



Welsh Affairs Committee

Oral evidence: [the future of nuclear power in Wales](#), HC 129

Monday 23 May 2016

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Written evidence from witnesses:

- [Office for Nuclear Regulation](#)
- [National Nuclear Laboratory](#)
- [Department for Energy and Climate Change](#)

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Members present: David T.C. Davies; Glyn Davies; Stephen Kinnock; Liz Saville Roberts; Craig Williams; Mr Mark Williams.

Questions 241 – 309

Examination of Witnesses

Witnesses: **Dr Richard Savage**, Chief Nuclear Inspector, **Dr Mina Golshan**, Deputy Chief Nuclear Inspector, and **Mike Finnerty**, Deputy Chief Nuclear Inspector, Office for Nuclear Regulation, gave evidence.

Q241 Chair: Good afternoon. Thank you very much indeed for coming along and giving us some evidence this afternoon. Because we have quite a lot to get through, I will go straight to the questions, but I would like to thank all three of you for coming along to grace us this afternoon.

Dr Savage: Thank you very much for inviting us. It is a real pleasure to be here.

Chair: We are a fairly friendly Committee, especially when it is not Ministers who have done anything wrong, so feel free to give us what information you think is relevant. Also you may see me try to speed things along a little bit later on, if I may, Dr Savage. I will start with Liz Saville Roberts, please.

Q242 Liz Saville Roberts: Thank you very much indeed. The first question is in relation to generic design assessment and why does it take so long to complete these processes?

Dr Savage: Our generic design assessment is a process for assessment of design, as we go through a number of stages to increasingly look at the design in more detail. It is an

important process in terms of de-risking the project and enabling the regulator to have early engagement so that the designer, the prospective licensee, can understand the regulatory expectations early and issues can be identified early, which gives time for resolution of issues. Of course, through that way, designers get an understanding of potential issues and projects can be effectively de-risked in terms of time and cost. It is an important process to safeguard the public, to identify issues early and make sure we have a rigorous design assessment.

Mike Finnerty: There are essentially four steps for the generic design assessment. The first step is all about opening discussions, particularly where we have international parties who don't quite understand the UK regulatory framework and so we go through that description with them. The next step is about making the claims about the safety case—so they say, “These are the main features of our design”—and having the discussion to see whether that design can be licensed in the UK. The third stage is about producing the arguments, so it is talking us through the methodologies, assumptions and so on that they make. Then the fourth step—this is the more detailed part of it—is where they bring to the table the evidence about why their claims can be substantiated. For example, if we look then at Wylfa Newydd, which I am sure you are interested in, they are currently at step four as well. I think the whole process, if you compare it with other international regulators, is quite an efficient and effective process.

Q243 Liz Saville Roberts: Thank you very much. As a Committee, I am sure we entirely appreciate that safety has to be paramount in this, but we have had some evidence from Professor MacKerron, who was concerned about whether you had capacity for carrying out GDAs, and particularly if there were new aspects to be brought on—say, the certification of SMRs—and whether you have sufficient capacity or you need more in order to deal with these new requirements and new expectations.

Dr Savage: In terms of ONR's capacity and regulatory resource to do this, ONR has just issued its strategic plan to 2020. In there we are clear about our work assumptions in the coming years. We have made assumptions about the completion of two generic design assessments that are currently ongoing—the assessment of Hinkley Point C as a new build and potential SMRs coming into our portfolio for regulatory assessment as well. Currently I sit with a professional nuclear inspectorate team of about 350 individuals. We project that to rise over the period to 2020 to over 500, so we have factored these changes into our plans and our resourcing to have the capacity and capability to deal with it.

Q244 Mr Mark Williams: Mr Finnerty mentioned Wylfa Newydd. This Committee has been to the site. I wonder whether you could say a little bit more on the progress Hitachi have made on the GDA—a little more detail on the first three stages, perhaps—and also when you anticipate the process being completed.

Mike Finnerty: They are at step four of generic design assessment. As we go through the various steps—from steps one to three—we have done more and more assessment. There have been issues that have come to the table. There are currently two regulatory issues. One is in regard to reactor chemistry; there is another with regard to a probabilistic safety analysis. The requesting party are engaging with us to a great extent to understand exactly what our—

Mr Mark Williams: What was the second one you said, sorry?

Mike Finnerty: It is a probabilistic safety analysis, which I can explain.

Mr Mark Williams: I hope you will, yes.

Mike Finnerty: This is different to deterministic analysis—where we look at actual faults when they occur. Probabilistic is about the kind of “What if?” questions, if I can put it nice and simply. We look through the case and say, “What happens if this particular fault emerges? What are the consequences?” We look through the various probabilistic stages to ensure that the requesting party has sufficient safeguards in place to terminate the fault. It is all about that methodology and how comprehensive that methodology is that Hitachi puts out.

Q245 Mr Mark Williams: Putting it into a context and a timeframe, and obviously there are some quite detailed—I don’t know about my colleagues, but I suspect we are all laymen on the sites—modelling processes that are happening as part of that.

Mike Finnerty: That is right.

Mr Mark Williams: You have identified the problem. They go away and reflect on it and amend it. What timeframe are you talking about, again for those two problems you mentioned?

Mike Finnerty: It does depend on the nature of the technical issue, but it is fair to say that we are looking to complete step four, the GDA, by December of next year. All the signs are that that will be achieved, because we are having these discussions, some at very detailed technical level, so that they understand exactly what the requirements are, what the expectations are. The signs are positive. There is still work to do, but the timescale is December of next year and there is no reason to doubt why they would not achieve that timescale.

Q246 Mr Mark Williams: I am just going to ask you, you do not envisage any more substantive problems emerging?

Mike Finnerty: I think this is one of the beauties about the GDA, because we are now at step four with the ABWR and any big showstoppers we expect would have come to the table already. So there are two regulatory issues. There are other regulatory observations that we are discussing with Hitachi, but I think, because we are at this stage of the assessment already, there is no reason to suspect that any major obstacle would come out of the woodwork at this stage.

Q247 Chair: Thank you. I am not sure who to pose this to, but we want to ask about SMRs. Would an SMR take as long to go through the GDA process and would it be relevant if there was an existing model, if you based it on a pre-existing reactor?

Dr Savage: I will make a start and then Mike might say a few words. ONR regulates new build nuclear reactors in the round in the UK; so that includes large-scale reactors and small modular reactors. That regulation scopes design, construction, operation and decommissioning—so through the full lifecycle of a nuclear reactor. My expectation is

that for a small modular reactor it would follow the same process. There is no operating small modular reactor in the world yet that supports civil power generation. It is novel technology and I think there needs to be caution around it, because there is the word “small”—small does not necessarily equal it is going to be a shorter process. I would just add caution to that a little bit, in that it is novel technology and, from ONR’s perspective, we have not conducted an assessment. It is early for us; so, we have not conducted a generic assessment, and of course we have not conducted any site-specific aspects associated with a small modular reactor either. So, in big handfuls, it would follow the same process. Having said that, ONR, we are looking at our processes to make sure they are as efficient and effective as they can be for small modular reactors, so we are looking at that now, but that is work in progress.

Mike Finnerty: To pick up on Richard’s point, it is design dependent because there is a whole raft of designs out there. I guess it is fair to say that if you look at something that is probably more familiar to us, like a light water reactor—a lot of the reactors around the world that are operating are full-scale light water reactors—if we had the light water reactor, that would have a greater chance rather than some of the more novel designs.

Q248 Chair: I am getting the implication here that it might take longer to get one through because it is such a novel design.

Mike Finnerty: It is hard to say. One of the things that is in its favour, I guess, is that some of the developers are talking about advanced safety features that will come to the table. Again, we would look favourably in that respect, but it is dependent on the design.

Dr Savage: It is hard for us to give you an answer on timescale. We can just caution against it because it is novel. There isn’t such an operating reactor in the world and it is right that ONR would do a rigorous assessment to protect the public, and that is what we will do. We are looking at our approaches to make sure they are efficient and effective to support this type of technology.

