Joint Committee on the National Security Strategy

Oral evidence: Critical national infrastructure and climate adaptation

Monday 28 February 2022

Watch the meeting

4.45 pm

Members present: Margaret Beckett (The Chair); Baroness Anelay of St Johns; Lord Butler of Brockwell; Sarah Champion; Baroness Crawley; Lord Dannatt; Richard Graham; Baroness Hodgson of Abinger; Sir Edward Leigh; Baroness Neville-Jones; Lord Reid of Cardowan; Lord Snape; Viscount Stansgate; Bob Stewart; Lord Strasburger.

Evidence Session No. 3 | Heard in Public | Questions 39 - 47

Witnesses

I: Steve Fletcher, Deputy Director, Engineering and Asset Management, Office of Rail and Road; Emma Howard Boyd, Chair, Environment Agency; Andria Gilmour, Civil Engineering & External Hazards Lead Inspector, Office for Nuclear Regulation; Dr Charlotte Ramsay, Director, Energy Systems Management and Security, Ofgem.

Examination of witnesses

Steve Fletcher, Emma Howard Boyd, Andria Gilmour and Dr Charlotte Ramsay.

Q39 **The Chair:** Thank you for giving evidence to us today, and welcome to the committee. Before we begin, I want to say a few words about the conflict in Ukraine, which I think has shocked everybody over the last five days. It is an appalling situation, and one where I think everyone feels very strongly for all those involved, particularly our parliamentarians, many of whom seem to be becoming actively engaged. On behalf of this committee, I express our sympathy and solidarity with the people of Ukraine and our wholehearted opposition to the actions of President Putin and of the Russian Government.

Hon. Members: Hear, hear.

The Chair: This is the third formal evidence session for our inquiry into critical national infrastructure and climate adaptation. We are very grateful to our witnesses for coming today; they are among the key infrastructure regulators. This is a hybrid meeting and some members of the committee are joining us virtually.

This winter, we have seen a speedy succession of named storms, and they have had a significant impact on critical national infrastructure. What can we already learn from these events about how well prepared CNI operators were and how effectively they responded? Could I ask each of you to give a general reaction on that basis?

Andria Gilmour: Thank you very much. I am from the Office for Nuclear Regulation, where I am the lead civil engineering and external hazards inspector. External hazards are basically hazards that can be created by natural occurrences such as weather, so they encompass climate change.

The nuclear safety of the United Kingdom's facilities is our key concern. Despite the fact that we have had some quite challenging events recently, the safety of no nuclear facilities in the UK was compromised at all by the recent occurrences, and the principal reason behind that is that we expect all duty holders—the operators—to plan for events that are very much more severe than those that we have experienced in recent years. The actual planning assumption is for an event that has a one in 10,000-year chance of occurring in any one year. One in 10,000 is, as you can imagine, a lot more severe than the sorts of things we have been experiencing, severe and challenging to other infrastructure though they have been. I can give you assurances that the nuclear safety of the facilities has in no way been challenged by any of the recent events.

The Chair: Thank you very much.

Emma Howard Boyd: I am chair of the Environment Agency. We are an environmental regulator and we also have responsibility for flood and coastal erosion risk management in England. Throughout the recent storms we have had dual roles, both in how we have been involved in the incidents—making sure that our flood defences are ready up and down the country, most specifically where we have seen river flooding and preparing for tidal surges—and through our environmental regulatory work, where we work with other regulators to make sure that operators are equally ready for the changing environment and changing climate risk that we are seeing.

From a flood risk perspective, we look after 36,000 kilometres of rivers, twice the length of the UK rail network. We operate and maintain approximately 78,000 flood and coast defences, with a value of £26 billion. In relation to the other regulators, we also look at how we work at both local level and national level to make sure that critical national infrastructure is ready for flood risk, and we set out that clearly in the

flood and coastal erosion risk management strategy that we launched two years ago.

The Chair: Thank you very much.

Dr Charlotte Ramsay: I am the director for energy systems management and security at Ofgem.

To speak to the question about what the recent storms tell us about preparedness in the energy sector, they have given us an opportunity to test the approach that we have taken so far in regulating the network companies to build resilience into their networks and systems as standard. It has also given us a really big opportunity to learn lessons from experiencing what happened, and that is learning lessons both to play back to the companies that we regulate in improving existing regulatory frameworks and to learn lessons about how we regulate more broadly, so it is about price controls as they relate to the networks and the system operator price controls and Ofgem's stance on climate resilience more generally.

In response to the very first named storm, Arwen, we recently published our interim report into the incidents that happened around Storm Arwen. With the more recent run of three more named storms within a week, we have been reviewing the impact of those storms, and given what we have already done in addressing the Storm Arwen issues, we are not launching anything further. The Storm Arwen report has given us some broad areas for looking more deeply, which will come out in our final determinations in the summer.

