

Energy Security and Net Zero Committee

Oral evidence: [Revisiting the nuclear roadmap](#), HC 735

Wednesday 22 April 2026

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[Watch the meeting](#)

Members present: Bill Esterson (Chair); Lizzi Collinge; Torcuil Crichton; Graeme Downie; Wera Hobhouse; Melanie Onn; Claire Young.

Questions 251 - 335

Witnesses

[I](#): Andy Mayall, Deputy Director of Nuclear and Radioactive Substances Regulation Strategy, Environment Agency; Paul Fyfe, Director of Regulation – Futures, Office for Nuclear Regulation; and Mustafa Latif-Aramesh, Nuclear Taskforce Member, Nuclear Regulatory Taskforce.

[II](#): Simon Bowen, Chair, Great British Energy – Nuclear; and Dr Gareth Headdock, Chief Science and Technology Officer, United Kingdom National Nuclear Laboratory.

Written evidence from witnesses:

- [Environment Agency](#)
- [Office for Nuclear Regulation](#)
- [Great British Energy - Nuclear](#)

Examination of witnesses

Witnesses: Andy Mayall, Paul Fyfe and Mustafa Latif-Aramesh.

Q251 **Chair:** Welcome to this morning's session of the Energy Security and Net Zero Committee on revisiting the nuclear roadmap. Our first panel is with us. Could you introduce yourselves, please?

Paul Fyfe: Good morning. I am Paul Fyfe, the futures director for the Office for Nuclear Regulation.

Mustafa Latif-Aramesh: Good morning. My name is Mustafa Latif-Aramesh. I am a partner at TLT, a law firm, and a member of the Nuclear Regulatory Taskforce.

Andy Mayall: Good morning, everyone. I am the deputy director of nuclear and radioactive substances regulation strategy at the Environment Agency.

Q252 **Chair:** You are all very welcome. I will start the first question about understanding the impacts of the Nuclear Regulatory Taskforce review. Mustafa, can I ask you to begin? How will we know that the new approach is having an impact?

Mustafa Latif-Aramesh: I think there are three things to say. The first is that the Government published their response to the taskforce report, "Nuclear Nation", a little over a month ago, and in that document the Government set out their plans for how they will go about implementing the taskforce's recommendations.

The second thing to say is that the measure of success is something that we consciously considered when we were drafting the report. In fact, the very last chapter of the report sets out what we think success looks like. As it currently stands, we are on course to reduce the amount of nuclear we use as a proportion of energy generation in this country, and what we want to do is seek to reverse that to meet the Government's ambitions for 20 to 40 GW of nuclear energy to be available.

The third thing to say is that the taskforce's report was obviously about energy generation, but it was also about national security, and that has two dimensions. The first is ensuring that we have energy security, but the second element is much more concretely about the defence context of nuclear. Success in that context is ensuring that we have a stable nuclear deterrent and the ongoing military functions that are relevant so that nuclear can continue.

Q253 **Chair:** In your report you highlighted the lack of regulatory tension and how it pushes risk reduction beyond what is proportionate as ever higher standards become entrenched and a risk-averse mindset grows, regardless of the time, cost or effort required. How can we be confident that this risk-averse approach will be addressed in a proportionate way to provide the increase in speed of action that meets the scale of ambition



that you have just outlined?

Mustafa Latif-Aramesh: Again, there are three things to say. The first is that the implementation of the measures in the taskforce's report was in large part driven to ensure that there is enhanced regulatory tension. One point worth emphasising is that, when we talk about risk aversion, we are not referring to any specific party. It was not as though we were saying, "Oh, it is the regulators who are risk-averse". What we were identifying was a systems problem. The implementation of the measures themselves is intended to ensure developers act proportionately in using cost-benefit analysis. It is to tweak some of the rules, particularly in the environmental and regulatory context, so that they are dealt with more proportionately.

The second thing to say about ensuring that things are dealt with proportionately is that one aspect of the report was ensuring a cultural shift across the industry and across all the significant players involved in nuclear regulation. The Chancellor sent a letter to the wider nuclear industry just after "Nuclear Nation" was published, asking all organisations to set out how they intend to increase their risk appetite within the law. I am hopeful that that measure, in and of itself, will make it clear what the Government's expectations are and that all parties who then respond to the Chancellor can do so.

The final thing to say about reducing risk aversion is that I think the publication of the report itself, followed quite quickly by the Prime Minister's strategic steer to regulators, made it very clear what the Government expect from the industry as a whole. I think what you are seeing is an emerging practice where, after each and every measure, someone will say, "What does this mean in the light of the Fingleton report?" or, "What does this mean in the light of the taskforce's report?" so you are already starting to see some reduction in risk aversion.

Q254 **Chair:** Paul, culture change is a very big challenge for any organisation. It is an even bigger challenge when it covers multiple, closely linked organisations. We have just heard from Mustafa what the Government's expectation is. How do you think you can guarantee that we will see the changes in the review?

Paul Fyfe: The first thing to say is that the ONR welcomes the taskforce's report and the Government's steer, and we recognise the issues that the taskforce brought up. You raised the key one, which we would agree is culture. A few years ago we had our own cultural survey done by one of the academic institutions, and it found very similar things to what the taskforce team has found. For very good reasons in principle, sometimes people were looking for perfection rather than what is sufficient or good enough to deliver the effect. We have done a lot to deliver cultural change in the interim between our own cultural survey and what the taskforce has said.



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We are doing a couple of things. One is simplification of our policies. We have something called the safety assessment principles, and we are thoroughly reviewing those to make them simpler and more concise. We estimate that by the time that is done, towards the latter part of the year, we will have reduced our guidance and documentation by 30% to 40%. That makes it easier for people to understand the key point, but it also means that we can reduce the potential for people to go for perfection.

Another thing is that we have a process called risk-informed targeted engagement. We are redoubling efforts to train our people in the way that Mustafa says is the "So what?". What risk are we trying to reduce? If the effect we are having is reducing a risk by only a tiny percent, or if it is an insignificant risk, we are getting our staff to realise that and then move on to something that is more significant. Cultural change, as you have alluded to, will take time, but we have a number of processes and training programmes in place to produce that.

Q255 **Chair:** We now have a lead regulator model. Has that started to be used?

Paul Fyfe: Yes. We have now agreed with our fellow regulators the concept of how that will operate. We welcome that. It is too complex at the moment for operators and new entrants to come in and figure out which regulator they are supposed to go to. The lead regulator will, as far as we can see, make an immense difference. It does not mean to say that the ONR will be in charge of all the other regulators. The independence of each regulator will stay, but in effect there will be a one-stop shop for people to go to, and then we will sort out the easiest and simplest way for them to get to the other regulators.

Q256 **Chair:** Andy, on the move to a less risk-averse approach, does your organisation have the necessary expertise, resources and capacity to work to a lighter-touch regime?

Andy Mayall: Yes, I believe we do. First, we also welcome the taskforce's report and its recommendations. The Environment Agency has a statutory remit to protect and enhance the environment, taken as a whole. That includes human health, both now and in the future, and in doing so to support sustainable development and growth. The question about risk is very pertinent to our role because we have to balance risk and its mitigation across a range of aspects, taking into account the benefits of technologies and projects. That question about risk aversion is central to what we do, and it is an issue we have been working on for quite some time, thinking about how we balance that risk against the benefits of development, technologies and so on.

Q257 **Chair:** What was the answer you came up with?

Andy Mayall: I was going to say that we have a range of disciplines within the Environment Agency. It is quite a broad organisation. We can take into account the health effects of industries, for example, and balance them against the benefits they provide, so we do have the skills.



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On being less risk-averse, we are looking at updating and revising our guidance, for example, to make sure that we take an integrated approach to risk, working with other regulators and recognising the big picture in which we operate.

Q258 **Chair:** How will you be measuring any changes in how you operate against revised guidance?

Andy Mayall: We have put various things in place already. For example, we are speeding up the permitting process. In issuing environmental permits, we have already put some key performance indicators in place to measure the issuing of permits more quickly. Risk aversion is a very difficult thing to measure, but we will be looking at how we can do that in the future.

Q259 **Chair:** Paul, the ONR and the Environment Agency are enabling regulators. The taskforce found evidence that applicants are unlikely to challenge regulators. How will you expect the Environment Agency to maintain a culture that balances support and scrutiny?