Chair: Everyone seems to want to come in on this. Did you want to go first, Liz, or do you want me to just make the point about safety?

Liz Saville Roberts: Whatever you wish to do, Chair.

Q249 Glyn Davies: I want to come back a little bit to the last one as well as the small modular reactors. What is the anticipated gap? This is a sort of basic question, and I hope I don’t sound silly as I ask it, but what is the anticipated gap between the end of stage four and the start of construction?

Mike Finnerty: If I give you a typical example—

Glyn Davies: If you make a proper speech, the Chairman is going to get a bit nippy.

Mike Finnerty: Right, okay. What you have to do is you have GDA, which is generic assessment, then you have licensing and then you go into construction. Licensing is an important part of this because we are looking for the prospective licensee to take control and take ownership of that design. That would take—I don’t know; a year, a year and a

half or so, something like that, and then it goes into construction; very, very broad, big handfuls.

Dr Savage: For Wylfa Newydd I have the dates here. We have licence application December 2016, as Mike said earlier, and I think we have already said we envisage GDA completion in December 2017, which is a year after that, and we envisage grant of licence in early 2018. Then beyond that, they would need a regulatory consent before construction could start on the site.

Q250 Craig Williams: I want a very quick one, because it was about the SMRs. Can I ask as a layman—again, perhaps a stupid question—what is the difference between the military application, in terms of all these ships going around the world, aircraft carriers and our nuclear submarines with their nuclear reactors? Are they small modular reactors?

Dr Savage: I think in a generic sense you might say they are.

Q251 Craig Williams: It is just that you said there were no others in the world and I wondered how you would compare these.

Dr Savage: The difference, I would say, if you take the definition of a small modular reactor is 300 megawatts and under. It fits that definition. What I would just caution against is the type of fuel and the fuel that is used in a naval reactor and what would be envisaged for a civil reactor and there are differences there.

Q252 Liz Saville Roberts: Dr Savage, you mentioned site-specific aspects and it is interesting that Trawsfynydd in my constituency was in *The Times* today earmarked as a possible site. What is concerning me is that Trawsfynydd is not on the strategic site assessment. What are the implications of not being on the strategic site assessment and, for an SMR to be developed there, what would need to be done on a site assessment if that was necessary?

Dr Savage: Absolutely right, Trawsfynydd is not identified on the national strategic siting policy. For ONR to consider it, it would need to be considered as a site. In terms of siting, I think from ONR's perspective and the use of Trawsfynydd for a small modular reactor, it is not unreasonable that it might be considered, given its history, but for me to say anything beyond that is quite difficult. ONR has not done an assessment of the technology—we have talked about that—and we have not done an assessment of the site, so part of our assessment would be site-specific characteristics for deployment of that technology. We would need to go through those assessments to be clear about the suitability of the site for deployment of a small modular reactor.

Q253 Liz Saville Roberts: Just to push the question home, the request that you assess Trawsfynydd as a possible site for an SMR, would that need to come from the Government? How would that be triggered?

Dr Savage: Yes, it would need to be part of the national siting policy before we could take that step. Mike, is there anything else to add there?

Mike Finnerty: It is the Government's policy, but they may ask us for some technical advice, for example, looking at the seismic characteristics and things like this, local

demographics, how you liaise with the local authority in terms of the emergency arrangements and so on; things like this. Then the fact that Trawsfynydd obviously did have an operating reactor may mean that it satisfies some of the criteria but it would by no means be a guarantee, so we would need to look at those criteria.

Q254 Chair: I feel I am leaving out Dr Golshan here at the minute, but do feel free. I have a quick question then, which is this. Some of the people who have come in to talk about SMRs have said that they will be safer than full-scale reactors. Is there any reason to think that is true or false?

Dr Golshan: That is an area for Mike. I am responsible for decommissioning—regulating the decommissioning.

Chair: We will come to those in a minute.

Mike Finnerty: As part of the GDA we would look at the safety with the same rigour as we would for a full scale reactor.

Q255 Chair: For you it has to be 100% anyway or it is not approved?

Mike Finnerty: Yes, it would have to meet all of the expectations.

Q256 Craig Williams: Can I pick up on safety a bit more and decommissioning? We will bring you in. Can I ask you more broadly about these new nuclear reactors: given the different scale, how you would maintain your inspection level and ensure that they are running safely?

Mike Finnerty: Again, essentially we take a proportionate, targeted approach to our assessment of all nuclear facilities, so we would do exactly the same thing with reactors. With small modular reactors, you could say that because they are small—so you have a small inventory—you could argue that maybe the consequences are lower than a full-scale reactor and that is how we would assess it. We would assess or inspect, once it is operating, to ensure that we are convinced that it does meet the right levels of safety. With the small modular reactors, it may be the case—I mentioned earlier about some of the enhanced safety features—that there are intrinsically safe features within the design as well, which may mean a lower level of intrusive inspection. We would always inspect and assess any particular design to ensure that it does meet our standards.

Dr Savage: Can I add a comment as well? The importance, from my perspective, of the generic design assessment, I think, where better to build in safety and security than in design? It is time well spent. It would be time well spent with small modular reactors as well as with large-scale reactors, so it is very much an enabling type approach where the issues are identified early, our expectations are understood, which potentially gives a better outcome further down the line.

Q257 Craig Williams: Perhaps I could touch on the ONR, then the regulations you put in place on the safety in decommissioning sites.

Dr Golshan: If I may start from the responsibility of safety being with the licensee itself, as part of that they are required to present to us a safety case that justifies the safety of

their operation, being generating electricity or defueling their reactor or conducting decommissioning activities. As part of that, we look at those safety cases, if required, assess them in a certain level of detail and, in terms of inspection and assessment, inspect the site to satisfy ourselves that those activities are conducted safely. Just to give you a perspective, on a decommissioning site compared with an operating reactor, we would normally—given that the risk and hazard is significantly reduced—visit the site once in a quarter compared with an operational facility, which we would normally inspect once a month.

Q258 Mr Mark Williams: It does not just end on the site. Obviously there is a relationship with the surrounding area. Local authorities have an obligation to have an emergency plan should things not go to plan. What is the dialogue between you and local authorities and the monitoring of those documents to deal with any change in circumstances?

Dr Golshan: Just to separate Wylfa—which I guess is your interest here—the site has an offsite emergency planning area that the local authority is responsible for. They inform the public on any incidents that may arise. Information is provided and, in the unlikely event of emergency, certain countermeasures are provided to the public.

Going back to your question on our interaction with local authorities, in order to set that offsite emergency planning area, ONR would assess the licensee's submission, engage with the local authority and make a determination as to what that area should be, so we and the local authority will be in constant engagement to arrive at that determination.

Mr Mark Williams: That is fine. I am glad you said, “We have a constant dialogue.” I think that is important.

Dr Golshan: Absolutely.

Dr Savage: Can I add to that? Our site inspectors will attend the local liaison meeting or site stakeholder groups on a quarterly basis, and of course ONR also puts reports on a quarterly basis of our inspection activities in the public domain on its website as well. So at the local level there is an interaction and then we build that to a strategic level as well.

Q259 Mr Mark Williams: Can I follow up on that? I suppose I have been looking for a definitive answer, and it is about ensuring that those relationships are robust enough. If I was to ask you whether you think the United Kingdom is adequately prepared for a nuclear emergency, whichever form something untoward could happen, you are satisfied that the arrangements are in place practically and in theory to allay the concerns that a lot of members of the public, I suspect, for whatever reason, still have?

Dr Savage: The UK is extremely well prepared in the unlikely event of an accident, as you allude to. Legislation requires that operators have onsite emergency plans and local authorities have offsite emergency plans, which you have already mentioned. So there is a legislative requirement to put the planning in place. ONR regulates these plans, so we have oversight of the plans and they are tested on a regular basis. The onsite emergency plan for an accident is tested at least on an annual basis and all aspects of the offsite plan are tested on a three-year periodicity as well, and those tests are with ONR's oversight.

