15 million towards the construction of the Jules Horowitz reactor in France, some £18 million of funding across some 36 different research and development projects from the Technology Strategy Board competition, and a final £38 million for the Nuclear Advanced Manufacturing Research Centre. These are sums that have already been announced for the current year.

For the future, this week we are announcing some £28.5 million. I announced £13 million yesterday for a nuclear research and development competition that will be co-funded by the Technology Strategy Board, DECC and the Nuclear Decommissioning Authority, which will run in March. In addition to that, I am announcing some £5 million towards the cost of commissioning the higher-activity phase 3 facilities at the National Nuclear Laboratory in which I know this Committee has taken an interest; some £8 million to establish a national fuel centre of excellence providing shared equipment and facilities run by the NNL and Manchester University, a further £1 million towards ADRIANA—as you may know, that is the Advanced Digital Radiometric Instrumentation for Applied Nuclear Activities—and £1.5 million for another early nuclear R&D programme that we are currently negotiating.

We have seen a step change in funding for nuclear from the position eight or 10 years ago when we were spending minimal amounts on research and development and I hope the Committee will welcome that.

The Chairman: That is welcome news.

Lord Jenkin of Roding: Could we have a list? I think it very important that we have a list of all that.

Michael Fallon MP: Certainly.

Lord Peston: I am just a bit lost on the source of funds. First of all, it might help me: the bottom box called "Public funders", who or what goes into that bottom box?

Dr Hollinshead: Sorry. I am Dr Hollinshead I am the Deputy CSA in DECC. In terms of the diagram, there is a wider funding stream here. Beyond BIS, GO-Science, DECC and so on, there is a range of other people, as the Minister said, who fund low-carbon energy and, therefore, those are the other "public funders" in that box. Now, they belong to the Low Carbon Innovation Co-ordination Group that funds all energy innovation. We have a sub-group that is just for nuclear that will form a link back to that group that considers the overall strategy for all energy R&D in the UK with all the relevant players on it. That is how you get your connectivity between the nuclear area and the entire concentration of energy research and development in the UK.

Q21 Lord Peston: That was not the answer I expected. The point is that everybody you have mentioned has no tax or revenue-raising powers whatever. The ultimate source of

funds must be the Treasury. Am I right about that and does it allocate funds to the department, who in turn are then allocating on?

Dr Hollinshead: Yes, that is right.

Lord Peston: What I cannot see in the structural diagram is that process. Are there meetings where the Treasury turns up and tells your department, "You can have this money in total or specifically"? How does it work? Or does it work the other way round: do you go to the Treasury and say, "I am very keen to do some research in this area or promote research in this area. Will you give me the funds?".

Dr Hollinshead: Clearly, at the moment, we have research programmes that were bid for through our department's spending reviews for sums of money for particular programmes, which in my case—I am speaking only for DECC—included a line for nuclear. What we intend to do, with the advice of NIRAB and NIRO as they look across the nuclear landscape and prioritise things, is to use that as information to make future business cases for additional funding with the Treasury or else what we will be doing is looking at our own programmes in terms of prioritisation of what we can fund. The NIRAB advice will feed into how we design our own programmes going forward but it could also be used as the basis for making the case for additional funding. That is how it will flow back to Treasury.

Lord Peston: Minister, do you go to the Treasury and speak on behalf of your department or do officials go to Treasury? You made a very welcome announcement about more money, which I am sure we all welcome. Was it you who got that money?

Michael Fallon MP: It was the department. If you look across at this time of year, Lord Peston—

Lord Peston: But it was your initiative; the structure works that way round?

Michael Fallon MP: Absolutely, yes. It is not the Treasury suggesting that we do this. This comes from the departments and, of course, at this time of year we look at the likely outturn of the various spending programmes that we have, and whether they are likely to be overspent or underspent. Where there is any underspend, this is the time of year when we can start to re-allocate it.

The Chairman: We very much welcome your announcement of a list of funding initiatives. Could you explain how those initiatives were chosen—what was the process and how transparent was it—and, within those initiatives, how transparent will be the process of allocating the funding?

Michael Fallon MP: Some of these funding initiatives are purely competitive. They are competitions organised by the Technology Strategy Board, which has a very good track record in organising this kind of competitive bidding process. Others are simply allocations that we have made in response to various bids. As you can imagine, in my department there are organisations talking to us the whole time about various projects they want to push forward. When we have NIRAB, of course, we will have a clearer source of external advice on the landscape, as it is described. At the moment we have our internal processes. All these bids have to be subject to preparation of a proper business case. They all have to be justified as value for money and yes, of course, they have to be reported in each case to the Treasury.

Q22 Lord Willis of Knaresborough: Minister, may I put on record that those extra resources of £28.5 million are hugely significant and very welcome, and I think it is important to say that. I have three brief questions.