Paul Fyfe: We recognise exactly what the taskforce said, and we have some evidence to support it as well. Basically, the short answer is more collaboration, building better and more effective relationships with vendors, new applicants and our current operators in order for those conversations and that challenge to happen. We now also have a process in place where we will upgrade our own internal challenge. The inspectors who are making the decisions will be openly challenged by our own team. However, key for us is building better relationships so that those conversations take place, and so that we do not see any more of us and the operators moving increasingly to perfection, but rather to what is good enough to be able to do what we need to be doing.

Q260 **Lizzi Collinge:** My question continues on the theme of proportionality. The UK nuclear sector is meant to operate under the “as low as reasonably practicable” principle, but we have heard evidence that the practicable bit sometimes gets a bit lost. I want to start on the environment with you, Andy. The Nuclear Regulatory Taskforce found that regulators often impose very strict, one-for-one, site-specific environmental mitigations. Do you think it is possible to get a more proportionate approach, including off-site mitigation, and for that to be reflected in regulatory decisions? If so, what is the risk of that?

Andy Mayall: First, the Environment Agency is a statutory consultee in the planning process. It is not a decision maker in the planning process. In any of the advice that the agency provides to the planning process, we take that bigger picture and wide-ranging view into account.

In our permitting role, we have a duty through various statutes to take socioeconomic and environmental costs and benefits into account in how we make our permitting decisions. We can take environmental benefit into account as part of our permitting decisions, and we will also do that



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with the advice we provide to the planning process. I think you might be referring to the habitats regulations.

Q261 **Lizzi Collinge:** That is part of it, yes. Are you limited by current regulation in the balance that you can give to different costs and benefits?

Andy Mayall: Potentially, yes. It is something we would like to do more of, but I do not have any information to hand. However, the legislative framework could be better in allowing that to happen.

Q262 **Lizzi Collinge:** Mustafa, I want to talk about both safety and environmental risk. The public obviously have views about safety, risk and environmental benefits, and they do not necessarily have a huge amount of knowledge about the nuclear sector in particular. Are you concerned that reduction or changes to regulatory control could potentially impact safety or environmental aspects in a negative way? Secondly, are you concerned about public support for nuclear if it is seen that we are reducing safety or environmental controls?

Mustafa Latif-Aramesh: Can I deal with safety and the environmental context separately?

Lizzi Collinge: Please do.

Mustafa Latif-Aramesh: Thinking about safety, the lens through which we looked at this is that complexity is not safety. There is safety to be had in the concept of simplicity. When you have an incident or you are trying to prepare to make sure that the incident never occurs, having reams and reams of pages is not helpful. We consider that none of the recommendations will impact the outcome of making sure that we have safe and reliable nuclear. What it is intended to do is enhance safety and make sure that, in fact, the public can understand the risks in a more transparent way. None of the measures in the safety context are saying that we are fine with an unsafe reactor. What they are calling for is proportionality and making sure that the decisions that Paul has referred to—a fraction of a percentage change in safety when the reactor is already operational elsewhere in the world—are not used as a reason for delaying a project.

On the environmental side, I think it is worth saying that many of the ideas in the taskforce's report were taken from European countries where the primary driver is looking at environmental outcomes. When we are talking about strategic compensation, off-site compensation, these things, in our view, would be better overall for nature. This is not about allowing developers to forgo all responsibility. It is trying to ensure that there is a focus on ensuring the best environmental outcome.

The last thing I will say on both safety and environment is that we often look at the risks of doing something, but there is also a risk in not doing anything. The risk in not developing nuclear, both in the energy and military context, is in our view sufficiently high that it should force us, as



the Government has accepted, to look for ways to expedite its delivery without affecting safety or the environment.

Q263 Lizzi Collinge: That brings me nicely on to a question that I will put to Paul Fyfe first. Outside of this Committee, I have had conversations about the shutdown of two nuclear reactors in 2022, at the height of an energy crisis. I have also had conversations about how reactors like Heysham 1 and 2 in my constituency are assessed for life extension. My reading of the evidence I have been given is that the ONR is risk-averse to the point of silliness, if I can put it like that, in how it measures the risks to a reactor. I am talking about things like graphite cracking and having to survive a one in 10,000-year earthquake, which is geologically unlikely in Heysham.

How are you looking at the wider benefits of nuclear, as Mustafa just raised, in the context of the current energy crisis? Are you reviewing the way you assess currently operating nuclear power stations to ensure that they can safely continue operating for longer?

Paul Fyfe: Along the lines of what Mustafa said, we see nothing in the taskforce that tells us we should be reducing standards. As the independent regulator for nuclear, as far as we can ascertain, the standards will remain and the public should have confidence that the safety standards will prevail. Our current regulations for current assessments and the other things you referred to follow international best practice for the safe operation of nuclear power plants.

At the moment, as was recognised by the taskforce, we do not take into account national issues such as energy security, defence or national security. The Government have indicated that they want to give us those vires, and how best to do that is being worked through at the moment. In future, it may be that the ONR will be given the powers to look at that in a different way, and then we will assess that through the system.

Q264 Lizzi Collinge: Do you agree that the extent of the risk aversion in some assessments of existing nuclear power stations goes too far? For example, that you have to disregard the secondary and tertiary safety mechanisms, nitrogen and boron, and show that the control rods themselves can shut down the reactor. This might be a bit detailed for your role.

Paul Fyfe: It is a bit detailed, but in principle I would refer back to saying that we follow best practice—the good practice that has come down internationally. There have been years of looking at these things, and there is a consensus about how we assess reactors. We may not do it in exactly the same way as our peers internationally, but broadly speaking it is the same.

There are two questions here. There is a question about the safety of the reactor in principle terms, and then there is the more strategic picture of national energy security or national defence. At the moment, as the independent regulator, we only look at the latter through our vires and



our regulations, but that is in discussion, as has been raised in the taskforce, and now we are in discussions with the Government. Ultimately, however, what we regulate is a matter for the Government to decide.

Q265 Lizzi Collinge: The taskforce identified regulatory duplication across the myriad regulators we have in the nuclear space. Have the regulators started working on that and on trying to harmonise processes to avoid duplication? Is that work already in process, or is it yet to start?

Paul Fyfe: The short answer is yes. There is some duplication. We are now looking at harmonisation internationally as being of key importance. We will crack on with looking at some of the duplication in our national areas, and the lead regulator model will help to iron out duplications and bring them to the fore before they become a problem for operators.

Looking at the international picture, we are encouraged and excited by the US Government and our Government signing the Atlantic Partnership. We are off to the States next month to nail down the details of what that means in terms of working together. Ultimately, in really simple terms, if we are assessing a reactor in design and so are the Americans, we want to use what they have assessed and have it come straight across to us, and vice versa, so that there is no duplication internationally. That will give vendors, and probably more importantly their investors, some assurance, significant assurance, that if something is going to be accepted in one jurisdiction it will be accepted in another.

Finally, in our own domestic area, we are assessing Rolls-Royce, as the Committee probably knows. Five international peers are observing our assessments because their countries may also be interested in Rolls-Royce. Our goal, which we think we will definitely get to, is a vast reduction in the number of independent assessments needing to be done by international regulators in order to make it cheaper and faster.

Chair: I think you have a question on decommissioning and waste management. You have three minutes.

Q266 Lizzi Collinge: Yes, three minutes on waste management, great. I am too obsessed with graphite cracking. When we build nuclear reactors, they are meant to look at the whole lifecycle, including defuelling and decommissioning. Is that being effectively interpreted and applied today? Given that we do not have a GDF, and that we do not know when and where we are going to have a GDF, how is that going to work? How do we plan for a whole lifecycle when we do not have part of it there?

Andy Mayall: That is a significant issue in our view, and it is an issue that we have been raising for many years. It is the issue of the ecosystem, the infrastructure that supports nuclear energy and defence, and the lack of suitable waste management infrastructure is a serious issue. At the moment, the UK Government have put in place various instruments to try to tackle that. We now have the funded



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decommissioning plan legislation in place for a new build, for example. Developers are required to set aside funding for waste storage and management, pending the arrival of a suitable disposal facility. That is one thing, and the agency is a consultee on that process. Yes, that is one way of planning for the future. Safe storage in the interim is obviously also part of the picture at Sellafield, for example. So, safe storage, funded decommissioning and development—

Q267 Lizzi Collinge: What are the costs of safe storage while we do not have a GDF, and how do they compare with getting on with a GDF?

Andy Mayall: That is a good question. I do not have the figures to hand, but we can certainly provide them in writing if you would like. The trade-off between the costs of indefinite storage versus disposal is a key issue in our recent response to the Nuclear Decommissioning Authority's consultation on its strategy. We pointed out that earlier decommissioning and waste disposal is perhaps preferred and that we do not hand this burden on to future generations to handle. Yes, it is a significant issue.