I would go on to say that with Fukushima, five years ago, there were numerous recommendations following that event. Those recommendations have been carefully considered and addressed and have brought enhancements in terms of emergency resilience in the UK.

Dr Golshan: In relation to Wylfa, back in 2014 we sent a letter to Wylfa, and Magnox Limited as the licensee, to advise them that we are satisfied with the modifications that they have made to the plant and also the measures that they have put in place to respond to the recommendation of the then Chief Nuclear Inspector and, in relation to the European Commission stress tests, that we are satisfied that those measures have been implemented adequately. In fact, to give you specifics, the site built a plant on the highest level onsite. It is well equipped with pumps and services required in the event of an emergency arising from an extreme event, external event, so we are satisfied that they have adequate arrangements in place and they are prepared.

Q260 Chair: This leads into what happened at Fukushima. I have heard conflicting analyses of this, where some people obviously have argued that it was an absolute disaster and proof positive as to why nuclear power should not be used. Other people have said the systems coped quite well with a completely extreme event. What would your analysis be of what happened there, how something like that could have been prevented and how bad was it or could it be?

Dr Savage: It is fundamentally important that we learn the lessons from such accidents. ONR's Chief Nuclear Inspector at the time led an international delegation to Fukushima shortly after the accident and produced a comprehensive report that provided 38 recommendations, which was issued only six months after the accident. So there was a comprehensive set of UK recommendations and some additional European stress test findings and more recommendations. These have been taken extremely seriously in the UK. Industry has taken these recommendations seriously and responded to them; we as regulators have taken the recommendations seriously and responded to them.

ONR has produced a report summarising progress against these recommendations on an annual basis since Fukushima; so there was a report every year over the last five years. Our last assessment, which was issued in February this year, shows that 80% of the recommendations on the UK industry have been addressed and all the most significant recommendations have been addressed. So our vigilance, and the responsible UK industry response, is delivering against those recommendations. It is not just ONR with that perspective. We have had an international peer review of our progress twice in recent years. An international mission to the UK in 2013, and a follow-up mission in 2014, supported the rigour of the UK response and how we have gone about addressing the recommendations.

Q261 Chair: Are you saying that they had not put in place enough safety measures in Japan?

Dr Savage: There is a plethora of lessons. There are lessons about design; there are lessons about how you mitigate accidents; there are lessons about analysis to ensure you

have done a rigorous analysis of design. I think there are lessons for industry, there are lessons for regulators and there are lessons for our expectations as regulators.

Q262 Chair: What I am getting at—and I am basically a supporter of nuclear energy from a personal perspective—is that this was what people might call a black swan event. It was something that you could not foresee happening. There may be other things. The whole point of an event like that is that it is impossible to foretell and there may be other things that are impossible to foretell that will hit nuclear plants in the UK. Was this a complete environmental disaster or did the systems they had in place cope quite well with an event that could not be foreseen?

Dr Savage: I think for the UK it is about enhancement of our criteria and protection of the public. Shortly after the event, the assessment conducted in the UK, there was no requirement to shut down our operating nuclear power plants. You are drawing me on the detail of the Japanese reactor.

Q263 Chair: No, what I am getting at is this—and I may not be putting it over very well—were the systems that were in place able to cope with an unforeseeable event or not? Because we now know that there is a possibility of an earthquake and tidal wave or tsunami or something and we can build in systems to protect against that, but the problem is that we may not have systems to protect against the next unforeseeable event. What I am saying is that an earthquake and tsunami are now foreseeable, but were the Japanese able to cope with an unforeseeable event? In other words, were the systems they had in place able to minimise the damage that was caused or was it a complete disaster?

Mike Finnerty: It is probably fair to say that they partially addressed some of the issues, because obviously what we are doing for the design, or we are looking for designs now, is to have resilience, so if you do have a loss of power, for example, there are other measures that can kick in to cool the fuel and you have that resilience. That resilience was not in place at Fukushima. You have various containment barriers and some of the containment barriers managed to hold out in some respects, others did not, so you had the melting fuel and so on. From that, what we are learning is—and particularly in terms of Wylfa Newydd, for example, because that is a boiling water reactor, so you could say a similar design—there are additional steps, as part of the UK regulatory framework, we would require to be put in to ensure that there is more resilience and there is more segregation. So that those barriers and so on do have lots of additional safeguards, but also internationally as well as part of the stress tests, as we call them, to really test these unforeseen events and make sure that there is resilience and there are safeguards in place.

Dr Savage: Can I add one thing to give you some confidence in the UK approach? You design a reactor and you design the systems to be safe. In the UK, there is a requirement for a 10-year periodic review of safety, so every 10 years the safety case needs to be reviewed to ensure that it meets modern standards and latest understanding in terms of foreseeable events. As you go through the life of an operating reactor—which could be 40 or 50 years—you have that 10-year periodic review to do that assessment. That is a formal point at which modifications to the plan and safeguards are considered and the regulator might put demands in for enhancements. It is a strength of the UK system that you would not have found in Japan at the time.

Q264 Glyn Davies: It is a similar question. The Chair has raised the whole Fukushima incident, and I serve on the Energy Committee as well as on the Wales Committee, and there is a huge fear of nuclear in every debate and sometimes it is an unevidenced fear. There was a group telling me the other day about the huge numbers of people who were killed in Fukushima. The best understanding I had is that the Fukushima incident did not kill anybody. It was the tsunami that killed people and the tsunami would have happened if there had not been a nuclear power station there at all. What is the truth in terms of the actual casualty impact of Fukushima? It matters in terms of a debate in Britain, because a huge number of people think an awful lot of people were killed.

Mike Finnerty: To my knowledge, there were no fatalities as a result of Fukushima, i.e. nuclear associated, whereas there were tens of thousands from the tsunami. So, from my knowledge, there were absolutely zero nuclear-related fatalities as a result of Fukushima.

Dr Savage: As you rightly point out, the reason is there is a significant public aversion to nuclear and it drives the high standards we have in the nuclear industry and the rigour of the regulation that we have. I think you are right: if you compare Fukushima with Chernobyl, Fukushima only released—the figures I have seen—10% of the radioactive inventory that was released in Chernobyl, which kind of backs up the point you are making.

Chair: That is very helpful, and those are all of the questions we have, so thank you very much indeed for coming in and giving evidence.

Examination of Witness

Witness: **Professor Andrew Sherry**, Director, National Nuclear Library, gave evidence.

Q265 Chair: Good afternoon, Professor Sherry, and thank you also for coming in. You will have heard some of those questions and we might pick up on one or two. I want to throw something at you that has also been niggling away at me, because some of the anti-nuclear people have been saying that the only reason we have a nuclear industry in this country is to support a nuclear weapons industry. I think that is one of the arguments that were put to us in north Wales. Now, is it possible—this is a strange way to look at it, but I am a layman—to have a nuclear weapons industry without a civil nuclear industry?

Professor Sherry: Yes. Of course the two industries started off as the same thing in the UK and that is part of the problem. If you go to Sellafield and visit the museum in Whitehaven, that is what it starts with. But of course the two industries have diverged substantially.

Chair: So the Government are in no way forced to support a civil nuclear industry in order to maintain—

Professor Sherry: No.

Q266 Chair: That is great. I appreciate your thoughts on that. In that case, going back to this, can you tell me why or if you think that Wylfa Newydd will be successful or not?

Professor Sherry: Yes, it is a great question. From my perspective, we all hope that it will be, but of course we are not part of the delivery programme and we are not part of Hitachi

and Horizon, who are delivering that programme. My evidence looks back to look forward. Looking back on the advanced boiling water reactors that have been designed and built in other countries—substantially in Japan—the evidence there is the timescales are faster than some of the timescales we are looking at today for some of the modern pressurised water reactors: three to four years from pouring first concrete through to loading fuel for four projects.