It has given us cause to think more carefully about the investment that has been made to date in resilience. As part of assessing price control overall, we looked back into the previous price control to see how investment in resilience had been spent, and we have done some site inspections to make sure that reported site conditions and all that kind of thing match up with what we saw on the ground.

Prior to the storms, we had been doing those kinds of assessments. Storm Arwen has prompted us to think again and to think more carefully to make sure that investments to date have been suitable—ex-post stress testing, if you like. It has also given us cause to think about the effectiveness of the operational response. Resilience in the sector is not just about how much you invest in long-term infrastructure; it is also about how you respond when something has happened. For the energy sector, and for the power sector in particular, it would be about getting people connected and getting services back online. Storm Arwen and the more recent storms have given us a good opportunity to learn lessons from how well prepared the network companies were to get boots on the ground and get people reconnected.

Finally, it has given us another area of investigation into roles and responsibilities—making sure, particularly at the local level, that all the services and parties that may need to be involved in an active response

know what they are doing and when they are supposed to be doing it and are able to communicate properly. That has been particularly relevant in supporting the most vulnerable consumers, who were often the ones who may have been left out through the Arwen disruptions. What opportunity has there been for observing the preparedness of the sector? It has presented one, and Ofgem is now in the middle of evaluating where the lessons learned are.

The Chair: Thank you.

Steve Fletcher: Good afternoon. I am deputy director of the Office of Rail and Road, responsible for leading the engineering and asset management teams and capital investment teams in the ORR.

In terms of preparedness, the recent storms demonstrated to us the vital importance of accurate forecasting to enable us at an operational level to be prepared for the events that were to ensue. We had three storms most recently, and through forecasting we identified that both rail and road demonstrated the capability to prepare, whether it be for key telecommunications to be resilient and capable for the events ahead, for maintenance gangs and teams to be available, or to set mitigations in place to ensure the safety of the operation of the road or the rail. We learned a lot of lessons from that.

The incidents that occurred during the recent events reinforced what we already know about the importance of vegetation management. We have all seen through the storms the impact of fallen trees. There is a need for rail and road to improve; it is a challenge, but we must get better at vegetation management and bring about different biodiverse approaches to the vegetation that is on the side of road and rail.

Furthermore, the recent events identified the importance of establishing regional, geographical river catchment area plans that are shared between agencies and all infrastructure operators. There are great examples already, but there are more opportunities. In Sheffield, the River Don burst its banks, which affected the station at Rotherham. On the flip-side, we have good examples of utilising strategies and investing in conjunction with the Environment Agency and other agencies, such as in the Lake District and the River Eden initiative, where the river was put back to its natural, meandering state, which helped to avoid spending an absolute fortune on hard infrastructure and, at the same time, protected the railway.

There was an incident in Haddiscoe in East Anglia with the washout of ballast from beneath the train tracks. Thankfully, no one was hurt. It is not great to see a train stop, but the point is that initiatives of the nature that we can do jointly with those in the Environment Agency and other agencies may avoid such situations happening again. It is a big task. The railway has a Victorian infrastructure. The industry is working hard to address the issues.

The Chair: Thank you very much. Do you want to come back, Emma?

Emma Howard Boyd: Yes, if I may, on warning and informing and some of the investment that the Environment Agency has put into working alongside the Met Office. Alongside their supercomputers and the naming of storms, we had probably the longest time ahead of the storms that we have seen, over the last 10 days, to give us an opportunity to work with other regulators to get prepared for the different types of impacts that we have seen. One thing that is very clear from my experience at the Environment Agency, where I have been chair for just over six years, is the interconnectedness each time we see a storm—obviously, our primary focus at the Environment Agency is flooding—and the resilience and preparedness for the multiple impacts that we are now seeing.

Ahead of our flooding and coastal erosion risk management strategy, we produced some long-term investment work that showed that, for every home that is flooded, 16 other people are affected by the infrastructure services that they use. I suggest that the recent experience of just the storms we have seen this year shows that the disruption, particularly to the rail, road and other utilities, is at a much higher level, and we now all need to look at resilience in how we operate through the events that we are now seeing.

The Chair: You make a very relevant point. We had evidence at an earlier session of this committee's hearings that the major floods along the Danube this summer were known about and predicted, and that information was conveyed in advance, but—I was going to say that nothing was done. I expect something was done, but whatever was done was completely inadequate. There are two elements: there is, as you quite rightly say, the importance of warning and understanding what may come, and then there is what you are actually going to do about it.