Q268 Lizzi Collinge: We keep being told that there is a lack of skilled workforce in the nuclear sector and that there is a concern that people will move from decommissioning into new generation, or will not move from new generation into decommissioning, because of the pay gaps and cultural aspects, to be honest. Do you think that regulators and public bodies are resourced to be able to recruit and retain the skilled staff we need to ensure defuelling, decommissioning and storage happen well?

Andy Mayall: The Environment Agency is finding it difficult to attract the right skillset to enable us to regulate effectively in this sector now. There is a lot of competition out there. It is a challenge.

You are right that the regulatory and decommissioning skillsets are as important as some of the skills attached to the shiny front end of the lifecycle. We very much support the whole lifecycle approach because decommissioning and waste management are a critical enabler, as are skills, to enable the success of the energy and defence sectors as a whole. I think there has been too much focus on the front end, and there needs to be more focus on the back end of the lifecycle.

Chair: Thank you very much. We need to move on.

Q269 Graeme Downie: I want to talk about the generic design assessment and ask each of you to describe very briefly what your view is on how effective it has been up to this point, given that only one has led to construction. We will then explore some issues around that. Andy, a very short answer to start with, please, and then we will talk around it.

Andy Mayall: We have done eight GDAs, or thereabouts. One design is going through to construction, so on that score it could be better, but we recognise that it still has great potential. We are seeing a lot of interest from vendors still in the process. For example, we have Rolls-Royce going through the process at the moment on Anglesey, and we have another in



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the pipeline, TerraPower, coming soon. We have recently completed two GDAs, Holtec and GE Hitachi. We understand that Holtec is destined for application potentially in the UK.

Graeme Downie: We will come back to that. I want to explore it in a bit more detail in a second.

Mustafa Latif-Aramesh: I think the thing to say about the GDA is that, up until now, it has not been used in the way it is intended to be used, which is, as the name suggests, a generic assessment of risk so that you can make site-specific assessments more streamlined. I think there has been a tendency to use the generic design assessment process primarily as a tool for investment decisions, to show that you have sufficiently progressed that you can unlock the next stage of investment, which is not its purpose. What we have said in the taskforce's report is that if you implement the measures that require further proportionality, the introduction of regulatory tension, you will find that the timescales for GDA should come down.

It is also worth saying that, following President Trump's visit last year, I think there is an agreement that where there is high international co-operation and collaboration you will see that come down, and that is the aim. To date, however, I think it has not served its primary function.

Paul Fyfe: I agree with Mustafa. I think what we can be proud of is that the UK has a great reputation—that is not just the regulators but the UK. People want to come through that GDA process to get that assurance from regulators, exactly as Mustafa said. We have learned an awful lot of lessons since the start of the GDA. The GDA process has been reduced from four years to two years, with no reduction in standards. Andy was talking about the two that have recently gone through phase 2. We are pleased to say that the combination of regulators, with great collaboration with the investors, have reduced the resource on that phase by 35%, saving several million pounds for both companies, and it has been the quickest phase 2 we have done so far. If Mustafa's suggestions come to fruition, I can see that there will be great utility in the GDA going forward.

Q270 **Graeme Downie:** You mentioned that you have brought the timescale down from four years to two. What is a reasonable target? Where do you want to get it to?

Paul Fyfe: In the combination of the GDA and the licensing, there is a caveat that in order to make the GDA go through in two years, we need the vendors to give us stable designs. Sometimes we see that, for very good reasons, the vendors want to change the design and then it has to go back in the process. However, if everything goes to plan, the idea or the aspiration is two years for GDA, and then one year for licensing, to get the process fundamentally cheaper and faster but with no reduction in safety standards.



Q271 Graeme Downie: What are the measures? What can you do to make sure vendors are treating the process properly and not as a vehicle for investment decisions for FDI? That question is for whoever feels best able to answer it.

Mustafa Latif-Aramesh: There are two things. One is nothing to do with the actual GDA or site licensing process. It is to have a clearer process for Government to say, "Yes, we want this particular project to come forward". If you give vendors the ability to apply for in-principle decisions, they no longer need to use alternative means to show investors that they are going down a path where there is sufficient advancement.

The second thing is that using the generic design assessment process is useful if you are pursuing a fleet approach to the delivery of your reactors, because you can use the outcome of any GDA process in rolling out those reactors. The wider measures on enabling a fleet approach should then encourage people to use the generic design assessment process for what it is for, which is the baseline.

Q272 Graeme Downie: Can I just pick up on that approach about future fleets and technologies? Is the GDA set up correctly to deal with SMRs and AMRs? You mentioned the Rolls-Royce project, but is it currently set up properly to deal with both SMRs and AMRs? If not, what more needs to be done to make sure that is in place?

Paul Fyfe: Again, the short answer is yes. Because the process is technology-agnostic, it will be able to cope with any of the new technologies that come along.

Andy Mayall: We have, jointly with our colleagues, instigated a formal early engagement process to allow those advanced technologies to be discussed and have an early assessment prior to GDA in a staged process. That caters for more emerging and advanced technologies.

Q273 Graeme Downie: Linked to some of the questions Lizzi asked earlier, do you think you have the right skills, particularly in the Environment Agency and elsewhere, to meet the targets you are talking about for the GDAs, and particularly thinking about new technologies?

Andy Mayall: We have been working with the ONR in support of Government for about 10 years on building capacity for advanced nuclear technologies. It is fair to say it is still work in progress. If we see the scale of ambition realised, we believe the Environment Agency will need greater skills. We have the skills, but it is the capacity, I think, as well. However, it is not just a question of capacity and capability; it is also about ways of working. We need to be more efficient in the way we are delivering. We have been doing a lot of internal work on redesigning our processes internally to deliver more efficiently. It is not all about throwing extra resource at it; it is about doing things more efficiently as well.

Graeme Downie: Another thing to pick up on—



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Q274 **Chair:** We need to move on. I have one follow-up question to Paul in particular. The fleet approach and the delivery of economies of scale for production, from a regulatory process, is that a key part of what you are saying about regulation?

Paul Fyfe: As Mustafa says, the process was primarily designed for a fleet approach, but I suppose you could say that because of the reputation of the UK, because people want to come through the GDA process, they are using it for different things. That clearer steer from the Government may help us, but when the Government give us something to assess through the GDA, that is what we do.

Chair: That is very helpful. Thank you.

Q275 **Lizzi Collinge:** I want to move on to my favourite subject, the semi-urban population density criteria. EN-7 retained the semi-urban population density criteria, despite the fact that it was created in the 1960s, it was based on technology we no longer use and it does not have the decades of operational and safety data that we now have. Concerns have also been raised that it is too restrictive, it is not based on good science and it prevents the development of new technologies, particularly in new areas. Does the panel think it is a blocker on new development? Do they think it is appropriate? If not, how would you review it?

Paul Fyfe: I understand that this is a particular concern of the Committee and I also understand that our chief executive and chief nuclear inspector, the last time he appeared, gave a commitment that he would work with the Government to review it. That is exactly what is happening now. You are correct. It is a long-standing policy that the Government have now said they want to look at. Is it proportionate, does it meet the new technologies, and so on? I can assure you that the review is ongoing, but it is ultimately a matter for Government.

Mustafa Latif-Aramesh: I should say it is also one of my favourite topics. I also think it is a blocker, for all the reasons you said, and the only nuance I would add is that it is not just about new areas; existing areas are failing that criteria because of bad science.

Lizzi Collinge: I live in Heysham.

Mustafa Latif-Aramesh: Exactly. What is good about the Government's response is that they have committed to reviewing the methodology that underpins the semi-urban population density criteria. The taskforce recommended that there should be a revision of the policy, and the key thing in this context is that, as we move towards SMRs and AMRs, we do not want to prevent the great benefit of having nuclear close to existing industries in those new areas.

To underline the point, most of our comparable friends and allies do not have these criteria. It is not based on safety, because we already have dose limits and restrictions on exactly how you build and construct



nuclear facilities that are adequate to protect the public. So the revision is welcome, and I wholeheartedly agree with your preamble.

Q276 Lizzi Collinge: As we have talked about looking at smaller sites closer to urban areas, for example, as well as sites like Heysham, are there any other regulatory considerations that we should have as we move away from just having traditional nuclear sites towards a more dispersed network, hopefully, of SMRs and AMRs? What other regulatory considerations should we be having? Is there anything new that we should be thinking about?