Q267 Chair: Horizon has spoken about a 90% load factor and, again, that is something that the anti-nuclear lobby are very sceptical about, to put it mildly. What do you think?

Professor Sherry: Yes, I have looked into this because I was interested by the conflicting evidence. The IAEA publish on their website all the load factor data for all the reactors around the world for which they have data, including the advanced boiling water reactors. There are probably two or three main factors that impact on the load factor of those designs. First, they have not been operating for 40 or 50 years and so a bad year, for whatever reason, has a more significant impact on the load factor for the lifetime of that reactor.

Secondly, in Japan, some of the interruptions to operation have come from earthquakes—more than the 2011 earthquake: there are other earthquakes as well—which meant the reactors shut down and had to go through safety checks with the regulator before coming back online. There was one further challenge on some of the newer ones and that was related to turbines—so not a nuclear issue at all, but turbines. If you set all that aside, you are looking at a load factor for those operating advanced boiling water reactors of around about 80%, which is pretty much what we would expect from modern, pressurised water reactors or, indeed, other boiling water reactors around the world.

Q268 Chair: So 90% might still be a bit optimistic then?

Professor Sherry: Some years you can hit 90%, but some years you can fall below 90%, so 80%-plus is pretty much what you would expect. As I say, the tables of data are there to be studied.

Q269 Liz Saville Roberts: The NNL conducted a feasibility study back in 2014 that produced two scenarios for small modular reactors. One is a niche means of generating in areas where the grid was not powerful enough otherwise, and the other where they would be market competitive. How do you feel that they are now in terms of market competitiveness?

Professor Sherry: As we heard previously, the big challenge is that an SMR has not been built yet but, looking at the price competitiveness, which is going to dominate in terms of the success or otherwise of SMR technology, it is going to come down to: how can the capital costs of an SMR be driven down and the timescales between pouring first concrete and generating electricity also be driven down? There are a number of SMR concepts, a number of designs at various levels of maturity and, of course, until that has gone through the generic design assessment that you have heard and been built—but importantly, been built a number of times—it is difficult to understand what that learning is.

Current estimates range depending on the power of the SMR, because of course there is a range of different powers. The best information that we have seen suggests that, on every doubling of the number of SMR builds, the capital cost will come down by about 10%.

You can see that if 10 or 20 are built, that would have a considerable impact on the cost competitiveness of that technology but the first of a kind, as in other sectors and other technologies, is likely to be the most expensive.

Q270 Liz Saville Roberts: Would you suggest that partnering with a foreign vendor in developing SMR technology would be an appropriate approach for UK Government?

Professor Sherry: I think it is something we have to look at seriously. The UK does have the capability to design and build its own SMR, but of course it would be starting from a fairly low base compared with the investment in SMR technology that is being put in in other countries—for example, the US, Korea, China and Japan and so on. So we would be starting behind that. That means that, in terms of the opportunity to build the first one and to enter the market, again we would be behind. To me there is a balance of factors to consider: do we go for a UK design, which we could do, but risk being too late into the market? Do we buy an off-the-shelf SMR, in which case we are simply buying a technology and not gaining the benefit in terms of UK intellectual property, manufacturing jobs, construction and so on? Or do we partner with a partially developed technology where there is the opportunity for IP and the opportunity to partner, not only in the UK market but also on the larger international market?

Q271 Liz Saville Roberts: Could you give any sense of the time span involved in all of these?

Professor Sherry: Our assessment suggests that an SMR could be deployed within about a decade.

Q272 Liz Saville Roberts: My final question, if I may: given Trawsfynydd's rural setting and the fact that there have been questions about the use of the heat that is a by-product of an SMR, how do you feel about Trawsfynydd as a first site?

Professor Sherry: Trawsfynydd has some considerable advantages. Of course it has operated a nuclear reactor previously, so it is a licensed nuclear site. It has a workforce and a community that knows and understands nuclear. It has grid connections that could be developed and there is land surrounding the existing nuclear licensed site that could be used for SMR technology. But as we have heard, there are factors that would need to be assessed in terms of an SMR. Cooling of the lake is going to be one factor. One of the things about SMRs is that they are likely to be substantially built in factories and transferred to site in some way. A small modular reactor is not necessarily all that small. It is small compared with other reactors, but the logistics of the transfer of large components from factories, wherever those happen to be, to the site would be another factor.

The need to use the heat as a by-product is one of the factors that are being considered, in terms of the cost competitiveness of the electricity, the levelized cost of electricity from SMRs, and whether the heat could be used to offset that. That is something that needs to be assessed. Of course, building small modular reactors close to the centre of a community, which could use the heat, would lead to other questions and concerns perhaps from the local population. That would need to be addressed as well. I don't think the fact that Trawsfynydd is a rural community rules it out by any means, and certainly not for a first of a kind plant, which is a proof of principle but could also generate baseload power that can be put into the grid.

Q273 Stephen Kinnock: Focusing on the supply chain and particularly the procurement process in the context of steel, and assuming that large quantities of steel are going to be required for this project, can you just say a little bit about how that procurement process is going to run and the extent to which you think you will be able to ensure that there is a good amount of local sourcing?

Professor Sherry: Are you thinking particularly in terms of the Wylfa Station or potential SMRs or perhaps both?

Stephen Kinnock: I think both. It would be good to get a flavour of how you are approaching the procurement particularly in the context of steel.

Professor Sherry: One of the key factors in any nuclear project, new build project, which would take a number of years, is reducing risk and certainty. For international players in terms of new nuclear build, there is already an international supply chain out there. One of the challenges for the UK, particularly in terms of driving up its nuclear ambitions in terms of its manufacturing capability, has been the ability to build confidence with the reactor vendors that they can enter an internationally competitive supply chain with certainty and without risk. That is a challenge for the UK because, of course, in terms of civil reactors we have not built a civil reactor for many decades. In fact, if we look at other nuclear projects, the European pressurised water reactor at Hinkley Point C, the reactor pressure vessel has already been bought for that plant.

That is a challenge for the UK. That is why the Government partnered with the Universities of Sheffield and Manchester to create the Nuclear Advanced Manufacturing Research Centre, partly to drive up the capability of the UK supply chain for new nuclear build—I will come back to that—but also to introduce innovation in manufacturing for nuclear. How can we make these large components faster, cheaper, while maintaining or enhancing the quality? There is research being undertaken in the universities that is scaling up in the Nuclear AMRC around that technology development, which is of great interest internationally but, equally, the supply chain are looking to get fit for nuclear without many orders for nuclear components, and that is a challenge for us.

Q274 Craig Williams: Given your advice and the National Nuclear Laboratory advice in providing safety guidance and training more broadly, how safe do you think we are with nuclear power in the UK?

Professor Sherry: In the UK, I think we have one of the most internationally respected regulators. I am not saying that because they have left the room but from a number of counts. We do have a different approach to regulation in the UK, which is a goals-based approach and not a rules-based approach. That means that the safety case can be made however the utility or the licensee chooses to make it, but equally it means that the safety case can be challenged as new information comes to light. We start with a very strong regulator and with a track record—certainly since the 1950s and the Windscale fire, which is why the regulator came in—of no major nuclear accidents in this country.

Of course, if you look worldwide at the safety track record of nuclear, you have to compare it with other energy sources. There have been lots of studies that looked at this, in

terms of fatalities per gigawatt year, for example. I point you to David MacKay's book on, "Sustainable Energy—Without the Hot Air", a really good summary of this.

Chair: What is it called, "Without Hot Air"?

Professor Sherry: Yes, it is, "Sustainable Energy—Without the Hot Air". David MacKay, the previous DECC Chief Scientific Adviser, sadly passed away a few weeks ago. He was a Cambridge professor—so, well researched but very, very readable. The data that he has drawn on from both European and UK studies shows that, in terms of that quantity, the number of fatalities per gigawatt year, nuclear is the safest by that definition, closely followed by wind power. Comparing that with gas and coal and so on shows that. I think it is worth pointing out that, while that is the case—and the conversation was about Fukushima earlier, and there were no fatalities from the nuclear materials because Japan was prepared for that and responded absolutely in line—there is a public fear about nuclear. The health impact of a nuclear accident has been less to do with the nuclear materials that are released and the impact on public health and much more on the stress, the uncertainty and the fear that is caused by that.