First of all, you said that none of that money, unless I misunderstood, is going through the research council. So EPSRC is not allocating any of those resources. It is going directly to TSB, ADRIANA, a new research board and the national centre. Could you tell me whether this is for one year as part of the 2014-15 extension to CSR or is it phased over a longer period than that and, in which case, what will happen thereafter? Thirdly, given that TSB is set up to attract funding from the private sector as well, has that £13 million to TSB built in an additional sum that you expect to get from matched funding from industry?

Michael Fallon MP: Some of these allocations are spread over a number of years. The first one, the £5 million, will be spread over three years towards the cost of commissioning the phase 3 facilities. Some of the others are spread over the spending year period: the ARIANA money and the early R&D money and the £30 million R&D competition. That money is spread over the spending year period.

Lord Willis of Knaresborough: One year?

Michael Fallon MP: No, it is spread over the spending year period, so up to 2015-16.

Q23 Lord Oxburgh: May I add my congratulations to those of Lord Jenkin on persuading Sue Ion to take over the chairmanship of NIRAB. I think that is an excellent appointment. You commented that NIRAB would have access to the Nuclear Industry Council. It would be a very good move, I suspect, for the chairman of NIRAB, ex officio, to be a member of that body because you want the information and the views expressed on the industry body to feed in directly to NIRAB. I think if you could do that, it would be of mutual benefit.

My main question relates to the future of NNL. It has effectively been a contracting organisation for the past few years and its programme has been determined by what jobs they could bring in from wherever in order to keep their work going. For it to become a national nuclear lab it needs to have a rather different set-up. It does not mean it cannot do contractual work. In fact, I think contractual work would be important, but it also must have core funding. We discussed this a little bit with Professor MacKay and I wonder if you could let us know whether any of the sums that you have spoken of are intended to provide core funding for NNL or how that is to be done.

Michael Fallon MP: On your first point I am very happy to look at whether NIRAB should have an ex officio seat. We do not have ex officio on the Nuclear Industry Council. It is already a very large council and its membership, of course, is not for me. It is for the council itself, but I do not see any reason why not and it is certainly something I will suggest to the Nuclear Industry Council. There are always a number of people clamouring to sit on the Nuclear Industry Council.

Lord Oxburgh: That is good.

Michael Fallon MP: But the body gets larger and larger. I am very happy to look at that it would seem, to me certainly, to make sense.

So far as the National Nuclear Laboratory is concerned, I think we are trying to do two things with the laboratory: first of all, to develop its internal capacity to undertake world-class research and I think the announcement I have made this morning about commissioning of phase 3 of the central laboratories will help provide a world-eating facility for experimentation with some of the highly-radioactive materials for applications in new fuel technology and reactor technology and decommissioning and dispersal and so on.

Lord Oxburgh: That is all welcome.

Michael Fallon MP: I hope you would welcome that and I would see some of this phase 3 funding eventually becoming part of its core funding. Of course, we also want to help the NNL to develop its profile in world-class international research collaboration and I think that is why it has been so important to pay our subscription, if I can put it that way, to the Jules Horowitz reactor in the south of France and have NNL in there is a managing partner for the United Kingdom for that reactor, as it did with the Holden reactor project as you will recall. I also think it is important for the Government to support the NNL in its partnering work with other national research laboratories: in the United States, for example, as well as in France. I think those are the two core ways in which we see the NNL developing and for that, of course, it needs money.

Lord Oxburgh: Exactly. The question is: when and how?

Michael Fallon MP: Indeed, but, having set up NIRAB, we will have advice from NIRAB and I think we will have a much clearer picture of how the industry itself wants to see the research effort taken forward.

Lord Oxburgh: When would you anticipate some clarity on the routes for the funding and the amounts?

Michael Fallon MP: A substantial amount of funding has gone in this year. We have announced additional funding for next year over a range of programmes and I am sure NIRAB will want to advise us fairly quickly on how some of that funding can be put on to a longer-term basis. I certainly see that as one of its functions. It will become our key adviser on that.

Lord Oxburgh: I think you said you saw NIRAB having its first meeting early in the new year.

Michael Fallon MP: I am about to send out invitations to membership of NIRAB and people have to either accept or decline my invitation in the next few days, but I certainly hope the first full board meeting will be held in January.

Lord Oxburgh: That is excellent news.

Michael Fallon MP: I hope we would all congratulate Dame Sue Ion on her appointment.

Lord Oxburgh: Absolutely.

The Chairman: Before I turn to Lord Jenkin, who would like to come in again, could I just ask one follow-up question to Lord Oxburgh's? Do you envisage then that the NNL, when it has changed its role and becomes a national research centre, will also be the lead body internationally for the UK? One of the things we heard before in our inquiry in 2011 was that the UK seems a bit of a reluctant partner in international programmes and it is important for us to know who the lead individual will be on international research collaboration. Do you envisage that being the NNL?

Michael Fallon MP: Yes, I do. I hope it will take a more active role in international collaboration from now on, not least, of course, because we have the resurgence of our civil programme here in the United Kingdom. I think we have something of a legacy in this area that we have probably neglected for too long.