Q40 **Bob Stewart:** My questions are to you, Dr Ramsay, to follow up what you have said already. I am talking about climate resilience strategy and Ofgem asking the operators how they are planning for climate change in the future. Are you happy with what they said they are going to do in their response to you?

Dr Charlotte Ramsay: Are you referring to the forthcoming price control for the distribution—

Bob Stewart: The current price round, yes.

Dr Charlotte Ramsay: I cannot say directly whether we are happy with the strategies they have come back with, because—

Bob Stewart: You have not seen them.

Dr Charlotte Ramsay: —we are in the process of processing them. Final determinations, which will include our perspective on what to approve out of the investment proposals that come from the strategy and then commentary on the quality of the strategy itself, will not come until the end of this year. I am afraid I cannot say directly what we think of them, but I can give you a little of the history that got us to this place.

Ofgem's perspective on resilience is that it has been a cornerstone of the price controls up to this point. It is not the first time that we have asked network companies to put resilience at the heart of their proposals. It has always been at the heart of proposals. The focus on climate resilience specifically is the first time that it has been brought into the price control structure.

We expect to see the network companies taking what they already know about what they need to do to keep their networks resilient, and demonstrating to us, and to the wider sector, that they are taking into account appropriately the specific risks that come through climate change. We have given them some very specific structures to come up with, albeit variable, proposals that come from being in different geographic locations. They should be making efforts to work transparently together, take common assumptions, work with things like the Government's climate change risk assessment and outputs from the environment agencies and other expert areas to help build more of a common understanding as to how we then tackle these risks as a sector.

Bob Stewart: How far in the future are you asking them to plan for? In years?

Dr Charlotte Ramsay: We have not been explicit about how we expect them to deal with this challenge. We prefer to give them that challenge, as they are best placed to evaluate the risks themselves and the response. Typically, the network operators would look to something like the industry standard of the future energy scenarios, which play out energy scenarios to 2050, but they would also take into account the timeframes that other expert agencies are dealing in. The timeframes that are viewed for the climate change risk assessments would be the timeframes that the network companies would also be viewing for them. We have not given them a specific boundary.

Bob Stewart: You are looking at the Government's interim report, which says that customers should not be off the grid for as long as they have been in the past. Is that something else that you are pressing on the operators?

Dr Charlotte Ramsay: Absolutely. We have been impressing that on the operators for a very long time. The incentive frameworks and the regulatory frameworks that we have in place for both transmission and distribution networks focus on resilience outputs and on incentivising the operators to invest appropriately to minimise customer interruptions and customer minutes lost. There has been a focus for a long time on improving the reliability of the network, which has a knock-on impact on improving resilience overall as well. We have had the foot on the gas on this for some time. With the addition of the climate resilience strategy and the requirement for that, you are seeing us turn the dial in stressing the importance of this.

The focus on climate resilience opens the question more broadly about how much resilience we want and what resilience standards we are

working to. Ultimately, there are broader questions to be asked about who pays for that, what standards we accept, and whether absolutely no interruption is where we want to be. If it is, we need to have a broader conversation, initiated by the Government, about who pays for that.

Bob Stewart: If the Government do not want to.

Emma Howard Boyd: One thing that has become clear to me is that we need the environmental regulators to work in lockstep with the economic regulators and the financial regulators. We have seen the Bank of England and the PRA introduce stress tests on climate change for companies and banks. We are seeing greater duties on the economic regulators. Ofwat has just been charged again with upping the way it looks at resilience to climate change working with the water companies, but equally we need to make sure that that chimes with the environmental regulators.

We know from the investment that we have put in place over the last decade, and as we can see just from what happened last week, that although sadly something like 400 homes have been flooded in England, over 40,000 properties have been protected from flooding because of the investment that we have put into protecting homes and properties. It is about how we work together as regulators, and are asked to work together as regulators, to align with standards of protection, knowing that we cannot protect everything but working together to build in resilience for the climate change that we know is locked into the system for decades to come.

Lord Dannatt: Could I take you up on one aspect of that? It is really good that 40,000 properties that were threatened have not flooded. What proportion of those are in large conurbations and areas that meet your threshold? I am speaking from a rural perspective. The threshold is often quite high for further investment in rural areas, frankly, so you get flooded or you may get flooded or you have the threat of flooding, but actually you are below the threshold and not much will happen in your area. Is there any consideration for reducing the threshold to widen the spend in rural areas?

Emma Howard Boyd: That is where we look at the overall risks in how money is spent along different rivers and coastal areas. As part of our current flood programme, we have slightly changed the way investment is made. I can provide you and the committee with details as to how money is spent up and down the country and between rural and urban areas. It is something that we have adjusted and will continue to adjust, and we will make sure that land is better protected too.