Q275 Glyn Davies: A brief question on that. That is absolutely the case: it is the fear of nuclear. Of course it is a justifiable fear of nuclear, but it almost seems to me to be a fear that is sometimes a bit irrational. I know the Chernobyl incident better than the Fukushima incident and it had quite a big impact on sheep farming in Wales.

Professor Sherry: Yes, indeed.

Glyn Davies: There could well be some farms in north Wales that could be still under restriction. I am reading now that the restriction on sheep farming was absolutely unnecessary, because you learn a lot by looking back over something, and 30 years later things seem very different. What we are reading now in, I think, peer-reviewed papers is that all of that fear about the implications for the sheep industry—the massive cost of not eating the sheep and taking them to graze elsewhere and painting them different colours—was a safety measure that in retrospect was not needed. Is that a fair assessment of where we are?

Professor Sherry: It is not my personal area of expertise. I would point you to the fact that the UK has probably one of the world's leading experts in this in London at Imperial College, Professor Gerry Thomas, and I would suggest you have a discussion with her about that.

But the point I would make is that, in terms of our understanding of the database, we have to look at it scientifically and rationally. Of course there have not been that many nuclear accidents and so the data is still coming to light and our understanding of it. One of the areas that Professor Thomas does look at is, she looks after the Chernobyl tissue bank. She follows the survivors from Chernobyl and uses that information to inform our understanding of radiation effects on public health. Of course, that will no doubt shed light on what happened in north Wales and around the UK and Europe at that time.

Q276 Craig Williams: I had one quick question on the SMRs. I asked about the difference between what we have running around the world in our ships, submarines and aircraft carriers

and the SMRs coming out, and he touched on a few. I wonder whether you could touch on the difference between them.

Chair: Layman's guide to the difference. Yes, I was wondering that.

Professor Sherry: Certainly the fuel is a major difference, and I will probably say no more in this context. The other point to make is there are a number of different SMR designs, some of which are a scaled-down large reactor, some of which are an integral reactor with everything in a single pressure vessel and others that look at different coolants and different fuels and all the rest of it. Most of those are very different from the reactors that power the UK's nuclear deterrent in the submarines. Having said that, there is manufacturing capability in the UK, a design capability in the UK and a safety case and safety assessment capability in the UK, all of which can be turned towards SMR technology. Of course, Rolls-Royce is the technical authority on behalf of the Ministry of Defence and has a civil reactors division. So those skills, developed, can be applied directly to an SMR development programme, design programme or partnering programme.

Q277 Craig Williams: With that in mind, might we be further forward than we think we are?

Professor Sherry: As I said before, I think the UK has a capability to design from scratch and build and operate a fleet of SMRs. The challenge is: what are the timescales? What is the international competition in the international market to make that and the numbers of those sufficient to bring down that capital cost and drive the economics?

Chair: Excellent.

Q278 Glyn Davies: Clearly, you have talked about the judgment of going in alone, going in with a partner or just simply buying bespoke. If you are going alone, clearly you can only do one or two. If you are buying bespoke, you can buy a lot, or at least the manufacturer who sells it to you can manufacture a lot, which inevitably means they are going to be a lot cheaper—a whole lot cheaper. If you were the Chancellor of the Exchequer, what would be your assessment of whether it was wise to buy bespoke from abroad or to go it alone and build it ourselves?

Professor Sherry: I have to be slightly careful in how I answer that, because there is an SMR competition ongoing at the moment and I have a role to play with Government on that.

Glyn Davies: Let us put that to one side for a minute.

Professor Sherry: There are distinct advantages of partnering, not only for the time taken to enter the market, but also depending on which partner one chooses and the opening up of a particular international market. The cost-competitiveness of SMRs based on a potential UK market alone may be questioned. In terms of entering an international market for export, I think there is a far stronger case and that can also drive the choice of partner, should that be the route to go.

Chair: Excellent. Thank you very much indeed for sharing. That was most enlightening.

Examination of Witnesses

Witnesses: **Andrea Leadsom MP**, Minister of State, and **Lee McDonough**, Director, Office for Nuclear Development, Department for Energy and Climate Change, gave evidence.

Q279 Chair: Minister, thank you very much for coming along to give evidence both on this and on the steel issue. What I thought I would try to do is take about 40 minutes or less on nuclear and then we can move on to a few questions about steel, if that is all right with you.

Andrea Leadsom: Great.

Chair: First of all—I say this as a supporter of nuclear, but as somebody who cares also about money, or at least making taxpayers’ money—given the very high cost of nuclear energy, why do the Government consider it to be an affordable energy source?

Andrea Leadsom: I think essentially what the Government believe is that we are trying to meet our energy trilemma at all times, which is to keep the lights on—which is absolutely non-negotiable—to keep the bills down and to decarbonise at the lowest price. Of course, nuclear meets all of those requirements. Essentially, it is a low carbon source of electricity. It is dispatchable—it is reliable, it has fewer additional costs for backup and so on. We believe it is also affordable. You might say £92.50 for Hinkley C seems an awful lot of money, but what I would say to you is that it will be delivering electricity in 2025 and, of course, none of us have a crystal ball. What we have to have is—unlike previous Governments, which did not invest in our energy infrastructure, which has left us now quite vulnerable with very old power stations and the like that cannot survive forever—investment in our energy future. In my view, it is the bird in the hand. What you want to have is the certainty of being able to deliver. Our new nuclear programme does just that at an affordable price for consumers.

Q280 Chair: The strike price is about £95 per megawatt hour.

Andrea Leadsom: £92.50, yes.

Chair: £92.50, sorry. That is for 30 years after it is built. Do you foresee at any time—

Andrea Leadsom: Thirty-five, Chairman.

Chair: Thirty-five, sorry. Do you foresee at any time over that 35-year period that the commercial price for electricity per megawatt hour will exceed the £92.50 strike price? Do you have forward projections—you must have—over what the commercial price for electricity will be over the next 24 years?

Andrea Leadsom: As I have just said, none of us has a crystal ball. If you look at the indicator that I think is useful in the power space of the history of the oil price, we have seen it at \$100 a barrel only two years ago—less than two years ago—and we saw it drop below \$30 a barrel, and now it is up at just over \$40. I think the point is that there is enormous volatility in the wholesale markets, likewise in retail, and the essential thing for our energy security for the future in the electricity space is we have to invest in our electricity infrastructure. That means new nuclear is a part of that. It is not the only thing. We certainly do not put all our eggs in one basket, but when you consider that, as things stand, we have our existing civil nuclear power stations that deliver around 16% of our

electricity day in, day out, but each of those plants is already quite old—their licences to operate have been extended and all of them are due to be finished, in other words to finally close, by around 2030. It would be very foolhardy to not consider how we are going to replace that. That is where our new nuclear policy is so important.

Q281 Chair: Does your Department have a forward list of predictions within a range for what the commercial price of electricity per megawatt hour would be?

Andrea Leadsom: Yes.

Q282 Chair: Presumably there would be variations because it would depend on what energy mix you come up with, but do you have one with a range for commercially produced electricity without any strike price, and if so, would you be able to share it with us at some point in the future?

Andrea Leadsom: Certainly where Hinkley Point C is concerned, we will publish a summary of the value-for-money analysis when the final investment decision is taken and we have signed the contracts. Then there will be—

Q283 Chair: The commercial price at the moment for electricity per megawatt hour is probably about, what, £50, something like that?

Lee McDonough: Yes, in that order.

Chair: In that order.

Andrea Leadsom: About £45, yes.

Q284 Chair: Presumably your Department will have predictions for what that commercial price will be going forward, I do not know how far—10, 20, 30, 40 years? Is that a fair assumption for me to make?