Mustafa Latif-Aramesh: One thing that I think requires some thought and development is one of the protections in place that I just mentioned. All nuclear facilities, when they are constructed, will have what are called detailed emergency planning zones that surround the area, where there are safeguarding measures for the public—proactive measures. It is not yet clear exactly how those will be implemented for the SMRs, because the existing buffer zones and boundaries, for example, are relevant for gigawatt-scale development, but they are less relevant here and need a bit of development. One of the recommendations in the taskforce's report was for a detailed consideration and revision of some of those boundaries so that they are more appropriate. That is probably the most direct example of something that might need to change.

Q277 Lizzi Collinge: Finally, Paul and Andy, do we think regulators have the capability, expertise and resources to regulate these emerging technologies—SMRs and AMRs are new technologies—and can we do that in a proportionate and effective way?

Paul Fyfe: Yes is the short answer, but it comes back to the challenge of capacity. In terms of making sure that we can do exactly as you say, we have increased the number of pipelines coming into the organisation. We take in more graduates and apprentices. Even before that, we have now retrained a significant number, a small but significant number, of our support staff into regulatory roles, so we are increasing the amount of training we are giving people.

We also have access to what we call technical support contracts. If we do not have deep technical knowledge in a certain area, we can buy it in through the academic resources, and we can bring in PhD students and so on. I am very confident that because our regulations are agnostic to technology, and because the vendor has to prove through claims, arguments and evidence that it is going to be safe and secure, we have the wherewithal to do it. However, we are not complacent about, say, the reduction in experience because our older and more experienced staff are retiring. We have even brought some of them back part-time to train our new people. We are not complacent, but we are confident that we can meet the demand. I am pleased to say that we have never been on the critical path for anything thus far, and we do not intend to be.



Andy Mayall: It is a similar picture at the Environment Agency. It is also important to recognise that it is a multidisciplinary issue. Seeing the deployment of nuclear technology in new areas, for example, and different deployment modes in co-generation and that kind of thing will need a multidisciplinary approach. It is not all about your traditional nuclear skills. Take water resources, for example. Lizzi asked about the capacity and constraints around new deployment models. Water resources will be another one of those, in addition to population density. We are busy trying to make sure that the organisation is equipped across the board, not just in traditional nuclear-type skills.

As Paul said, we are not complacent. I think we are gearing up to make sure that we can transform. We are undergoing a transformation process in the Environment Agency to deliver these new programmes, not just in nuclear but in other sectors as well.

Q278 **Claire Young:** We have already touched on the issue of relying more on approvals by trusted international regulators. Can I start with you, Mustafa? I have constituents who are concerned that we are just going to accept, for example, US safety standards, as they perceive there to be a different safety culture in the USA. How do we balance avoiding duplication with maintaining our safety standards? Should regulators be required to explicitly justify any deviation from a reactor design that has already been approved internationally?

Mustafa Latif-Aramesh: On the first of those, I think it is clear in the taskforce's report and the Government's response that we are not progressing with something like a unilateral or bilateral recognition of any nation's approvals. Instead we are doing what Paul referred to earlier, which is increasing collaboration and making best use of the information and evidence that is presented as part of other approvals. In talking about the balance, I think that is where it lies, in leveraging as much as possible from international processes and regulators.

Your second question is about whether there is a concern from a safety perspective that we would be relying on the wrong types of information because it is presented in different regulatory regimes. I think the answer is that what we are trying to do is, again, make best use of what is already available, and proportionality means that we are not reinventing the wheel every single time a new reactor or new facility comes forward. If a facility is operating safely, that should clearly be a consideration in any regulatory process. Design changes are costly and delay development, so there should be justification for deviating.

The example I often like to give is stolen from Julia Pyke, the former head of Sizewell C: in this country, when Hinkley was being constructed, we had to fund and develop our own welding academy because we did not have sufficient resources. The more changes you make, the more breaks in the supply chain occur, so you do not just have to relearn or redesign a particular aspect of a development, you have to ensure that the entire supply chain relearns it. There is a significant benefit in



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ensuring that we can constantly reuse the same supply chain, which is downstream of not making design changes unless they are absolutely necessary.

Q279 Claire Young: On this issue of design changes, we have had some evidence arguing that the changes required by the ONR at Hinkley Point C were essential to address flaws in overseas designs. How do you judge whether UK variation is justified rather than excessive?

Paul Fyfe: In terms of reassurance to your constituent and yourself about just accepting other jurisdictions' standards, even if we wanted to do that it is not legally possible and not what we want to do. As Mustafa said, we will be upholding the UK's safety standards as set down in the legislation. The issue, again, is exactly as Mustafa says. We want to be able to use their assessments, where their assessments are applicable to the UK legislation and safety framework, and not simply go through them again.

In terms of Hinkley Point C and the changes there, a lot has been said in the media about how many changes were required and what the cost was. We do not recognise the number of changes that were made nor the costs, and we instructed a detailed report to try to find that evidence. I am happy to give that report to the Committee, but we do not agree with what was said in the system.

Q280 Claire Young: Looking at the wider question coming out of that, how do you judge? Some changes were made. How do you judge whether those changes are justified?

Paul Fyfe: The changes are always ultimately agreed with us and the vendor, and they go through a rigorous process of assessment. Now we are making sure that those processes are even more proportionate, but there is a rigorous process and peer review of how that works so that we are satisfied that the changes required for Hinkley Point C were in line with the legislation and were proportionate.

Q281 Claire Young: Andy, evidence suggests that misalignment between UK regulation and comparable countries deters investment. Do you agree, and what steps are being taken to address this?

Andy Mayall: I do not agree. I think the UK system of regulation is heavily based on international standards, such as those that come out of the International Atomic Energy Agency. That harmonisation piece, if you like, and consistency is there in the UK. The application of the ALARP principle was referred to earlier, and it is sometimes alleged to be gold-plating by some commentators. We have heard that, but I do not believe it is the case. The equivalent in the environmental regulatory space is called the ALARA principle. It is a similar concept. We do not look at that as a minimisation requirement. It is a question of balancing risks and costs against benefits. I do not agree with that observation.

Q282 Claire Young: Paul, what efficiencies do you think can be gained from



greater co-operation with international regulators, and what should Government do to make that possible?

Paul Fyfe: I think the Government have already done it. As I said earlier about the partnership with the Americans, I think if we can get that collaboration and can use their assessments, and if they can use ours, so that we do not duplicate, there are significant savings to be made. I cannot quantify them exactly, but I think in principle they would be significant. The really interesting thing about the Atlantic Partnership, if we get that right, is that we can duplicate it with our European partners as well. Then, although I do not think we will ever get complete harmonisation through all the jurisdictions, we can certainly go a significant way towards reducing to the absolute minimum any duplication between the independent jurisdictions' legislation.

Q283 **Chair:** Mustafa, should the Government revisit the plutonium policy? At the moment, it is treated as a fuel under the waste burner concept, but UK policy classifies plutonium as waste. Should the Government revisit the policy, and can you tell us what security, regulatory and financial implications they would create in doing so?

Mustafa Latif-Aramesh: I think my answer on this will be brief, only because part of the process that we went through in the production of the taskforce's report looked at this question. There is no explicit commentary on it in the report, not least because we know the Committee on Radioactive Waste Management is looking closely at the policy. The policy that the Government have established has been made clear over a number of years, and I think it requires much more technical assessment by the Committee on Radioactive Waste Management before any firm decisions can be made.

Chair: That is the end of the session with our first panel. Thank you all very much for your evidence.

Examination of witnesses

Witnesses: Simon Bowen and Dr Gareth Headdock.

Q284 **Chair:** Welcome back to this morning's evidence session of the Energy Security and Net Zero Committee on revisiting the nuclear roadmap. Welcome to our second panel. Gentlemen, could you introduce yourselves, please?

Simon Bowen: I am Simon Bowen, chair of Great British Energy – Nuclear.

Dr Headdock: I am Gareth Headdock, deputy CEO and chief scientist at the United Kingdom National Nuclear Laboratory.

Q285 **Chair:** Thank you very much. We look forward to your evidence. I will start with you, Simon. Is the Government's 24 GW by 2050 achievable?



Simon Bowen: Yes is the simple answer, with a set of caveats. The first is that, although it is expressed policy from what I understand, what this Government are very focused on is deliverability. In everything we have done over the past 12 months in terms of the Sizewell FID to getting the SMR programme up and running and the advanced nuclear framework, all that starts to create the certainty required for the programme, but there are a number of component parts that we need to work on fast. You have heard evidence from the Fingleton team. We have to mobilise everything that we do within the Fingleton review very quickly, and that includes industry as well as the regulatory bodies. Then there is a huge piece of building to do in terms of skills and supply chain.