Lord Jenkin of Roding: You mentioned the Jules Horowitz reactor and that certainly is welcome. It is a facility that is being built. It will have considerable capacity. The other one I have been told about is the Holden research reactor in Norway where, again, we are involved with NNL in the lead. What I have been asked is, for instance, with Jules Horowitz,

"What is the UK going to bring to the party?". It raises the question: with all the spending that you have announced—no doubt, there will eventually be others—does that amount to a national nuclear research and innovation programme? I put the emphasis on the word "national" because that is what seems to be missing at the moment. It is not a unified programme that the NNL can then take and say, "This is what we can contribute and we want your help".

Michael Fallon MP: First of all: what are we bringing to the party? We are bringing £12.5 million to the party. That is our financial contribution to the new reactor in the south of France. That is a significant contribution and it puts us right in there as a key member of the new reactor project as it is taken forward. I am not pretending that these various announcements and structures will instantly create overnight a new national programme, as you have put it. There should be a programme, but I think this is a good start. As I said, we are stepping up the funding and putting a clearer structure in place that I think will give us the genesis of a national nuclear research programme in the future.

Lord O'Neill of Clackmannan: In some respects we are playing catch-up at the moment because we have been out of the game for such a long time. Would you envisage, with some of the new partners who are coming into the civil programmes, that we would have the opportunity of getting alongside South Korean or Japanese research in areas such as fast breeders? It is one of the ways of dealing with the Sellafield problem. Certainly, we still have another 15 or 20 years to go on the fast breeder, maybe a bit less, but, since we cannot recreate Dounreay, can we get into partnerships with the people with whom we are already in partnership in terms of the funding for some of our civil programme? Would you envisage government-led initiatives in that area?

Michael Fallon MP: Yes, I would and we have made very clear to all overseas interest in our new civil programme that there are opportunities there to participate on the research side as well as getting themselves familiar with our regulatory structures. We have made that clear to the Chinese, the Koreans, the Canadians, the Americans and indeed to the Russians through Rosatom. There is plenty of scope for that and there is plenty of scope now for us to collaborate in these third countries; to collaborate, for example, in South Korea and in China with some of their research.

Lord Oxburgh: I think it is clear that some of the questions to which we would like answers you cannot possibly answer at the moment because it will depend on the advice from NIRAB. NIRAB will be a very important element in the structure. I suspect that this Committee will maintain its interest in things nuclear. When would you imagine would be a good time for us to return to this to look at some of the details that fill in the broad outline that you have sketched for us today? In other words, if we were to come back in late spring or something like that, would that be appropriate?

Michael Fallon MP: I think that is for you to decide.

Lord Oxburgh: You know how fast things are going to move.

Michael Fallon MP: I want things to move fast and I think this Committee has played an extremely important role in that. We did a lot of work through the Beddington work streams and we have done a lot of thinking about the new structure and how the effort can be properly funded. I think we do need to give the chairman of the board and her board some time to design their programme of work. I think that is only reasonable, so perhaps spring could come a little later next year.

Lord Oxburgh: It may well.

The Chairman: I wonder if I could just ask another question about the NNL. As it changes its role from a consultancy contracting organisation to a strategic research leadership organisation, would it be worthwhile making some comparison between what we envisage for the NNL and what is going on in other countries? There might be lessons to learn about how countries with well-developed nuclear R&D programmes run their system. Do you think there is any merit in taking a look see?

Michael Fallon MP: Yes, certainly. I think that is a very good idea. There are some very advanced research programmes, obviously, in the States and indeed in France that we could well learn from in terms of how the research effort is modelled and how it is shaped.

The Chairman: Again, with regard to the NNL in terms of the leadership required to bring about this change, is that something that will be addressed by the NNL itself or with the advice or NIRAB?

Michael Fallon MP: Certainly with the advice of NIRAB. It will be for NIRAB now to be in the driving seat and sketch out its own programme of work and to advise us on how it sees the direction of this effort in NNL, but I think I have sketched out for you what the Government want to see happen with NNL.

The Chairman: Yes, that is very helpful.

Q24 Lord Peston: We are talking about research here, are we not? One word you have not used at all, Minister, is "universities". Is there a university involved in all of this, in particular in terms of producing enough researchers to work in the areas that are dear to your heart?

Michael Fallon MP: One of the announcements I made this morning was the collaboration between Manchester University and the programme. It was the national fuel centre announcement, the £8 million to establish a national fuel centre of excellence. That will be a collaborative effort between NNL and Manchester University. That is one example of how there is very direct collaboration.

Lord Peston: Would you agree, since you also used the expression "world-class" that world-class means world-class researchers? If you ask where they come from, we could recruit them from abroad but, presumably, we would most like to recruit them via our own higher education system.

Michael Fallon MP: Indeed.

Lord Peston: That would be very much dear to your heart, would it?

Michael Fallon MP: Absolutely. Another reason for looking across this between BIS, which has responsibility for the research councils and the universities and has the science budget, and the Department of Energy, which has the more direct responsibility for nuclear. That is why we are trying to join all this up.