Our primary focus has been lives and properties, and working with different communities using different measures. Where we are not in a position to put in larger schemes, we may look at nature-based solutions or property-level resilience to help individuals become better prepared for flooding.

Lord Dannatt: I am sure the committee would like to see that information.

The Chair: Yes, I am sure we would.

Steve Fletcher: Could I step in to build on your point with a general point? I want to reinforce the fact that if we all work in isolation as regulators, there is an opportunity missed. I mentioned at the very beginning having joint strategies. There are a number of examples where, in rural areas, investment from the railway supporting investment from elsewhere in the environment is better spent and money is saved. There are opportunities, and we need to encourage more co-operation between our organisations and the infrastructure managers to make sure that happens.

Emma Howard Boyd: It happens in a more ad hoc way.

Steve Fletcher: It does.

Emma Howard Boyd: I would really encourage this happening automatically and being embedded in the way we operate.

The Chair: Thank you.

Q41 **Baroness Hodgson of Abinger:** Good afternoon. My questions are about forecasting tools. What assumptions or forecasts do you use to understand climate risks, and more short-term risks from extreme weather, against which you then assess operators' adaptation plans? Are the same forecasting tools used by you all?

Steve Fletcher: The Office of Rail and Road does not utilise its own risk assessments as the regulator of Network Rail, holding it to account. On behalf of the DfT, we assess what they are doing with regard to their delivery plans. As part of our work, we engage independent consultants and independent reporters to assess what they have done and how they review and utilise risk assessments, and see where they source the information to enable them to do so.

As a regulator for rail and road, we are part of the infrastructure operators adaptation working group in which Network Rail, National Highways and the Environment Agency pull together and work together in workshops looking at risk assessment. As a regulator, we do not manage and we do not do; we test and challenge and ensure that Network Rail is undertaking risk assessments as it should.

Dr Charlotte Ramsay: It is a similar picture in Ofgem. As an initial input, we would take common sources such as the climate change risk assessment as giving us a common overview. I cannot comment on what other regulators use, but I suppose I expect that that would be a common source of information for all. It is certainly the common source of information that we expect those we regulate to turn to for initial input.

We are building all the time the expertise in evaluating what companies are coming back to us with. To the point made earlier about the climate resilience strategies being something that we have asked for for the first time, there is a challenge in being the regulator on the other side of that. The regulatory toolbox is normally one of comparative analysis, like recognising that we are not a teacher marking the homework with the same level of expertise as the organisations that we are regulating.

The ability to be able to critique the network operators' strategies will come in part from what we are doing to try to encourage them to bring transparency to their own thinking and to encourage critiquing collaboration across the sector. That said, we have our own small, in-house team of engineering experts who go out and undertake audits and all that kind of thing, so that brings a certain amount of capability to critique in-house.

Emma Howard Boyd: As I have already explained, we work very closely with the Met Office on our warning and informing through the Flood Forecasting Centre and the analysis that it provides. This is where we combine our hydrological information alongside their meteorological information to understand the prospects for flooding, or not. We are looking at how we flip that the other way round to prepare increasingly for drought.

In relation to our flood defences, particularly those made of earth, it is really important to understand the impacts that weather is having on that infrastructure. They get a pounding from the rain and the storms, but they can also dry and crack in hot weather. We work with government scientists and the Hadley Centre on the five-year cycles of modelling that show that we are heading towards warmer and wetter winters, et cetera. That is the sort of information that we are factoring into our work and our flood strategy.

Andria Gilmour: In the nuclear industry, our expectation is that all operators plan for reasonably foreseeable climate change effects for the entire period of operation. For an ageing AGR power station, that is obviously quite a short horizon, but for the proposed new-build facilities that are being constructed or planned at the moment it is quite a long horizon. We refer them to the United Kingdom climate projections 2018 as the current relevant good practice in this area, and there are a number of planning scenarios within that. Not all operators have fully adapted from UKCP09 to UKCP18, but we are expecting them to have achieved that within the next couple of years. One of our regulatory interventions is to ensure that that is happening in a timely way.

The Chair: Thank you.

Lord Dannatt: Can I briefly follow up with the Environment Agency? Thank you for your last answer. I am probably asking slightly parochially about eastern England, which traditionally has the least rainfall, but there are tidal surges and the coast does not have the great granite and rock protection that the west coast of the country has, and there is a lot of

erosion and an increasing amount of flood damage. I come back to the question I asked before. Are we looking at the thresholds to increase investment in protective infrastructure? I think we all recognise that climate change will exacerbate these problems, particularly in the east of England.