Andrea Leadsom: Yes. We certainly do and as I say—

Q285 Chair: Would you share them publicly? Would you be willing to share them publicly?

Andrea Leadsom: We will certainly write to the Committee with what we can say, but I really do want to give a big proviso here, which is that when you look through history, the one thing you can be sure of with predicting future prices is that you will be absolutely wrong. We obviously do need to make future assumptions and we absolutely do, but really importantly is the value for money assessment and, as I say, that will be published once the contracts for Hinkley are published.

Q286 Chair: Yes. You will consider having a look at producing those figures, the forward look on commercial?

Andrea Leadsom: We will write to the department with what we are able to say, yes.

Chair: That does not sound like a straightforward yes to my question.

Andrea Leadsom: Yes, we will write to you with the forward forecasts that we are able to share with you. Yes, we can do that.

Q287 Chair: Just quickly then, will your value-for-money costs and benefits exercise take into account what the anti-nuclear lobby refer to as hidden subsidies? For example, I mean the Civil Nuclear Constabulary comes at a fair old cost and they are only there because they have to protect nuclear power stations. Costs like that could be argued to be a subsidy. Are they taken account of?

Andrea Leadsom: Yes. In fact, the costs of operating a nuclear power station are all taken into account. Those are all for the operator. There are hidden costs in all power generation at the moment, which is something the Department is working on, trying to absolutely get to the bottom of whole system costs. There are things like balancing the system and so on that in nuclear arguably are much lower than with intermittent technologies like wind and solar. There are not any special hidden costs in nuclear that you do not see in any other power generation.

Chair: Thank you for that.

Q288 Mr Mark Williams: This Committee has always shown great interest in Wylfa Newydd and we have been up to Anglesey to see and talk to those there. Are you confident that Wylfa Newydd will be built on schedule? You have talked about the vulnerability of not having that energy infrastructure and the impact of 16% generation. Possibly I can see this figure going down to 3% if these infrastructure projects are not realised. Is Horizon's target of 2025 operational start realistic and I suppose, importantly, what is DECC doing to help facilitate that?

Andrea Leadsom: A huge amount, actually. DECC officials are in constant contact with the developers. Obviously, it is the developer who has set out the timetable that they think they can be delivering electricity by and, as far as we are concerned, there is absolutely no reason to think that that cannot be met. The developer is making huge progress. You will be aware that they are at the final stage of the GDA assessment from the Office for Nuclear Regulation. There is a huge amount of work already going on and, yes, we do not have any reason to believe that they cannot meet the deadline that they have set for themselves.

Q289 Mr Mark Williams: Hinkley Point C was initially due to begin operation in 2017. Obviously we will see how fast that can proceed now, but I am interested in if you could reiterate the implications for this country's energy supply and—critically, from a Welsh perspective—the economy of Anglesey were there to be any protracted delays in the development of Wylfa Newydd.

Andrea Leadsom: In terms of the nation's electricity supplies, as I have explained to the Chairman, we do not have all our eggs in any one basket. Absolutely essential to energy security—which as I have said is totally non-negotiable—is that we have a diverse range of sources of electricity. We are investing in lots of different technologies and new nuclear is one of them. I have mentioned that today we get 16% of our electricity from it. Hinkley C would provide up to 7% of our electricity needs. Wylfa would provide a significant amount, a significant contribution. However, should one new nuclear project not get taken forward, it would not be the case that, therefore, our energy security would be at risk. That

is not the intention. As I say, the diverse range of sources will ensure that that is not the case and our capacity market that buys forward electricity supply makes sure that the lights will not go out.

In answer to your specific point about Anglesey, obviously that is why we are working very closely with the developers to try to make sure that this gets delivered. We are very enthusiastic about it. You will be aware of the Anglesey Energy Island programme that has been around since 2008. That has a huge programme to look at investing in new low-carbon energy production, establishing world-class facilities to put Anglesey as a leading location for low carbon energy innovation and demonstration, and so on. That is very Welsh focused, Welsh driven, with co-operation from DECC, but looking at what more can be done in the energy space for Anglesey. Nuclear is not the only game in town, but obviously it is very important and we are working to ensure that that happens.

Q290 Mr Mark Williams: One of the essential ingredients of this has to be a skilled workforce. The Chairman, Liz Saville Roberts and I had a meeting at lunchtime today with representatives of the civil engineering industry in Wales, who made the point that there is the potential for skills shortages when we look at a whole raft of infrastructure projects ranging from High-Speed 2, Hinkley Point C and Wylfa. You made a speech on 30 June when you acknowledged that there is a potential there, and you talked about it being essential that Government take action to prevent skills gaps developing. How much of a challenge do you think that is? Fundamentally, what are you doing—and I guess what are you doing critically in partnership with the Welsh Assembly Government—to ensure that that skills gap is not a reality? Otherwise these projects are going to find it very challenging to meet those deadlines that we all aspire to.

Andrea Leadsom: Yes, that is a good question. The answer to it is it is my personal absolute priority to ensure that right across the energy space, so right across my portfolio of power generation, we are looking at transferability of skills. I am undertaking some work with BIS to look very closely at, for example, what we can do with the enormous amount of expertise that is becoming available from the offshore oil and gas sector in the north of England and in Scotland. Transferability of skills is absolutely key, as is the training of new apprentices, graduates and people with existing engineering skills.

What I can tell you is we have set up the National Nuclear College, which is going to be in both Cumbria and Somerset, and that is going to do a huge amount of work. We also have two skills organisations that are assessing where the new skills are going to come from. I can also tell you that Horizon themselves have both a graduate programme where they have graduate places, which started in September, specifically advertised across north Wales and particularly with Bangor University, Glyndŵr, Cardiff and Swansea. They also have an apprenticeship programme. They have taken on 10 apprentices, all from Anglesey or north Wales. Certainly, Horizon expects around 700 apprentices in both construction and operations before the station starts operating in the first half of the 2020s.

Q291 Mr Mark Williams: As part of that—that is all encouraging—should we not expect and envisage some contact between your Department and the relevant new Minister in the Assembly Government in Cardiff? Such is the enormity of this project that this is surely one of those areas where the UK Government and Assembly Government need to be working together.

Andrea Leadsom: Absolutely and we do. We are constantly engaging with the Welsh Government. There is no question, officials from BIS and DECC are talking constantly to the Welsh Government. We will, of course, be—

Q292 Mr Mark Williams: The new Ministers in these areas can anticipate calls from Ministers at a UK level on these matters?

Andrea Leadsom: Well, they will be made aware very quickly of the extent of engagement that is already taking place and that that will be expected to continue, yes.

Mr Mark Williams: Good, thank you.

Q293 Liz Saville Roberts: I am delighted to hear what you mentioned about the National Nuclear College. When will there be a Welsh campus?

Andrea Leadsom: As it stands, the Welsh Government are already investing significantly in the education and skills need for the nuclear sector in Wales. Coleg Menai is an existing member of the National Skills Academy for Nuclear's high-quality training provider network, and it is continuing to build its reputation as a centre of excellence for engineering and energy sectors. The decision on whether there will be a Welsh hub to the National College for Nuclear will lie with the NCfN board, which is made up of each of the original six partners chaired by a senior executive of the nuclear industry and the Department for Business, Innovation and Skills. What I can tell you is there are ongoing discussions between Welsh Government and officials from BIS and DECC surrounding the National College for Nuclear, so they are looking into that.

Q294 Liz Saville Roberts: You mentioned earlier that it is important not to have all one's eggs in one basket. The other thing I would like to ask is, have the UK Government considered alternative economic options for Anglesey and north Wales if Wylfa Newydd were not to go ahead?