The Chairman: How was the link with Manchester University that you referred to determined? Why was Manchester selected, or was it an open competition?

Michael Fallon MP: I think there has already been some collaboration between Manchester and the NNL, but I would be happy to confirm that. Lord Krebs has been passed a list of some of the other collaborations that are going on. They involve some of the more obvious universities that specialise in this particular area.

The Chairman: Yes. Perhaps you could send us a copy of that list. That would be very helpful, because we would like to see the NNL as a truly national laboratory rather than just collaborating with one university.

Michael Fallon MP: Indeed, but I think one way of strengthening this is to invite, as I am doing, some academics to sit on NIRAB itself. There will be a very direct university presence as NIRAB shapes its advice. There will be academics on the board.

Lord Jenkin of Roding: Just to follow on from Manchester: of course, the Dalton Nuclear Institute is a very important in Manchester University and works very closely with a lot of other organisations, notably the NNL. Coming back to the research councils, you have laid considerable emphasis on the funding that will come via research councils. Normally the pattern there is that research councils wait for projects to be put forward by enthusiastic researchers and then, if they are accepted, will then fund them. To what extent could that be credibly regarded as part of a national research and innovation programme? What influence would the research councils bring to bear on their selection of the projects put to them so they would fit in with NIRAB's and the Government's overall research ambitions in this field?

Michael Fallon MP: Of course, projects go up to research councils. There is bidding into the research councils, but there is also, through the Technology Strategy Board, a competitive element. We are able to call for research projects in particular areas, but I do not want to exclude the ability of universities and institutes to submit projects of their own design, on their own initiative, for research council funding. I do not want all research to be directed by the Government.

Q25 Lord Winston: Minister, I do not feel entirely happy with the response to Lord Jenkin. The backbone of British research is the PhD student in a university working, usually, on a research council grant. The Engineering and Physical Sciences Research Council puts around £7 million a year into fission research and rather more into fusion research. That is a tiny sum and there is clear evidence that young people who are bright are not going into fission research because they feel that it is a dead end; there is not enough funding for research. Surely the right mechanism is to ensure that the research councils are in charge of that kind of funding and have more say in how it is distributed rather than the TSB.

Michael Fallon MP: I think there is a balance there, but I certainly take your point. I hope you also take mine that we should not have this all completely controlled and directed by government; that we should allow scope for universities and the various research projects to put their bids in to—

Lord Winston: But research councils are not government. That is the Haldane principle. They are independent of government.

Michael Fallon MP: I understand that, but I thought the suggestion lying behind Lord Jenkin's work was that all this effort should be aligned through some national programme. I am a little wary of that.

Lord Jenkin of Roding: I recognise the point about "some", but I think there needs to be, and you have satisfied me that there will be, a central monitoring of this so that you can regard this as part of a national nuclear research and innovation programme.

Michael Fallon MP: I have satisfied you, Lord Jenkin, but I have upset Lord Winston this time. I, quite rightly, protect the integrity of the research councils.

Lord Winston: You have not upset me. I should have declared an interest. I am an academic at Imperial College, although I do not work in physics, I have to say, just to make that clear. I do feel that one of the concerns has been that the research councils have had very little money to play with in this area.

Michael Fallon MP: There has been incredibly little money in this area. That is very clear to me looking back over it as a new Minister who came into the department last spring. There has been appalling little money devoted to nuclear research and we are stepping that up. It started to change before I arrived at the department, but I am determined to step it up further.

Q26 Earl of Selborne: I would like to move on, Minister, to the site selection issues of the Managing Radioactive Waste Safely programme, a topical one. Of course, you have just completed a public consultation on the review of the siting process for a geological disposal facility. This was triggered by Cumbria County Council opting out of the process of finding a repository and that was attributed widely—we talked to Professor MacKay about this in July—to the failure of local communities to identify any benefits, so there was no buy-in from local communities. For the new programme the Government plan a public information-sharing and discussion process. What is going to happen this time to make it more likely that communities will buy in?

Michael Fallon MP: Last time the two communities most directly affected did buy in and they voted in favour of the scheme. The problem was that the county council, which of course contained members from the other side of the county who were not directly affected, voted against it. Looking back on it now, I think that was extremely unfortunate. They did not have a direct interest in it and they effectively were able to veto the project.

What we are looking at now is making sure that that direct interest of the immediate local communities—the district councils concerned—should dominate the process and we should not allow it to be vetoed by some wider group that does not have a direct interest. That is what we will be consulting on. There are a number of options in the consultation process and we need to see how we can learn from that aspect of it and give communities more confidence to engage in the process, while still retaining the voluntary principle that this should be for communities to step forward and want to host rather than Government directing them to host.

Earl of Selborne: But if the community level at which the discussion should take place is not to be the county council, why will it not include parish councils as opposed to the district councils? You have to decide which is the host community and at what level you will involve the local community. As I understand it, parish councillors are excluded because they are not elected or some of them are not elected.