Emma Howard Boyd: I am very happy to supply the information that shows the breakdown for coastal and inland protection. We work on risks, and I think I am on record as saying that although we want to build back better—this is where we are talking about protecting homes—over time, we may collectively as a country need to make decisions about building back to better places. On the east coast, we have worked with the operators of the gas terminal at Bacton not only to better protect the gas terminal, which is responsible for something like 20% of gas supply to the UK, but, by working very closely in raising additional finance from those operators, to protect two villages with the fantastic sand scheme that we have put in place, which will provide about 25 years of additional protection while we build in further resilience.

I am really keen that we focus on the new infrastructure that is due to be built in this country. The IPA has set out some £650 billion-worth of new infrastructure build by the end of this decade. The money that has been allocated to flood—something like £5 billion—is a tiny fraction of all the new infrastructure that will be built in this country, and is roughly 50% government funded, 50% private sector funded.

We need to work out the best way to make sure that that infrastructure is built with resilience at its core, and given that I have a background in finance, I am working way beyond the Environment Agency with other initiatives such as the Coalition for Climate Resilient Investment or the taxonomy that the Treasury is looking at to make sure that we are embedding resilience into finance strategies. We are delighted with the doubling of our flood budget, but if you just look at new-build infrastructure, it shows how much more investment will be required to make sure that the new infrastructure is resilient to the range of weather events that we will experience. We have focused on flood, but there is the heating element of it, as well as wind and other damage.

Q42 **Richard Graham:** Turning from the east to the west and the south, may I seek your thoughts, Emma Howard Boyd, and the Environment Agency's thoughts, on a plan that some of us put together before the pandemic? It was an outline plan, if you like, to look at ways of resolving the distribution problem in water. Effectively, we have too much water some of the year in some parts of the country, and too little at other parts of the year in others. If we could magically transport the water that comes from the Welsh hills, and floods counties and cities along the River Severn, into Thames Water's area in order to ensure that it does not run out of water in the summer, it would be a huge leap forward.

The Severn partnership was formed precisely to look at ways of doing that—effectively to catch, through reservoirs, water in the Welsh hills and pipe it down through the river later, and so on. The truth is that two and

a half years later quite a lot has been said, but very little done. What can we do to try to move that project forward, assuming that you are broadly in support of it—Severn Trent certainly is—and how can we try to make sure that those sorts of strategic approaches, which will affect two major regions of the country, can change the dynamics of having too much in the flooding season and too little in the summer elsewhere?

Emma Howard Boyd: Thank you for your question. That sort of partnership working along catchments will be incredibly important as we look at too much water, too little water, and indeed at water quality. This is where I think, as I have already touched on, it is really important that we have the environmental regulators working with the economic regulators and, where possible, with financial regulators.

Not specific to the Severn partnership, but specific to how the Environment Agency is working with Ofwat, we have various initiatives where we are aligning our thinking and work on resilience, to too much and too little, with Ofwat's five-year cycle of price reviews. We have various initiatives that are partly to do with environmental improvements, and another one called RAPID, which looks at infrastructure investment. It will look precisely at some of the initiatives that you have talked about—taking water when it is plentiful, and storing it or taking it to other parts of the country.

We have also set up a network of water resources groups at regional level, where again we are working with all the relevant partners, including the right regulators and the right water companies, to look at the required investment in the sorts of infrastructure that you are talking about. It also needs to be combined—knowing the river that you are talking about—with nature-based solutions. I am hopeful that over the next period we will start to see progress and plans joining things together.

Working with Severn Trent and Ofwat, the Environment Agency certainly saw some encouraging developments in green recovery plans, some of which Severn Trent bid for or put up plans for, to accelerate investment in these sorts of initiatives without waiting for another five-year price review. Those are the sorts of things that I regularly discuss with the chair of Ofwat.

Baroness Anelay of St Johns: Perhaps I could follow up with the Environment Agency and ask for an explanation, for somebody who clearly is fairly new to some of this anyway. In talking about levels of resilience, you referred in passing to considering where resilience might be a matter of too much or too little. As a lay person, I can only think of too little. How would I recognise too much resilience if I were in your job?

Emma Howard Boyd: I was talking about too much water—sorry, I missed a word out—and too little water. We can find ourselves going very quickly in certain parts of the country from too much to too little. Certainly in Cumbria, shortly after the floods in 2015-16 we moved into

water shortages because of the way the water system works in that part of the country. Apologies for missing a key word out.

The Chair: That is admirably clear, thank you.

Q43 **Baroness Neville-Jones:** I think my question is directed at Ms Gilmour. You began to tell us a bit about the way you approach and regulate the whole question of the operators' attitude to their plans for climate change and extreme weather. I would like to put to you three short questions.

First, how regularly do you review the operators' climate change planning assumptions, and what they say they are going to do by way of adaptation and mitigation? What view do you take of their assessment plans? Do you look at whether they are commensurate?