Andrea Leadsom: Obviously in the Energy and Climate Change Department we look to industry to come forward with proposals. There are a great deal of energy activities going on in Wales, right across Wales. Certainly if it would be helpful, I can write to the Committee with exactly what energy projects are ongoing at the moment but, as I mentioned earlier, the Anglesey Energy Island programme—which was set up in 2008 at the time of the closure of the Anglesey aluminium works in Holyhead—is public and private sector working together in partnership to try to put Anglesey at the forefront. That is in terms of low-carbon power generation. For example, there are a number of different ideas—not specific to energy, but there is a growth deal proposed for north Wales with the Treasury. That, of course, will help to strengthen the region's economy and make the most of its connections to the northern powerhouse. We are looking for Welsh businesses and Welsh Government to come forward with proposals, but we are certainly very keen to support where we can.

Q295 Glyn Davies: Are there any implications for the local environment if Wylfa Newydd goes ahead? I see talk of preparations and environmental considerations. Are you involved in any discussions about environmental preparations and concerns if Wylfa Newydd goes ahead on Ynys Môn?

Andrea Leadsom: Obviously the application process for development consent for any nationally significant infrastructure project is absolutely aimed at ensuring local environmental impacts are totally considered and any unacceptable impacts are completely mitigated. The environmental impacts will be a key consideration in deciding whether development consent can be given for a project and there will always be lots of conditions and provisions to make sure that the decision is based on robust environmental information. Is that what you mean?

Glyn Davies: Yes.

Andrea Leadsom: I think it is intrinsic to the consent process that environmental impact is taken totally into account.

Q296 Glyn Davies: Do you see this as being a part of your discussions with Natural Resources Wales as part of the Welsh Government?

Andrea Leadsom: Yes.

Lee McDonough: If I could add, Minister, as part of the GDA process, the generic design assessments, the Environment Agency is one of the regulatory bodies and they cover off that whole angle so work very, very closely with NR Wales, yes.

Andrea Leadsom: Yes. Of course, the UK is also bound by the terms of the EC Habitats Directive and the EC Birds Directive and the Ramsar Convention. Those are designed to conserve natural habitats and wild species across Europe. There is a great deal of environmental consideration taken into account.

Q297 Chair: Apparently, some UN committee has said that we need to do more to consult with our European partners about nuclear energy. This is all a bit of a surprise to me because I thought France was absolutely chock-a-block full of nuclear reactors, but apparently the Irish are complaining about Hinkley Point C. Is that going to affect Wylfa Newydd as well and are we to ask permission now before we go ahead with these sorts of schemes?

Andrea Leadsom: The Espoo Convention is not specific to the European Union, but what it has said is that they may consider that the UK needed to consult more widely but they will not be deciding that until 2017. We believe that we have made all of the necessary consultations. However, the Government are considering how best to proceed following the recommendations of the committee. While we do not believe that there is any requirement under the Espoo Convention to consult more widely, we think because the committee will not meet to decide their hearing until June 2017, we will probably extend the consultation for further new nuclear more broadly just to make sure that should they decide we needed to consult we have already done it.

Q298 Chair: But there will be no veto, will there, for any other countries?

Andrea Leadsom: No.

Lee McDonough: No.

Q299 Chair: In other words, we will tell them that if they want to send us their opinion they are welcome to do so and we will accord it the weight that we feel appropriate, like any other consultation.

Andrea Leadsom: Yes. As I understand it, there is the potential for European Union infraction proceedings in the event that we were found to be in breach of the Espoo Convention's decision.

Lee McDonough: I think the important thing is that we are confident that the mechanisms we have in place already do satisfy the requirements. All safety, security and environmental aspects have been consulted on, Governments, organisations and members of the public, anybody, has had opportunity to input through our normal processes, so we are confident that we already are meeting the requirements.

Q300 Glyn Davies: I think a lot of the witnesses who have appeared before the Committee and, indeed, a lot of the conversations that you will hear whenever nuclear power or nuclear power stations are discussed is about the safety of nuclear power stations. A lot of people will say they are just not safe. This is a part of dialogue. We have talked about licensing and design assessment here with the Office for Nuclear Regulation today. You, the Minister, are pretty confident that nuclear power is safe?

Andrea Leadsom: Yes. Do you know, having visited Sizewell B recently, having visited Sellafield very early on in my time as a Minister and having just last week been to the National Nuclear Laboratory, I am so impressed by the safety regime. The UK is a world leader in the entire process, right from the fact that the National Nuclear Laboratory is about 25 years ahead of the rest of the world in looking at advanced nuclear fuels that are safer to use, looking at safe methods of dealing with radioactive waste, the fact that Sellafield has some of the most complicated radioactive waste in the world and we are literally inventing engineering solutions to deal with this. It is so impressive. When you go to an existing civil nuclear site, the calm, measured, entirely safe and robust methods that are in place are really impressive. Yes, I am very confident that it is a very safe, very safely managed means of generating electricity.

Q301 Glyn Davies: No matter how safe you think it is or I think it is and the Committee in general might think it is, there is always a chance—maybe a very, very tiny outside chance—of an incident or some sort of an accident. How well prepared are the Government to cope with an accident?

Andrea Leadsom: We have an enormous number of methods in place. The Office for Nuclear Regulation is without any doubt one of the world's top nuclear regulators, which I think is one of the reasons why a number of developers are very keen to get their reactor designs approved here in the UK, because of the stringency of our requirements. The Office for Nuclear Regulation also sets the boundaries, for example, for detailed emergency planning zones around sites, which determine the area over which they consider countermeasures would need to be deployed in the very unlikely event that there was an incident. This is based on evidence that is very regularly reviewed. Local authorities have a legal duty to develop adequate plans under the Radiation (Emergency Preparedness and Public Information) Regulations of 2001, which includes all of the provision of prior information about the actions to take in the event of an incident. In fact,

only recently we have updated and upgraded and not exactly simplified but condensed the information to make it much clearer, punchier, and very, very user friendly for local authorities to be very well supported. They, of course, have a legal duty to develop adequate plans for emergencies under the radiation regulations of 2001. Those plans are updated every three years.

Q302 Glyn Davies: Is there discussion at the international level about preparedness? I did not know until I was reading papers in preparation for this session that the Belgian Government distributes iodine pills to the entire population in case they would be needed in terms of an incident. I had never heard of that before, but I suppose a lot of different countries in the world have all sorts of different preparations. Are we learning from each other? Is there an international field of cross-fertilisation?

Andrea Leadsom: Yes, certainly, we absolutely do speak to other nuclear-minded countries. There are various international organisations that meet and provide best practice. Specifically on the Belgian Government's handing out iodine pills, I can tell you we take a risk-based approach, which involves having iodine pills pre-distributed at civil sites nationally, and that is supplemented with extra distributions to people within a regulated, detailed emergency planning area on the day of an incident. We undertake periodic reviews of our risk-based approach to make sure that it remains fit for purpose, but it is definitely something that is constantly under review.

Lee McDonough: Could I add two things? I think it is important that the emergency planning zones are set by the ONR and they are a condition of the site licence, so all that is open and public and publicly available. The other thing is you asked about international institutions. The International Atomic Energy Agency is a good example of where all of these agendas are discussed. If you looked at what happened after Fukushima and the design changes that have been recommended as a consequence of that accident, how they were disseminated across the globe and built into our own GDA processes, it is a good example of how the international community shares experience.

Andrea Leadsom: Of course, I should add as you would expect the Government has very clear emergency response plans in place so that we would respond very instantly to any nuclear incident, but I say again the safety regime is second to none.

Q303 Mr Mark Williams: I think any of us who have visited nuclear facilities would certainly concur with what you have said about the security arrangements there and the measures in place. I think we have been largely reassured as a Committee about the rigour of local authority emergency plans. I guess as constituency MPs now we all get inundated with comments on these issues. One issue that does keep reoccurring is the way in which we as a country are dealing with nuclear waste, both transportation of and disposal of. I was wondering, with this rather mysterious issue in terms of disposal, what progress is being made with the geological disposal facility. More generally, how do you feel or how would you rate the UK in making nuclear waste safe?