Is it achievable? Yes, it is, but it is only achievable with certainty, with cross-Government certainty, with cross-party support and with a clear commitment to the programme. What does that really mean? What it means is that you have to have a commitment to fleets. We have a commitment to three reactors that we are going to build with Rolls-Royce at Wylfa, but that is only the start. That gives you only another 1.5 GW, so it takes you close to 9 GW. For any target that is set somewhere between 16 GW and 24 GW, you just have to do the maths to realise that you have to accelerate. A clear long-term commitment to fleets of reactors is what is required. Is it challenging? Yes, it is. Is it deliverable? Yes.

Q286 **Chair:** That sounds like a bid for your mandate for the two FIDs to be extended beyond 2029, which is your current mandate. Should you have a mandate to include full-scale nuclear deployment planning?

Simon Bowen: It is not a bid by me; it is just my opinion, Chair. The reality—

Q287 **Chair:** What is the difference?

Simon Bowen: I am not bidding to the public, saying “Please give me—”. It is just spelling out what I think is the reality of what the programme needs to look like. The commitment that we have to have has to go past 2029. Yes, you are absolutely right. The £2.6 billion that we have in the spending review is a fantastic start, and if you had told me three years ago that we were going to get that, I would have taken it all day long. However, it simply is not going to be enough to deliver the programme, so a longer-term commitment to the programme, the ability to get private finance in and all that comes from creating certainty in a longer programme. Yes, we need more certainty and, yes, we need a longer-term programme.

Q288 **Chair:** Gareth, does UKNNL have the resources and authority to deliver your 10-year objectives?

Dr Headdock: Yes. You will be aware that in 2024 the laboratory was the subject of a DESNZ strategic review, which reprioritised our objectives in terms of delivering nuclear outcomes for Government and supporting the growth of the sector. Since then, we have been working



hand-in-glove with DESNZ to make sure that the laboratory is appropriately positioned and resourced and has the capability to deliver on those outcomes for Government. At the moment, we are in the last year of our five-year strategy cycle, and we are developing a new five-year and beyond strategy, which we will publish in September.

Q289 Chair: Simon, how are you approaching your task to identify potential sites for future large-scale new nuclear projects in areas where there are political planning constraints on new nuclear development, particularly in Scotland?

Simon Bowen: We are doing two discrete studies, one of which was declared by the Secretary of State and which is about the suitability of Scotland for new nuclear development. Our advice has gone to the Secretary of State, and you would need to talk to him about when that is going to be published. When you look at the estate in Scotland, it does not take an awful lot to work out what the answer is going to be. Simply, you have three major centres of nuclear capability and nuclear development at Hunterston, Torness and Dounreay, which are natural for nuclear developments. Under the EN-7 policy, if that were applied to Scotland, swathes of Scotland would be ripe for new nuclear development. I will leave it to the Secretary of State to declare what the study says, but in broad terms that is what it will say.

In terms of large gigawatt, we are doing the study and that will report in the autumn. People who have previously given evidence to the Committee have talked about sites like Bradwell and some of the larger sites around the UK. There are some natural sites that you would focus on. Moorside was mentioned last week as well. Those are sites of a scale that you could develop. With further purchases of land around existing nuclear sites and, again, on EN-7 sites, a number of sites could be developed for new nuclear. We will put a comprehensive report to the Government towards the autumn, and then the timing of its publication will be down to Ministers.

Chair: Before I go to Mel to ask about the roles and responsibilities of your two organisations, Graeme, do you want to follow up?

Q290 Graeme Downie: Thank you for mentioning the report. I raised that with the Energy Minister a few weeks ago as well. What is your assessment, Simon, of the impact on UK energy security if we are not able to build new nuclear in Scotland?

Simon Bowen: It constrains our ability to build at the scale we need. Scotland has a rich nuclear heritage with a depth of nuclear skills, both defence and civil, that should be available to the industry. If the development in Scotland received political and public support, undoubtedly that would help us to accelerate on the journey to whatever target is set, somewhere between 16 GW and 24 GW. It is more deliverable if you do it in Scotland, in terms of both estate and the availability of skills.



Q291 Melanie Onn: Simon, now that GBE-N holds an electricity generating licence, will it participate in the building and operating of nuclear infrastructure with a view to being an investment vehicle to deliver returns for the Government?

Simon Bowen: Potentially, yes. We have the generating licence to facilitate a lot of the work that we need to do at Wylfa. We have gone for that early. As Alastair Evans said to you, the intent and the reason GBE-N was formed was that the development capability does not exist in the market, so GBE-N will form that. It is fantastic that we have signed this landmark agreement with Rolls-Royce for the development of the SMR, but we want it to focus on the development of the technology. We will focus on the development of the site, on the formation of an operating company, and then on the formation of generating capability.

Does that mean we will want to do multiple sites and generate on them? Yes, likely. Would we do that in partnership with people? That is highly likely as well, because growing an operating and generating capability from nothing is a daunting and challenging task. However, yes, we want to do that, and we want to do it on multiple sites.

Q292 Melanie Onn: Are the Government looking at GBE-N in that capacity as well? Do they have expectations?

Simon Bowen: You would have to ask the Government whether they have expectations along those lines.

Melanie Onn: Have they shared anything with you about expectations?

Simon Bowen: No, but we have three roles. We have to deliver, enable and advise. We have been asked for advice on where the potential development sites are, and we are accountable for the delivery of the new nuclear programme following Hinkley and Sizewell for Government-led programmes. It is highly likely that GBE-N would lead those Government-led programmes.

The advanced nuclear framework, however, sits alongside that, which is for market-led projects, and we expect the market to be the developer, the operator and the generator for those. Would we expect to be involved and engaged in that? Absolutely, to create a consistent programme across the UK.

Q293 Melanie Onn: Gareth, does the public corporation model provide a sustainable way for UKNNL to deliver Government priorities, given its reliance on commercial revenues while acting as a custodian of nationally critical nuclear capabilities? There seems to be some tension between those two requirements.

Dr Headdock: It is a good question. To refer again to the strategic review, the answer is clearly stated in that report and it is that the model is not particularly suitable for sustaining the nuclear infrastructure that we operate. As we sit here now, about £2 billion-worth of nuclear



infrastructure is critical for the delivery of national programmes across the UK.

The good thing that is happening at the moment is that we are in a conversation with DESNZ about that business model, and the strategic review commits DESNZ to reviewing that. That has been happening and is progressing extremely well.

Q294 Melanie Onn: Do we have a timeframe for when that is likely to conclude?

Dr Headdock: Yes, we will be moving forward on that in the next few months.

Melanie Onn: Suitably vague.

Dr Headdock: Indeed, but you know how these things go. We are in the middle of it now, which is good, and we have a commitment. The term we are using is “business model sprint”. That implies pace, which is good. We are taking a look at that. The commitment was in the strategic review. Both parties feel there is probably a better way of doing it to support this critical infrastructure, and we will be moving on that soon.

Q295 Melanie Onn: The Nuclear Futures Institute praised UKNNL and encouraged it to diversify its offer to industry. Are there any plans for diversification?

Dr Headdock: Again, that is a good question. The capabilities of the national lab should and do mirror the policy being applied in the UK. As nuclear ambition develops, I expect the capabilities within the national lab to develop. On page 26 of the advanced nuclear framework, you will see that we are listed as a project enabler under that programme, and you can see the capabilities there that we are offering to the new build sector to help it move through the advanced nuclear framework pipeline. Yes, we are always looking to develop new capabilities to support the sector in our mission, which is clearly defined in the strategic review.

Q296 Melanie Onn: Can I ask both of you how you will judge the success of your organisations by the end of the decade? I do not want to say “failure” but, conversely, what would constitute less of a success?

Simon Bowen: For GBE-N, we need real progress towards final investment decision and a firm date for when that will be—because it will be close to the end of the decade. We also need clarity on what the design work is telling us the cost of the SMR programme is likely to be, and the pace at which it will start to reduce. Will it start to reduce in unit 2, unit 3 or unit 4? In the SMR programme space, we need real progress and clarity on both a final investment decision, but also a projected commercial operation date.

On the advanced nuclear framework, some exciting stuff is going on within the market, and success for us would be that we have been



heavily involved with the advanced nuclear framework. We have supported the development of these private-led projects. We have created with the National Wealth Fund a funding framework and clarity about where the private sector and the public sector can play a role so that we foster these new nuclear projects and they get up and running. You heard from Leon Flexman from X-energy last week that they are up and running, and they are following the US. We have created a framework that allows us to do that, and we have real evidence of private sector investment in the nuclear industry.