District councils, of course, do not normally have the facility to conduct the sort of debate that is needed on to what extent international guidelines on geological depositories are being met or to what extent engineered solutions are acceptable. These are the sort of issues that need an informed debate and I would have thought it is unlikely to happen unless you can structure the debate in such a way that people can participate in a way that is fully informed.

Michael Fallon MP: I certainly agree with that and the purpose of the consultation has been to a better way to have this community involvement and engagement and to do so at the right level. Some parish councillors are, of course, simply co-opted on to the parish council. They are not directly elected. I think the district council is the best-placed

democratic body because of the impact on jobs and on the local economy. I think it is best assessed at district council level. Some counties are extremely large and, as I said before, there are parts of Cumbria County Council, for example, that simply would not have been affected at all and had no direct interest in it. My instinct is that the district council is the right level. As you asked us to do and you would expect us to do, we have been consulting on all this. That consultation has now closed and we will now publish our response and set out a way forward.

Earl of Selborne: Is it not going to be very important to define what you mean by a host community?

Michael Fallon MP: Yes, I accept that.

Earl of Selborne: It should not exclude all tiers of local government and indeed other community groups, should it?

Michael Fallon MP: It should certainly include community groups, of course, but I do not think it is right, at a county level, that a county should have a veto over a project. I want these decisions about hosting to properly engage the local community and I do not think some overarching local authority should have the right of veto. I think that was unfortunate.

Q27 Lord Winston: Minister, what you are saying is something that would touch on something that both Lord Jenkin and I would agree with very much. I wonder whether you feel that one of the problems in nuclear has been consistent failure to engage the public by successive Governments and what this Government might do to improve that public engagement to make sure that many of the anxieties that local people have might be assuaged.

Michael Fallon MP: As I said, that was one of the purposes of the consultation and we are still thinking about that and still open to it. We have not made any final decisions on that, but engaging the public more generally is one of the important work streams of the Nuclear Industry Council. I do not think it is sufficient to rely on the current public acceptance of nuclear power. It is there in the opinion polls at the moment, but it is not necessarily secure or bedded in.

Obviously, an accident that takes place abroad can affect it and so on. I think the industry and Government needs to continue to work at this to help people to understand that nuclear power is clean and efficient and safe provided it is properly regulated. This is work that we need to keep returning to and at the moment we are addressing this though the Nuclear Industry Council's work stream.

Q28 Lord Oxburgh: Minister, recognising that all communities of nations are idiosyncratic in all sorts of ways, I wonder to what extent the department has looked at other European countries, particularly the Scandinavian countries, and how they have managed this. In fact, what you are describing as your preferred way forward is quite close to what happens in Finland where there is a broad consultation, the Government then have a target area with which they would like to go forward and the one group that can veto that—and it is a clear, uncontested veto—is the local community, more or less as you have suggested. There is quite a lot of experience of doing this and it is probably worth seeing whether there is any value in looking at that.

Michael Fallon MP: I will certainly do that. I have not looked very closely at how other countries do this, so that is a very worthwhile suggestion. We have not made any final decision on this, obviously. We have just finished the consultation and I was just sharing

some thoughts with you as to what went wrong with the previous process and how we might improve it. I am troubled by this issue of the veto, but we have not come to conclusions yet.

Q29 Lord O'Neill of Clackmannan: Minister, the two issues of research and the siting of this facility raise a problem: how far do Government assume leadership and a sense of national priority, and do they leave it to the research community to put forward bids for money or, in this instance, the identification of the site? It is a national priority and it is something that, at the end of the day, you have to make a decision on. We hoped that, under the old system, a decision would be made, but it seems that the interests of bed and breakfast providers in other parts of England were of greater significance than finding a bed for nuclear waste. I feel that we can have any number of consultations, but the buck will stop with you.

In political fairness, as an opponent to you, I will say your predecessors, my own party, were singularly inept in their handling of this, but you have a chance now. You have a groundswell of public support nationally behind the industry and if you want to realise one of the biggest concerns that people have—a home for the waste—I think you have to show more leadership than this kind of getting close to it but not too close. I know it is out of character for you, but I think a rather more aggressive approach might be appropriate.

Michael Fallon MP: Successive Governments have wrestled with this problem. It existed when I first came into Parliament in 1983. I think NIREX was recommending that the waste be stored in a mine at Billingham on Teesside. That was 30 years ago, so there is a long and fairly sad history to all this. I still hope that we can cling to the volunteer principle. I still hope it is possible to find a way in which a local community can have an interest and see an interest in hosting this kind of disposal facility.

I am not going to rule out other options if it turns out, under whatever new process we come up with, that no community is willing to step forward. Of course, we will then have to look at other options, but I see this as part and parcel of the revival of interest in nuclear power. I think it is probably the first time for a very long time that we have had all three of the major political parties in favour of nuclear power. I do not think that has happened in my political lifetime. They are all now in favour. We had a very, very large majority when the nuclear issue came up in discussion on the Energy Bill in my House.