Andrea Leadsom: I can only say again, having been to Sellafield, having seen some of the amazing engineering solutions that they are coming up with for interim storage—because obviously the ultimate solution is a geological disposal facility, but the interim storage requirement is still there—to safely store radioactive nuclear waste, there are all manner of

extremely innovative ways to deal with the extraction from some very old silos and so on, to deal with nuclear waste so that it is safe and not volatile, so it is in a secure position, and then to be stored extremely safely in places that are absolutely robust to water, bombs, you name it.

The interim waste disposal is incredibly important but, of course, as you rightly point out, what we and every other developed country have decided is that the geological disposal facility is the best solution for permanent storage. In the UK, as things stand, we are undertaking now the consultation to identify suitable sites. They need to be suitable—as in the local community are interested in considering hosting a site—but they also, of course, need to be suitable in the sense that the geology works for a geological disposal facility. Those two things both require a great deal of consultation and communication with local people and a great deal of geological work to pin down. We are looking at three to five sites to begin with, narrowing down to one or two sites at the end. That will take time and then, of course—

Q304 Mr Mark Williams: Sorry, presumably that is more a case of actually finding the appropriate site rather than setting a timetable for something that might not be sufficient.

Andrea Leadsom: The site that we will identify will be the final site. We will be launching the consultation next year and that will be with areas that are likely to have suitable geology but, in addition, do have the willingness from the local community to engage with the siting of a GDF—so, those two prerequisites. As I say, it may be up to five different sites that start the discussions. That will be narrowed down by looking at the optimal combination of the geological conditions and the willingness of the community.

Q305 Mr Mark Williams: That is necessarily quite a deep process of consultation given the sensitivity of what we are talking about.

Andrea Leadsom: Yes.

Mr Mark Williams: If we are talking about consultation next year, when would you envisage decisions being made on the specifics of a specific site or sites?

Andrea Leadsom: A specific site will be as soon as we can but—

Lee McDonough: As soon as possible, yes, but if we looked at it the other way round, in terms of what are our planning assumptions for when a GDF will be available—so that means what the sites are looking at in terms of their storage—as a planning assumption, we are basically looking at 2040 as the date for the first time that waste could go in. But that is an indicative date and it is not a target or a milestone.

Andrea Leadsom: I am urging them to speed it up.

Lee McDonough: To go faster, but I think that the reason for that, it sounds a long way off but it is not really, in terms of the degree of engineering that needs to happen. As the Minister says, we want to go as soon as possible to get to a point where we can start to do the engineering work. The exact timetables on projects of this scale—and particularly given the public interest—is slightly variable, so 2040 is the planning assumption but we are hoping that we can go sooner than that.

Chair: Can I quickly take a supplementary from Glyn and then we will go to Liz, if that is all right?

Liz Saville Roberts: I would like to move on to the Government's programme—

Chair: Liz, may I just bring Glyn in for a quick supplementary?

Q306 Glyn Davies: The only reason I want to ask is because it is a fundamental question. I have an interest in this issue because the previous Government about 12 or 15 years ago set up a UK committee to look at what we did with waste. It was called CoRWM, I think.

Lee McDonough: That is right.

Glyn Davies: I was the Welsh chairman that looked at this at the time. The conclusion was deep disposal, but increasingly I am hearing people say that is something we should really not be doing—that a huge amount of energy is still left in this waste and it ought to be reprocessed. As you have seen, Minister, the technology is developing so quickly, to bury it underground is a massive waste of a huge resource. Is there any thinking in terms of rethinking that the ultimate solution is deep underground disposal, or is there some thought being given now to reprocessing in order to avoid waste?

Andrea Leadsom: The answer to that is that there is the potential for reuse of some nuclear waste. That does require technology that is not yet available and could potentially cost a huge amount of money to create and could take as long as the GDF. The geological disposal facility will almost certainly be needed anyway, so the question of what you could reuse and potentially create energy from nuclear waste, you are exactly right: there is a lot of work ongoing to look at that and there are some proposals that have been put to the Government. As things stand, there is not something that is operating that someone can point to and say, “Yes, this would work to commercial scale” and so on. Again, it is that bird in the hand and the GDF will definitely be needed anyway.

Chair: Thank you for that.

Q307 Liz Saville Roberts: Given that Trawsfynydd is the only publicly owned site that is not otherwise earmarked for development, what assessment have the Government given to Trawsfynydd as a possible site for an SMR?

Andrea Leadsom: As things stand, we are very excited about SMRs. It is a part of our new nuclear programme. It is not going to displace the other new nuclear plants that have been brought forward, but SMRs could absolutely add to our existing plans. However, there is no SMR design that is buyable off the shelf, but we do recognise that there are a lot of potential designs. As you will be aware, we have launched our competition. That closed in early May and we have had 38 responses. We are sifting through those. None of them are commercially available—obviously, they are at design stage—so whichever go forward will need to go through that GDA process and only probably quite a bit later this year will we get some proposals ready to look at potential site licences and where you might put them and so on as well as which designs might be most fruitful.

What I can say is that the huge advantage of SMRs is, first, that they are much cheaper per unit than a large nuclear build, and that makes a big difference because it makes them

much more fundable through the financial markets. That is a huge advantage for them because these big nuclear projects are extremely difficult to finance. Then the other big advantage is, of course, that you could create, in effect, a production line for SMRs. You could make them quite commercially available, so they could be a huge opportunity for UK plc if we can build the entire supply chain, including the design of the reactor itself, and then it could be a huge exportable opportunity. There is a huge amount going for it but, as things stand we are still a bit of a way off considering where site licences might be applied for.

Lee McDonough: If I could add just to be clear, Trawsfynydd is not currently licensed for new build. It is licensed for decommissioning activities. We said at the Budget that we would come back later in the year with a roadmap that would set out how we are going to take forward SMR delivery, including siting because clearly that is on the critical path. If you do not have a site, it does not matter which design you pick. Obviously at that point it will become clearer about the role that Trawsfynydd could play.

Q308 Liz Saville Roberts: Exactly, that is the question—thank you very much for leading me into it—that it is not on the 2009 strategic site assessment, precisely because at the time the lake did not contain sufficient water, as was anticipated, for the technologies at that time. But the technology has moved ahead, so what does Trawsfynydd need to do to be in the running? Alongside that, it is all owned presently by the Nuclear Decommissioning Agency, but they are in the process of considering selling off properties around the lake, including the lake itself. I think the implications of what that might be need to be considered at this stage. I would appreciate your response to those.

Andrea Leadsom: I think this is a very live issue right now. The Department is already looking at potential places that would be suitable for SMR sites, so this is a very timely intervention that you make and it is certainly something we will take back to the Department and look at. Obviously it is a bit “chicken and egg”, because the Department will be looking at potential sites, but equally we do need developers to come forward with projects. This is not a top-down way that we run infrastructure in the energy space. We do wait for developers to come forward, so it would be very welcome for developers to feed into the process, but I can assure you that we are also looking at what is a potentially suitable site.

Lee McDonough: We will set out publicly the site criteria that are appropriate for SMRs and the plan is to start to do that later in the year. I think the timescales are probably acceptable.

Q309 Liz Saville Roberts: Finally, when the time is appropriate, I would very much like to invite you, Minister, to Trawsfynydd to see the resources that are there.

Andrea Leadsom: Thank you, yes, I would love to. Thank you very much.

Q310 Chair: We will see. Can I ask one last question very quickly? It goes back to the first point you made about the need to decarbonise and the concerns over global warming. If it were not for those concerns over manmade carbon emissions and the pressure to decarbonise, would we still be pursuing the nuclear option at all?

Andrea Leadsom: Yes, I think we absolutely would because, for a start, we do need cleaner air. It is not just about decarbonisation. My Department's responsibility is the climate change goals, but clean air and a clean, sustainable energy future is absolutely vital. The beauty of nuclear is, of course, that it is dispatchable. It is a very good egg in our basket of diverse energy sources. Yes, I think we would almost certainly be doing it anyway.

Chair: Great. Thank you very much indeed for that.