Finally, and most importantly, Fingleton is a reality. We have a path to getting the development consent order in four years, not the 10 or 12 years that it has taken Hinkley and Sizewell. Natural Resources Wales is working completely in partnership with the Environment Agency to deliver habitat regulations and environmental permitting, again at pace, when national security and national imperative are taken as an absolute guiding light for how we do these programmes. To me, by the end of the decade, what it looks like is clear.

Dr Headdock: UKNNL is here, essentially, to underpin the ambitions of the UK in the nuclear sector. I want to see us as a stable, appropriately funded laboratory that has undergone a programme of modernisation so that we have facilities that are conducive to the world-class science that we need to deliver. I want to see us as a convening and facilitating body within the UK across industry, academia and Government, efficiently delivering on the objectives that are set out. We are undertaking a review at the moment.

From a personal perspective, I want the laboratory to be a great place to work, where we can attract the best and the brightest to come and make a difference in this sector and have an impact on the science that we deliver.

Chair: Lizzi, you have some questions on UKNNL's role in advanced technologies, if you want to ask about that.

Q297 **Lizzi Collinge:** Yes, I have a quick follow-up on the advanced nuclear framework. Is it clear what criteria the vendors and technologies will be assessed on under that framework? Is it clear to them what would be prioritised in the sifting of those technologies?

Simon Bowen: The documentation has been published. Sorry, I will have to come back with a written answer but, from our discussions with all the vendors that are applying for the advanced nuclear framework, they know what is required, and a number have already made their initial submissions.

Q298 **Lizzi Collinge:** Does that cover the regulatory route as well?

Simon Bowen: Yes. Next, we will do the detailed deep dives with regard to the prioritisation of how you choose. At the end of the day, they are looking for Government endorsement to say, "This is a credible project



and it should go ahead, and here are the conditions under which it should go ahead." I will write to tell you exactly what the prioritisation piece is, because I do not have that to hand.

Q299 Lizzi Collinge: I want to move on to advanced technologies, and this is mainly for Gareth. Advanced modular reactors require uranium at a higher enrichment level than conventional reactors, and this is known as high-assay low-enriched uranium, or HALEU.

Given that the Government have an ambition to deliver a UK capability for HALEU by 2031, what are the technical, regulatory or funding risks to that ambition? What could potentially delay its delivery, or what could potentially enable it?

Dr Headdock: The first thing is to recognise the move that the UK Government have made on HALEU. The general principle is that the smaller a reactor, the higher the enrichment of the fuel required. That is not always the case, but that is the general principle. Of course, the previous Government came to our laboratories in Preston to announce the £300 million investment, the bulk of which has gone into enrichment capability at Capenhurst.

In terms of the technical challenges, the first part of that process—the enrichment part—flows into a whole train of other processes to get to an actual nuclear fuel. From a technical perspective, at the moment we are looking at the deconversion process for those HALEU materials so that we can produce, for example, oxide materials that can start the fuel manufacturing process. The topical example at the moment, of course, is coated particle fuel, which is used for high-temperature gas reactors.

The important part of this is that it is not just about enrichment. It is about everything that follows it as well, and having the ability to deconvert and then flow through into advanced fuel manufacture.

Q300 Lizzi Collinge: How significant a constraint is the lack of a UK civil nuclear test reactor?

Dr Headdock: That is a great question. I am a scientist in a research laboratory. We can do so much. As I sit here now, we are making uranium kernels at the Preston site where we are developing advanced fuel forms. We will get to a stage with that fuel development where we have final fuel forms, so we will have made pellets, spheres or whatever it is. At that point, we need to prove the performance of that fuel, which involves putting it in an environment that it will experience in its deployed scenario.

There is no getting around the fact that you need a continuous high-fluence neutron environment in which to do that, and that is provided by a materials test reactor. At the moment, the UK pays into various international programmes like FIDES, and we have committed to 2% core time at the Jules Horowitz reactor in France, but a sovereign materials



test reactor would be a key facility for us in accelerating the qualification of materials in the UK.

Q301 **Lizzi Collinge:** Is there a risk to our sovereign knowledge base of having to rely on an international reactor?

Dr Headdock: The harsh reality is, of course, that for certain applications—around the defence programme, for example—that is not an option. The need on the defence side of the house is quite clear for a materials test reactor. However, we see that the time available in international test reactors is becoming more squeezed as nuclear ambitions expand. Yes, this could potentially become quite limiting.

Q302 **Lizzi Collinge:** We are collaborating with Japan on a high-temperature gas reactor design—

Dr Headdock: Indeed.

Lizzi Collinge: —and this has been described as cost-effective and low-risk. Are there any trade-offs for UK sovereign capability and long-term independence with relying on an international partner, however solid the allyship?

Dr Headdock: We have had the programme with Japan for a number of years. This is under the advanced modular reactor research, development and demonstration, or RD&D, programme. When we looked at what was happening around the world, it was quite clear that the world's only operating prismatic-core high-temperature gas reactor was with JAEA in Japan. We have a relationship as national labs, and it seemed appropriate for us to do that.

The way we thought about this was that Japan has already built a 30 MW thermal demonstration reactor. In the UK, if we wanted to progress this technology, we could go to more of a first-of-a-kind reactor because the demonstrator had already happened in Japan. In terms of cost-effectiveness, that seemed to make a lot of sense. That programme, of course, was backed through the AMR RD&D programme.

We have learned a huge amount. From a UKNNL perspective, it has allowed us to build reactor and fuel capability within the laboratory, learning from Japanese experience but then applying UK criteria to that and looking at how that technology could be progressed.

Q303 **Claire Young:** To follow up on AMRs, I was told at an industry event that it is tacitly agreed that France is specialising in molten salt-cooled reactors and we will specialise in high-temperature gas, plus lead-cooled for maritime applications. Is that how you see it? If so, would you still see advantages to having both molten salt and high-temperature gas projects in the UK, even if it is not our sovereign technology?

Dr Headdock: I always go back to the Nuclear Innovation and Research Office's technical assessment of the six generation IV reactor



technologies. It was a criteria-based assessment, with 30-something technical criteria, but two that were prioritised were the ability to meet our net zero 2050 ambition—essentially, TRL and time to market—and the ability to produce high-grade heat. Based on that, HTGR was prioritised through the AMR competition.

In addition, it is important that the UK stays connected to the international programmes out there. We stay close to CEA. In fact, we had a full technical exchange with it a couple of weeks ago, where we are trying to learn from what it is doing around molten salt and fast reactor technology, while we are communicating with it the things that we have learned and the capability we have developed around high-temperature gas reactors.

Both are incredibly important. They are different technologies that can do different things. In the UK, we have prioritised HTGR so far through the AMR competition, but of course the advanced nuclear framework gives all vendors the ability to come to the UK, get appropriate engagement and look to see if their technology is applicable to our needs.

Q304 Claire Young: Again, if I can move on, we had the GBE-N SMR design competition. Following on from what we have been talking about, selecting a single SMR design has advantages and disadvantages. Gareth, should the Government implement an equivalent competition for AMRs?

Dr Headdock: I am slightly careful what I say here. A competition, most people would agree, is not the quickest way forward. We probably saw that with the SMR competition. My personal view is that it is good to see us clearly define what we want and need, and to progress on that basis. I am not sure a competition is the quickest way forward.

Q305 Claire Young: Simon, did that competition provide the certainty and investor confidence originally intended or, given all the delays and developer withdrawals, did it affect the UK's attractiveness for SMR investment?

Simon Bowen: No, it did not affect our attractiveness. All you have to do is look at the interest we have had in the advanced nuclear framework. A multitude of companies are applying for the advanced nuclear framework because they believe that the UK is a good place to develop.

It was determined through the policy and advice of the Department that we should not go to direct award but that we should go to competition. That was the right thing to do. The SMR competition aimed to work out the best technology for the UK, and we have done that. Yes, it did take a while, but this is a complicated build. This is substantial amounts of taxpayers' money, and therefore you have to be able to assure yourself that you are driving value for money. The competitive process did that. Yes, it took time, but it did that.



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It is interesting for me that the market has substantially moved on, even since we started the technology procurement competition, because of the advent of AI, the geopolitical issues that have happened, the need for sovereign capability, and the need for nuclear as part of the energy mix. All that has meant that the market is inserting itself into the development. When we started, it looked like the only people who would be prepared to take the risk on new nuclear development, the first of a kind, would be Governments. That is no longer the case because Amazon, Meta and Microsoft, through people like Bill Gates and Warren Buffett, are investing directly in technologies. Do they need Government backing to lessen some of the risks? Yes, they do, but the levels of investment, particularly in the advanced technologies, are substantial, so the market has moved on.