Secondly, do you see any need as a result of recent experience with weather to revise your approach to regulation in respect of climate change?

Thirdly, are there any lessons from the way you go about increasing resilience that are not being applied and could be applied to other sectors?

Andria Gilmour: First, on how frequently we look at the plans for dealing with climate change, for new facilities we spend quite a lot of time doing that prior to key regulatory releases, which could be start of construction, start of bringing fuel on to site or start of active operations. That is when we do most of the consideration on new build, but subsequent to that, and for all existing facilities, we insist that all operators undertake a periodic review of safety, at most on a 10-yearly basis.

Baroness Neville-Jones: Safety and resilience are obviously closely connected, but they are not quite the same thing, are they?

Andria Gilmour: No. Our statutory purposes as defined under the Energy Act 2013 are to ensure nuclear and conventional safety, security, safeguards, which is the international accounting, and transport of nuclear materials. Our application of resilience is entirely towards those safety and security-type approaches.

Continuity of supply is not within our remit, and we have no vires over that. We entirely review their safety arrangements and, as I say, that is on a 10-yearly cycle. Within that period, because of the very onerous events that we expect them to plan for, we do not see any changes within a 10-year period that could undermine safety in those 10 years. Does that answer it?

Baroness Neville-Jones: Do you envisage a realistic possibility that there could be climate conditions in which it was not safe for nuclear energy to make a contribution and it might have to go out?

Andria Gilmour: Absolutely. The most obvious example, and something that Europe has come close to, is high temperature, when the cooling

function could be compromised or the margins reduced. Certainly in parts of Europe in the last few years there have been times when operators have either reduced power output or even switched off reactors to ensure safety. In the UK context we could foresee that happening within the sorts of periods that you describe as medium term, five years.

Baroness Neville-Jones: There are no modifications to the plants that could be made that would increase their capacity to work in high-temperature situations.

Andria Gilmour: There certainly are, but that is a cost/economic balance, and we do not get involved. We have no vires to look at the cost-effectiveness of the measures. If they are safe, they have complied with their requirements under the law that we regulate.

Baroness Neville-Jones: I get the feeling from what you are saying that your regulatory focus is so much on safety that you are limited in what you can demand of the operators in relation to climate change.

Andria Gilmour: We have no statutory purpose to regulate continuity of supply.

Baroness Neville-Jones: You are very specific, are you not?

Andria Gilmour: Very definitely.

Baroness Neville-Jones: Is there is a gap in the system?

Andria Gilmour: Potentially.

Baroness Neville-Jones: Thank you. Say something about the other two questions, if you would not mind.

Andria Gilmour: Certainly. Clearly, we are very cognisant of the potential challenges that may arise from climate change. The difficulty we have is that we do not know what aspect of our climate will change, by how much, and when, so we insist on a precautionary approach.

We generally recommend that duty holders take a management adaptive approach. We worked closely with the Environment Agency to develop that, so that we have a consistent approach across a range of different industries, although it may manifest itself in a slightly more onerous way in the nuclear industry, whereby as long as they plan and have contingency for a very severe scenario they do not necessarily have to be resilient to that from day one. An example might be a sea wall, whereby you design a foundation to a sea wall that can be extended higher should you need to do that at some time in the future.

The lessons for the rest of UK critical infrastructure are probably limited. Because we insist on such onerous conditions to remain safe against, it would probably be disproportionate for other aspects of UK critical infrastructure to achieve the same level of resilience, because, as I think my colleague from the Office of Rail and Road mentioned, there has to be

a level at which you consider failure to be tolerable. With nuclear safety, obviously, that is exceptionally high, so we have very onerous conditions, but it would be disproportionate to apply that to the rest of UK critical infrastructure.

Steve Fletcher: We would not be too accepting of failure, but we would be accepting of mitigation in place. We are not expecting anything to be bombproof. With the infrastructure being Victorian and 20,000 miles long, it is not likely that it would be affordable to complete everything, fix everything and be resilient for everything.

Baroness Neville-Jones: I have a question later on about electricity, which of course is absolutely key. Again, we need more of it and bigger infrastructure, and there is already an apprehension that we will have to generate a lot more electricity. It seems to me that there is a gap in the system if nuclear is one of the elements where, instead of contributing when we have a severe weather situation, it goes out precisely when we need help. I think that is an issue.

The Chair: That is where we get into the territory between them and Ofgem.

Baroness Neville-Jones: It is certainly something to note in our report. Does anybody else want to contribute?

Dr Charlotte Ramsay: I can pick that up if it is not going to come up later. To the point about the power sector becoming an increasingly important component part of the resilience of other sectors, which I think is what you are getting at—

Baroness Neville-Jones: Yes.