We have the restarting of the civil nuclear programme with the agreements with EDF on Hinkley and the guarantee now given to Horizon, and the prospect of 12 new reactors spread over five sites. You are right: this is a time to capture some of the public support we need for nuclear and GDF, the disposal facility, is part of that. We will certainly have one very good go at getting this facility located for the long term, so we are not giving up on it.

Q30 Lord Wade of Chorlton: When we proposed the NIRAB and that it should have a strong independent chairman, one of the issues that we discussed was that this person could take a role in drawing to the attention of the public the importance of nuclear power and its ramifications. They would possibly become a much more public figure than people who sit behind the scenes on other issues in Parliament are likely to be because some difficult decisions, as has just been discussed, will have to be taken. Do you foresee a role for Sue Ion, who would be an ideal person to do it?

Michael Fallon MP: She is certainly independent and, I think, perceived to be an independent figure with a strong nuclear background. Whether she would be willing to step

forward as the public front of nuclear I do not know. That is something I would have to discuss with her—whether she says that is part of her role when the advisory board gets going.

Lord Wade of Chorlton: The industry needs a voice to be respected by the general public.

Michael Fallon MP: I think that is right. The industry does need to speak up now and I think that is beginning to happen. We have more voices being heard at the Nuclear Industry Council. There are more conferences being organised and there is a growing interest in the economic potential of the revival of our civil programme.

Q31 Baroness Perry of Southwark: Minister, I was very heartened to see that you are intending to do something about schools and the school syllabus for nuclear understanding and nuclear sympathy. Also, I think your document mentions that there will be teacher training in this field as well. I certainly know that there are teachers who tell their pupils that nuclear is very dangerous and nuclear waste is very threatening and so on. It is very important to get the next generation growing up to feel that there is an argument for nuclear, is it not? I wondered what your strategy would be. Who are you going to get to write these new syllabuses for schools and for teachers?

Michael Fallon MP: Yes, I think that is a very important point. The work on improving public understanding of nuclear is being done as one of the work streams of the Nuclear Industry Council. In fact, it is being led by a professor from Manchester University and that is certainly part of making sure that, in the educational system, people are not poisoned against nuclear right from the start. With the development of the new plants, I hope that in places such as Somerset, Anglesey and the other sites that are now coming under consideration we will see in the schools and the colleges a new attitude to nuclear.

Lord Oxburgh: Just a quick one to follow that up. One of the best things for families to do on a wet day in the Lake District until not very long ago was to go to the Sellafield museum. I do not know how the decision to dismember and close it was taken, but it was a bit of a disaster and, indeed, it addressed the kind of things that Baroness Perry was referring to.

Just to comment more broadly, having worked in different parts of the world in the public sector: one of the things that very often is done in parallel with a new programme is to set up a public information facility. For example, if you go to Singapore, where water is a key part of the infrastructure, visiting the water museum close to the international airport is remarkable. You may think it is virtually impossible to have a museum of water, but they manage it and it is a good education facility. In these various facilities that are being planned around the country, it would be worth a little push—for Government to say, "Look, we are giving you this money to do the work but also you have a responsibility to us and to the local community to let them see why we are doing it and how it is spent".

Michael Fallon MP: I am very happy to think about that. It is already being done at the two new sites at Hinkley Point C and there is a visitor centre, which I have visited, at Wylfa in Anglesey, which sets out the plans for Wylfa B and the timetable. There is lots of information and it is well used, I understand, by school parties from Wales, but that is certainly something I will take forward. There are visitor's centres at existing nuclear stations, but I am sure there is more we can do there.

Q32 Lord Rees of Ludlow: I wanted to ask you to comment on the signal we are sending to young people choosing careers in science and technology. We have had some welcome

incremental steps, but, as you say, from a very low base, in the past 20 years. One would have thought there was a possibility that the UK could take a more active part in fourth generation nuclear, as with other kinds of renewable energy. If we look towards 2030, do you think it is realistic to be such serious players again in the nuclear industry as we were 30 years ago?

Michael Fallon MP: I do, personally, and we have to replace our nuclear fleet. It is an indictment of the past that the year that Hinkley comes on-stream, eight of our nine stations will be off-stream, unless the last four are extended, which shows you that are just in time to start replenishing the nuclear fleet. The method of finance that we have chosen is unique. We have persuaded somebody else to come forward with the £16 billion and we have persuaded them to take all of the construction risk as well. I think, with the financing solution that we have found, we have the very real prospect now of following on from Hinkley to a second EDF station at Sizewell and then the two Hitachi stations at Wylfa and Oldbury, and then we have a third consortium engaged at Moorside near Sellafield. So we have the prospect of 10 to 12 reactors at four or five sites. This is a growth industry. The supply chain involved in Hinkley had a huge exhibition at which I spoke. I toured the stands afterwards and I saw virtually every college in Somerset had a stand there offering the different courses already that the nuclear industry is going to need. These were not simply in design and technology but also in management in how these projects were going to be put together. I hope that young people will see this revival of nuclear as a huge career opportunity, as a growth industry for the future and as something that, once again, this country can do well in.