The advanced nuclear framework is not just about AMRs. There will be SMR designs as well. It is not a single SMR design that will be in the UK. It could well be two or three. We need to see what comes out of the advanced nuclear framework. Only one will be supported by the Government programme, but market programmes may well be enhanced by Government support and backing on risk.

Claire Young: It sounds like you probably agree with Gareth that running an AMR competition would not be sensible.

Simon Bowen: It is not necessary now.

Q306 **Claire Young:** Simon, you mentioned the SMR competition delays. Is that a sign that GBE-N does not have the capability, capacity or resourcing to manage it effectively?

Simon Bowen: No, absolutely not. We have put in place a group of talented people, both internally in GBE-N and with the advice and support we have had, and we have delivered that SMR programme quicker than anybody else has in the world. When we looked at it, when we talked to the International Atomic Energy Agency and to other countries that have done it, people quoted 36 months as being the standard. We have done it in under 30 months. We expected it to take a while because of the rigour that is required.

You are asking the Government to commit to large amounts of taxpayers' money, and therefore they have to assure themselves through the Treasury, the Cabinet Office and the Department that what we are doing and what we are about to do makes sense for the taxpayer. Yes, it took time, but that was nothing to do with the capability we had to hand. It was to do with the rigour that was applied to the process, and that was wholly appropriate.

Q307 **Claire Young:** Are you saying that the deadline was wrong? You did not manage it quicker than the deadline.

Simon Bowen: No, because the deadline was set politically. The deadline was not set by us.



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Q308 Claire Young: GBE-N has called for a clearer route to market for market-led nuclear projects. What should that route look like, and what role should the Government play in supporting it?

Simon Bowen: The advanced nuclear framework is designed to address exactly that. The route to market needs to be supported by the private sector. People will bid into the advanced nuclear framework, and we will look at the development company framework that they put forward. They will have a developer, a technology and an operator. We need to look at how all that is pulled together and assess how credible it is.

Then there will be sovereign risks, things like nuclear indemnities, that maybe the individual companies cannot take, or they need private finance. The National Wealth Fund can step in there, in the way it has with Rolls-Royce.

What will it look like? It will look like a private sector developer, supported by GBE-N and the Government in some ways to make sure it is consistent and we plug any gaps, but it will not be publicly led and wholly publicly funded. Does that answer the question?

Q309 Claire Young: Are you saying that the AMR framework does provide this? We have had evidence that you were calling for a clearer route to market.

Simon Bowen: No, I am not sure where the evidence about the clearer route to market came from, but we are saying that the advanced nuclear framework is a different route to market because it is market-led.

Q310 Graeme Downie: We have heard in previous sessions, as well as today, about the importance of nuclear skills, and about the shortages across some areas. Gareth, with that in mind, why is UKNNL seeking to cut 200 jobs? What impact is that likely to have on the Government's ability to deliver their nuclear pathway?

Dr Headdock: That is a good question. If we go back to 2024, the strategic review gave us our north star on the future of the laboratory by restating the mission and areas that we needed to focus on, based on, I guess, 100-plus interviews DESNZ did with the wider sector. The way forward was clear.

What happened afterwards is that we did not get the return that we expected last year in the multi-year spending review. It is widely recognised that, at the time, Government finances were extremely stretched, which meant our customer and stakeholder base did not get the returns they expected in that multi-year spending review. Therefore, the contracts we have in the sector got squeezed.

Another major contributor is the fact that we operate an ageing estate. The critical active handling facility within our portfolio, where we can handle the most active materials in the UK, a unique capability, was built in the 1950s. If you bring all that together, it has manifested itself as a



short-term financial sustainability issue, which means that we are looking to pull a number of different levers at the moment. We have implemented a programme called Fixing the Fundamentals, which is aimed at reducing our operating costs.

- Q311 Graeme Downie:** You talk about this as a short-term measure. How do we make sure that these skills are not being lost at a time when we need them? I will possibly ask Simon to contribute here as well. How are we making sure there is a connection between GBE-N and the NNL on how those skills are not lost? You say it is short-term. Is it your idea that, somehow, these people will come back into the organisation?

Dr Headdock: Yes, I say it is short-term because, with everything that is going on in the wider sector, I expect us to come out of this position in six months' time.

- Q312 Graeme Downie:** You have 200 redundancies and you think you will want to rehire those people in six months?

Dr Headdock: That is not necessarily the case. What we did with DESNZ, I should say, is quite important to this discussion. DESNZ and the Ministry of Defence sit on our policy advisory group, and they help us with prioritising our objectives and what we will need to deliver.

When this came up and we decided to implement the programme, we sat down with our sponsors and the Ministry of Defence and looked at the capabilities we absolutely must maintain and prioritise. The way we are doing this is in line with the objectives of DESNZ and the MOD.

- Q313 Graeme Downie:** Is it your view—and you mentioned this earlier—that you are losing capability that you would naturally have lost anyway, or naturally wanted to lose anyway, because it was based on older technology and, six months in the future, you will be hiring people who can do the next stages? Is that broadly what you are saying?

Dr Headdock: We are saying that people can leave the organisation without materially affecting our ability to deliver on our objectives. That is how we approach this through a criteria-based analysis. The voluntary redundancy programme has had a healthy response, but we will make sure that the people we allow to leave will not have an effect on our ability to deliver our objectives as defined by DESNZ and the Ministry of Defence.

- Q314 Graeme Downie:** Yes, you touched on it there. The concern with the voluntary redundancy process is that you lose people who can, frankly, go and get other jobs elsewhere. They take a package and off they go, and good luck to them—

Dr Headdock: Yes, exactly.

Graeme Downie: —but you end up having people in the organisation who are not the ones you want. How exactly are you guarding against that?



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Dr Headdock: In a voluntary redundancy programme, you do not need to accept an application. The assessment we did with DESNZ of the capabilities that we must protect will factor into the criteria by which we release people.

Q315 **Graeme Downie:** You mentioned the multi-year spending review. Why were you not successful in gaining the support you expected or would have wanted, keeping in mind that the UK Government have said that nuclear should be one of their top priorities?

Dr Headdock: It is a good question. Accelerating nuclear infrastructure projects was prioritised, so you saw a series of announcements at the same time around progressing gigawatt-scale projects. Of course, we had the SMR competition live. Investment was prioritised there. That is not to say that, since the decision, we have not re-engaged with DESNZ and are looking at this again.

Q316 **Graeme Downie:** Did you get feedback from DESNZ or the Treasury about how your spending review submission maybe was not quite there? How has that been improved upon to make sure that you can secure the funding you need in the future?

Dr Headdock: We have since worked closely with them to make sure that how we frame things is appropriate.

Q317 **Graeme Downie:** How was it not appropriate before?

Dr Headdock: I am not saying it was not appropriate. The whole environment around that spending review prioritised other areas of the sector. Of course, the primary funding mechanism for the laboratory is through the commercial contracts we have in the rest of the sector. In any one year, we will do around £170 million of commercial contracts with the rest of the sector, which goes to fund our organisation, facilities and people. That particular round of funding was unsuccessful for a number of reasons. Since then, we have re-engaged with DESNZ. It has recognised the need, and we are making good progress in addressing those issues.

Q318 **Graeme Downie:** This is possibly a question for Simon as well. If we are losing staff from the NNL, how can that be picked up by GB Energy - Nuclear to make sure those skills are not lost from the sector? Again, we have had a discussion about how we do not have enough nuclear skills in defence and in civil. We are about to have 200 people looking for new jobs. How do we make sure they are absorbed? Can GBE-N take on some of that capability, or can those skills be re-adapted?

Simon Bowen: All our roles will be advertised in the market to recruit people. There is regular debate across the nuclear industry and with NNL to make sure that the people who may be leaving NNL are aware of those opportunities.

Q319 **Graeme Downie:** There has been communication on that?



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Simon Bowen: There is discussion on that. Also, the Destination Nuclear website, which you have probably heard about before, was set up to create that interconnectivity across the industry. When jobs are advertised, they are advertised across the industry so that people can see the totality of roles that are available in the nuclear industry and can apply through that website. We have to make sure that we maintain the website so that we maintain that visibility. Are we geared up or funded to be able to take people who do not have substantive roles? No, we are not.