Dr Charlotte Ramsay: —it sits within our remit to be aware of that, and to take account of it in what Ofgem is doing, over and above its ordinary duties on network price controls in the space of resilience, and understanding the resilience of the power sector.

It sits in the first instance with the electricity system operator and how we regulate the electricity system operator. The electricity system operator is now subject to a separate price control from the transmission network owner. Part of the new price control and regulatory oversight that it is subject to has seen the introduction of a system restoration standard, in addition to the pre-existing focus which the system operator always had in playing its role of delivering security of supply. The restoration standard is essentially how the system operator can restart the system or ensure that it has an understanding end to end of the resilience of the power system. It is starting to bring that focus on to whether the power system is resilient overall. By introducing it as a restoration standard with the system operator, we are placing that focus with the party best placed to influence it.

We are at the beginning of getting confident that we have a power system that will be resilient, because we are at the beginning of

processing what it means to meet net-zero targets, which include the electrification of huge amounts of energy demand across the country. To be able to get on top of that, just having restoration standards for the ESO, for the system operator, is not sufficient. Understanding in more detail the interaction across many elements of our critical national infrastructure to be able to deliver resilience is of utmost importance.

Another area of activity worth looking into is how the energy sector and other sectors with CNI are working together to try to understand the implications of the changing system dynamics. I can speak for the energy sector, where this has been coming about over the last one to two years. There is an annual activity co-ordinated by the national emergency co-ordinator, which sits with National Grid, whereby they pool together operators of critical national infrastructure and run a crisis exercise, stress-testing the system overall, with a focus on resilience in general and emergency preparedness and testing emergency protocols.

In recent exercises, one thing that has come out as we have been observing the changing dynamic in the system is that there is far more interaction and interactivity between CNI. In the energy space this has spawned additional working groups that sit beneath the institutional structures that we already have to address the changing interactions between the gas and electricity system operator. As I understand it, it has also prompted, through last summer, a much wider assessment of resilience across critical national infrastructure, resulting in some lessons learned for the energy sector, for Ofgem, for the system operators and for BEIS, and for the infrastructure owners beyond. It is by no means fixing everything, but it may provide some reassurance that the parties with responsibilities in that space are starting to think about resilience in this new context.

Baroness Neville-Jones: It seems to me that I can demolish a little bit of my other question.

The Chair: I think that is right. In the meantime, Lord Snape.

Q44 **Lord Snape:** May I address a question to you, Mr Fletcher? The ORR submission to this committee said that it is working with Network Rail to develop "more robust output measures and indicators" for the next funding period, and that you expect to see closer working with other infrastructure managers. Does that mean that you are dissatisfied with Network Rail's current approach to climate adaptation? Whether you are dissatisfied or not, what further measures, if any, do you think Network Rail could take?

Steve Fletcher: I would not suggest that we are ever satisfied. We are always challenging and ensuring that Network Rail improves and does more.

Lord Snape: It is not a word you like to see in *Hansard.* I appreciate that.

Steve Fletcher: No. Perhaps I could take us back a bit. Back in 2013, we were very keen for Network Rail to produce its climatic change and adaptation plans, and we forced it to do that in 2013 as part of a periodic review. We are currently in what we call CP6, which is a control period. When that was under review, we reviewed Network Rail's plans and we were not satisfied that enough money was being spent on earthworks and drainage. We instructed Network Rail—or determined, I should say—that on top of its original plans another £0.5 billion should be spent in that particular area, which is what has taken place.

Over the last two years, we have found that the system has been under even more stress than was forecast then. Despite the additional funding, over the last two or three years certain events have taken place. There was the issue at Carmont when we had tragic fatalities. Since then, we have had recommendations from Lord Mair and Dame Julia Slingo, and we are holding Network Rail to account against those. Nevertheless, given the forecast, the system has been somewhat stressed.

In the current review for the next control period, it is vital that we assess better measures and look to get better forecasting. The greatest challenge is not planning, which can be construed as jam tomorrow; it is actually seeing things on the ground, and things that can be done. We do not want some algorithm, some abstract measure, that we can use as the regulator and say, "They're 1.2 and 2.1, and they've gone up two digits". What we want for the next control period is to come up with real pragmatic measures where we are able to have the infrastructure operators demonstrate to us that they are actually making progress.

That is not to say that they have not made progress. The ORR believes that Network Rail has come a long way in the last 10 years, but there is more to be done. We will hold it to account against these more appropriate, pragmatic, better measures to make sure that we continue to address what is, to be fair, an ever-changing challenge.

Lord Snape: Have you seen the interim report on the Salisbury accident that took place in October last year?