The Chairman: Minister, that is a very positive note on which to end this session and I thank you for coming to meet with us. I think I speak on behalf of the Committee in saying that we welcome the news that Dame Sue Ion will be appointed as the chair of NIRAB and that NIRAB will start its work early next year. We welcome your announcements about new funding and we welcome your commitment to making the NNL the lead national laboratory for strategic research on nuclear R&D. As Lord Oxburgh has said, we retain an interest in this area and we see now that things are beginning to happen. I feel it is quite possible the Committee will want to come back and look at things some time in 2014, just to pick up the story and check that things are moving forward in the way that you have so encouragingly portrayed to us. Thank you very much indeed.

Department of Energy and Climate Change (DECC) – Further supplementary written evidence

During the meeting of the Science and Technology Select Committee of the 10th December, I offered to provide further details on funding for nuclear R&D in the UK and on the establishment of the Nuclear Innovation and Research Advisory Board (NIRAB) and the Nuclear Innovation and Research Office (NIRO).

On the financing of the operation of the NIRO and NIRAB, NIRO is funded from DECC and BIS via a procurement for service provision from NNL, the host organisation, to the Departments. The contract is between DECC and NNL for the value of £646,900 until March 2015, with DECC providing £300,000 and BIS £346,900. NIRAB receives no funding from DECC other than for the chairperson, who will be paid a daily fee, as well as travel and subsistence expenses. The daily fee has been agreed as £465, with a maximum of 12 days per year.

Appointment to the NIRAB took place via nomination of a shortlist for ministerial approval, rather than by open advertisement. This decision was based on:

- The fact that the membership positions, excluding the chair, were unfunded.
- There was a need to balance maintaining the board at an optimal size, whilst still covering the majority of areas in nuclear research and development.
- A need to secure the involvement of those individuals in positions best placed to represent their sectors.

In selecting potential members, particularly in the industrial and academic sectors, it has been important to identify organisations and individuals that have the credibility and position to best represent their fields in terms of expert opinion and information. Consequently, the individuals proposed have tended to be leading academics, directors of R&D or chief technical officers of their organisations.

Positions are therefore offered on an unpaid basis and representatives from industry and academia are expected to represent the interests of their wider sector, beyond those of their home organisations. This will be made clear in both the Terms of Reference for the NIRAB and in any letters of appointment.

A similar approach has been used successfully to establish advisory boards in the past, which include the Nuclear Industry Council and the Automotive Council.

You asked whether the chair of the NIRAB might have a seat on the Nuclear Industry Council (NIC). Whilst this is a decision for the NIC as a whole, rather than for me alone, I have asked the NIC to raise this possibility as a point of discussion at its next meeting in January 2014.

I highlighted Manchester University to the Select Committee as an example of the nuclear industry's involvement with academia. Naturally, collaboration with academia goes considerably further than this. A key example would be the Nuclear Advanced

Manufacturing Research Centre, which is base at the University of Sheffield and was founded in conjunction with Areva, Westinghouse, Sheffield Forgemasters and Tata Steel.

Further direct collaboration takes place directly between universities and industry or national laboratories. The National Nuclear Laboratory has links to 30 universities, strategic agreements with 6 and sponsors around 70 PhD students. EDF Energy maintains research centres at and links with Imperial College London and the Universities of Manchester, Strathclyde and Bristol. Similarly Amec, Rolls-Royce, Westinghouse and Sellafield all maintain links with universities and sponsor research.

On the issue of public engagement with the nuclear energy industry, Sellafield Ltd has entered into an agreement, with the approval of the Nuclear Decommissioning Authority, to create a public exhibition in the Beacon Centre in Whitehaven. This will cover the development of the nuclear industry in West Cumbria from its origins through to modern nuclear decommissioning and waste management. The exhibition itself, which will be education focussed, will be installed during spring 2014, with the expectation that it will open to the public in the summer. There will also be additional space for short-term exhibitions, which will support on-going engagement with the local community.

The Nuclear Industry Council is working with universities, research institutes and other programmes to help the people of the United Kingdom better understand how nuclear energy and ionising radiation are used within society, and how they are managed by the industry. The Council oversees a workstream dedicated to improving the public understanding of nuclear energy, with membership drawn from industry, academics, independent observers and officials. The workstream has identified key sections of the public they will engage with, including nuclear communities like those in Cumbria.

In addition, publicly funded websites such as those managed by the NDA, Sellafield Ltd and DECC continue to provide a considerable amount of information on the UK's nuclear history, current plans and activities and policy matters.

Finally, I offered to provide a breakdown of recent and new funding to nuclear R&D. I am providing this as an annex to this letter, which I trust will prove self-explanatory.

21 January 2014

ANNEX - Funding of nuclear R&D.

In the 2012-13 financial year, Government announced around £80million of new public investment in nuclear facilities and projects.