Q320 **Claire Young:** We are in a difficult geopolitical environment at the moment. We have seen in Iran and Ukraine that energy infrastructure can be a military target. How is scenario-planning accounting for both large nuclear sites and a future fleet of more geographically dispersed SMRs, Simon?

Simon Bowen: The geographical and basic planning for security happens through the ONR, and it is part of the conditions of both securing a licence and attracting a licence.

Are we actively looking to disperse the nuclear fleet geographically? Not to the best of my knowledge, and that would sit within policy. The work that we are doing is looking at what suitable sites are available for nuclear development, both through EN-6 and EN-7, and then working closely with NESO on the spatial energy plan to ensure that the sites fit within the overall structure of the grid.

Is any security consideration overriding where we site nuclear plants? No, not at the moment, nor is there consideration of the scale that you should be building out at each site. That may come in time, but it is certainly not a consideration at the moment.

Q321 **Claire Young:** It is not a consideration when regulating them, but if we end up with some large-scale sites and a whole range of smaller ones—for example, private ones that are not even grid-connected—we will have a whole range of sites and you have to protect them. Are you happy that planning is accounting for that now?

Simon Bowen: If the question is whether planning is accounting for the geographical dispersal of nuclear assets, not to the best of my knowledge, but the security of the sites, aircraft impact on nuclear sites and all those things are considered as part of design considerations. That is a critical part of how nuclear plants are designed to protect against both accidental events and any form of military intervention.

We are not planning at the moment for levels of military intervention other than what is based on the existing requirements of the ONR. Nothing in that sphere has changed.

Q322 **Claire Young:** How confident are you that UK nuclear sites are adequately protected against cyber-attacks, even if they are state sponsored?



Simon Bowen: I am confident that they are protected, because it is and has been a key consideration over at least the last decade. How you design plants against cyber-intrusion and how you segregate them from the internet has been a live issue since the late 1990s and 2000s, following the purported Israeli attack on one of the Iranian enrichment facilities. That was done through a cyber-intervention. It is absolutely live, and I am confident. It is one of the most active conversations in terms of the design of control systems, how the control systems are segregated from the internet, and how you maintain that protection. Then, in terms of personnel security, education is a prime consideration when you are building and operating nuclear plants. Yes, I am confident.

Q323 **Claire Young:** How does the risk profile of nuclear compare with other energy technologies?

Simon Bowen: The risk profile of nuclear is related to high-consequence but low-probability events. I cannot speak for offshore wind or battery technologies, but I can say that the probabilistic risk assessments that are done as part of the safety cases for nuclear plants are based on 1×10^{-5} events. The design standards are incredibly high to make sure that even those low-probability events are designed for.

The nuclear industry, particularly in the UK and the US, which has the standards that we would always operate to, has a good safety record. That is because of that probabilistic assessment and the regulatory requirements that we have to adopt.

Q324 **Claire Young:** Are you confident that those things that are low probability still remain low probability?

Simon Bowen: Yes, absolutely.

Q325 **Claire Young:** Gareth, will the new nuclear power stations be climate-resilient over their lifetime, particularly given risks from rising sea levels, drought and rising water temperatures?

Dr Headdock: Absolutely. That will be incorporated into the design criteria for the nuclear power stations and regulated through the processes that we have been describing. I expect that to be incorporated into the ONR and EA requirements.

Q326 **Claire Young:** Modelling changes. In the last year or so, we have seen the Environment Agency release some new flood risk modelling. How is the regime adapting to updated information that might suggest problems could be worse than were previously considered?

Dr Headdock: Yes, definitely. It will go only one way. I am afraid that is not my area of expertise.

Simon Bowen: I can help, Gareth. If you look at Oldbury, particularly, the site that is close to you, we are aware that the only way to develop the Oldbury site for nuclear development will be with a significant investment in flood defences. The design standards for those flood



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defences will, of course, be done in conjunction with the Environment Agency, again, applying those probabilistic assessments of a one-in-10,000-year event and therefore what we have to design for. Of course, all the learning from Fukushima was that the plant would have survived and would not have had the accident it did if the flood defences had been built to the design standards that were required. We have learned that, and we will continue to design to those standards.

Q327 Claire Young: Gareth, while reducing fossil fuel imports can strengthen energy security, some evidence points to risk in nuclear fuel supply chains, including Russian dependencies. How exposed is the UK to those risks?

Dr Headdock: In terms of the nuclear supply chain, the UK makes all its own nuclear fuel at the Springfields site in Preston. The oxide fuel complex has a long history of producing the UK's nuclear fuel and produces all the fuel for the 14 advanced gas-cooled reactors in the current fleet. That is the current situation. I do not see any particular risk at the moment in terms of supply.

Simon Bowen: Okay, I can help out with that. The fuel supply chain, as Gareth was talking about earlier, is critically important from a national security and energy security perspective. While at the moment we do rely on partners, and you are right to point out that certain fuels are still based on Russian material, it is a critical part of our thinking on fuel strategy that we have the full supply chain for fuel based in the UK. We would expect to have some dependence on our partner nations, but we are looking to increase the capability in the UK, not just in enrichment and fuel fabrication but also at either end in conversion and deconversion capability. It is an active part of the considerations in our planning. The policy teams are actively looking at that as well.

Q328 Claire Young: Which partner nations would those be?

Simon Bowen: They could be anywhere from the US to Canada, Sweden or France. We all work in partnership in the various parts of the fuel supply chain.

Q329 Chair: When will we end all dependency on Russia for fuel supplies?

Simon Bowen: I cannot answer that, Chair. I do not know. The supply chain is—

Chair: Is that a realistic proposition?

Simon Bowen: Yes, it is realistic, but for the timing you would have to talk to EDF, because that issue is specific to EDF.

Q330 Chair: Coming back to what you said about the 1×10^{-5} risk, we have heard quite a lot. The first panel was largely devoted to this area. How do we get the balance of the design standards right to deal with the level of risk you were talking about, while not overdoing it? That has been the



concern raised in the Fingleton review.

Simon Bowen: Yes, absolutely. There is a real debate about what is safe enough, and that does not mean what is unsafe. It means how far you go from a probabilistic assessment perspective. It is as much for our engineers to ensure that we are being proportionate. That is exactly what Fingleton was pointing to. What is a proportionate application of these standards and what is disproportionate? Of course, that is a judgment, but we are all looking at it. Have we become overly conservative in many areas? Yes, we have, particularly when you benchmark us against other nations.

Q331 **Wera Hobhouse:** I have a quick question because you keep repeating "low probability". What do you call low probability? I am sorry that I was quite late, but you have been repeating that you are confident that a low probability is the right assessment.

Simon Bowen: It is 1×10^{-5} .

Q332 **Chair:** Gareth, I am interested in your thoughts on this. We increasingly hear a lot about the use of waste heat from industrial processes. Nuclear is a good example. Are you looking at how we might use it for heat and power?

Dr Headdock: We are used to electricity as the product from nuclear power stations, but the way we are thinking about this now is that the new nuclear product will be high-grade heat. A technology like a high-temperature gas reactor can operate with an outlet temperature of up to 950°C , and that can be used to run a whole series, potentially, of industrial process applications. Hydrogen production is getting the most focus at the moment. We need to get used to the new nuclear product being high-grade heat and its ability to decarbonise certain aspects of our industrial complexes, particularly petrochemical applications through hydrogen, ammonia and sustainable aviation fuel potentially. It is an inspiring new application for nuclear.

We have a huge amount of experience, 70 years of operating experience, in operating gas-cooled reactors. The UK is well positioned to advance this technology and look at the way we can integrate nuclear assets with, for example, petrochemical complexes.

Q333 **Chair:** How quickly can we expect to see this happening?

Dr Headdock: The research is happening now. We are looking at the engineering challenges of removing heat from the secondary circuit of, for example, a high-temperature gas reactor and distributing it to an industrial complex. The research is happening now. In Japan, they are building a connection right now between their high-temperature gas reactor demonstrator and a steam methane reformer for producing hydrogen. They will be taking the heat directly over to a reformer and will be able to run that process to demonstrate hydrogen production.



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Q334 **Chair:** Simon, when we were talking about the SMR competition, you said the deadline was set politically. Is that accurate?

Simon Bowen: Yes, for the completion of the programme.

Q335 **Chair:** Are other deadlines in nuclear set politically that are not technically credible?

Simon Bowen: No, not that I am aware. This is purely about the timing of the competition. The timing of final investment decision and the commercial operation date will be determined by the project plan. Yes, of course, there is always pressure to try to get these plants online earlier, but they will be determined on what is safely deliverable.

Chair: Okay, thank you very much. That is the end of our session. I thank our second panel for their evidence.