This included:

- £15million for a National Nuclear User Facility. Providing new equipment in a range of universities and facilities across the UK.
- £12.5million towards the construction of the international Jules Horowitz Research Reactor, giving the UK access rights for the lifetime of the reactor and making the UK part of an important consortium of leading countries with nuclear energy capability.

- £18 million of funding across 36 nuclear R&D projects from a Technology Strategy Board competition. Aimed to leverage in a further £13 million of private sector investment.
- £38 million to the Nuclear Advanced Manufacturing Research Centre to support manufacturing industry.
- £1.2 million for an R&D programme with the National Nuclear Laboratory, which finished in March 2013.

This was on top of the £16 million from the Research Councils and the £99 million spent by the NDA's estate on R&D.

In December 2013, we announced £29.4m in additional investment, including:

- £5.5 million towards the costs of commissioning the Higher Activity, Phase 3 facilities at the National Nuclear Laboratory site in Cumbria.
- £8 million to establish a National Fuel Centre of excellence, providing shared equipment across the UK nuclear energy community, located in facilities run by NNL and Manchester University.
- £1.04 million to provide equipment for the Advanced Digital Radiometric Instrumentation for Applied Nuclear Activities (ADRIANA).
- £1.5 m for a nuclear R&D programme managed by the NNL.
- £13m for a nuclear R&D competition in March 2014, which will be co-funded by TSB, DECC and NDA.

This financial investment is alongside the funding provided for the administration of the NIRAB and NIRO.

Department of Energy and Climate Change (DECC) – Further supplementary written evidence

This supplementary memorandum is a letter from the Rt Hon Michael Fallon MP, Minister of State for Energy (DECC) and Minister of State for Business and Enterprise (BIS).

Further to my appearance before the Science and Technology committee in December last year and my subsequent letter, I would like to provide you with a further short update on the progress of the Nuclear Innovation and Research Advisory Board (NIRAB) and the Nuclear Innovation and Research Office (NIRO).

The NIRAB convened for its first meeting on 30th January 2014 and has held a subsequent meeting on 26th March.

As you are aware, the NIRAB is chaired by Dame Sue Ion. I attach, for the committee's information, a list of the Board's other members and observers. As I noted in my previous letter, appointments to NIRAB are personal appointments and the members agree to represent their sector, rather than their employer. Accordingly the list identifies both the sector and the employer for each member.

The NIRAB are undertaking work to provide recommendations and evidence, on priority areas for UK nuclear R&D. Three sub-groups (Academic; Industry; Advanced Systems) have been established to develop recommendations for consideration by the main Board. The subgroups are not limited to members of the NIRAB and allow for a wider constituency of opinions to be considered.

The NIRAB will produce an annual report at the beginning of each year, with the first due in spring 2015. The Nuclear Industry Council will have an opportunity to comment on the NIRAB annual report ahead of publication and these comments will be published along with the report itself.

Further to a recruitment process for the roles of Chief Technologist and Project Administrator, the NIRO is now up to its full contingent of staff with the appointment of two new individuals from industry.

11 April 2014

ANNEX – Nuclear Innovation and Research Advisory Board (NIRAB)

List of Members

INDIVIDUAL	SECTOR / ROLE	ORGANISATION	POSITION
Sue Ion	-	Independent	Chair
ACADEMIA			
Andrew Sherry	Reactor technology	Manchester and NAMRC	Member

Tim Abram	Fuels, Advanced Systems and Fuel Cycles	Manchester	Member
Bill Lee	Waste Management and Disposal	Imperial	Member
Neil Hyatt	Waste Management	Sheffield	Member
Malcolm Joyce	Engineering and Decommissioning	Lancaster	Member
INDUSTRY			
Neil Thomson	Reactor Operations	EdF Energy	Member
Paul Stein	Supply Chain	Rolls-Royce	Member
John Lillington	Supply Chain	AMEC	Member
Peter Wylie	Recycling, Waste Management and Decommissioning	Sellafield Ltd	Member
Mick Gornall	Fuel Manufacture	Springfields Ltd	Member
Andrew Carlick	Small and Medium Enterprises	DBD Ltd	Member
Paul Harding	Enrichment	Urenco	Member
RESEARCH FACILITIES			
Graham Fairhall	Fission	NNL	Member
Steve Cowley	Fusion	CCFE	Member
Mike Tynan	Manufacturing	NAMRC	Member
OTHER			
Richard Clegg	Professional services	Lloyd's Register	Member
Laurence Williams	Geological Disposal	CORWM	Member
PUBLIC SECTOR			
Sir Mark Walport	The Government CSA	GOScience	Observer
John Perkins	BIS CSA	BIS	Observer
David Mackay	DECC CSA	DECC	Observer
Robin Grimes	FCO CSA	FCO	Observer
Melanie Brownridge	NDA estate	NDA	Observer
John Jenkins	Nuclear Regulators	ONR	Observer

Derek Allen	Technology Strategy Board	TSB	Observer
Jason Green	Research Councils	EPSRC	Observer