Steve Fletcher: I have not seen that report myself. I know that it refers to the adhesion of the trains and the collision between the two trains, and how high wind and leaf on the track can have a devastating impact. No, I have not seen the interim report. That is part of our safety inspectorate area, and no doubt I will see it in the fullness of time.

Lord Snape: You have put your finger on part of the cause. The report cites 12 hours of strong winds and heavy rain. I think you would all recognise that we are early into climate change, and 12 hours of heavy rain and strong winds will not be that unusual at this time of the year in future. The time since the railhead treatment train passed over the particular stretch of track was 32 hours. The leaf mulch on the track was, we think, and the interim report indicates, the direct cause of the accident. Network Rail aims to treat susceptible track every 24 hours. Should that aim be strengthened, and should it maintain a 24-hour period

rather than 32 hours, as happened on this occasion?

Steve Fletcher: That is a level of operational detail beyond my current knowledge, having not read the interim report and the recommendations from Network Rail and its responses. Is it sufficient? No, I would say not. I would use the analogy of a leaky bucket. You do not put another bucket under a leaky bucket. You replace it and put in something new, or you stop the water flowing, so you never get a leak. What I mean by that is that lots of work can be done on vegetation management. What we want is no leaves on the track. You can never get no leaves on the track, but we can improve vegetation management on the periphery of the railway corridor, and replace it with biodiverse alternatives, which will be good for the environment and safer for the railway.

Lord Snape: I understand that too, but in much maligned British Rail days vegetation was cut back from the track, and trees alongside the track were removed. I realise that these days you need a public inquiry to chop down a tree, but would you not agree that in recent years we have allowed vegetation to encroach on to railway property with results such as the Salisbury accident, which could of course have been far worse? Salisbury meant a driver seriously injured and two passengers kept in hospital overnight. Had one of the trains been moving faster than it was, we would have been talking about another serious railway accident. Can we not get vegetation cut back completely, as it used to be?

Steve Fletcher: It is a lot more complex than that. My learned colleagues to my side would endorse this, not that I am asking them to speak for me or agree with me completely on this particular occasion. Earthworks require trees and vegetation, which bring stability to the earthworks. We need the right mix of vegetation to enable just that, where we can reduce, minimise or remove the risk of leaves on the track.

Cutting down all trees and napalming the whole Network Rail corridor would be catastrophic. It would generate more risks and different risks that you would call us to task on and discuss in one of the committees. We need to get the right balance. We need to get the balance between having the right vegetation, and for Network Rail to have the competency, and to build its competency, to manage that vegetation in such a way that we can get safety and have the right balance of vegetation in the infrastructure.

Lord Snape: Finally, you would agree we have not got to that happy position yet.

Steve Fletcher: We have not got to that happy position yet. As I say, there are 20,000 miles of railway corridor and a lot of vegetation. Network Rail has its plans, and the ORR holds it to account on them and scrutinises its vegetation planning and processes on a periodic basis.

Q45 **Baroness Crawley:** My question is also about climate adaptation plans. The Adaptation Committee of the Committee on Climate Change concluded last year that "The UK does not yet have a vision for successful

adaptation to climate change, nor measurable targets to assess progress". You said in your submission, Mr Fletcher, that the National Highways climate adaptation plans are "largely a reaction to events, rather than proactive improvements". Should we be very concerned about this, and what would you prefer its adaptation plans to look like?

Secondly, is there more that the Office of Rail and Road could do to encourage National Highways to invest in climate adaptation, or does the situation require government intervention?

Steve Fletcher: Thank you for those questions. Would you allow me to give some context for the role of the Office of Rail and Road with respect to National Highways? In the rail sector, the ORR has 380 staff who are allocated to holding Network Rail to account on an economic and a safety basis, and we are accountable to Parliament for that.

Our role is somewhat different on National Highways. For National Highways, with a team of 19 people—not 380—on behalf of the DfT, and at its request we review its road investment strategies and delivery of its plans. It is very much the monitoring of implementation of its plans and delivery of them at a high strategic level, as opposed to a more intrusive review of National Highways in a similar way to that for Network Rail. We do that on behalf of DfT. We support DfT at its request. It has come to our organisation and requested that, under a remit, we provide it with a service in a sense to have oversight of the delivery of the risk.

Would we want to see more? The Office of Rail and Road would be supportive of broadening its remit for the DfT; and asset management, of which climatic change and adaptation is a part, is a very good area where we would be more than happy to assist DfT. As I said, our function for highways is somewhat different from rail. It is very much a specific remit that we deliver on behalf of the DfT.

Baroness Crawley: Thank you, Mr Fletcher. When was the last time the Office of Rail and Road spoke to the department about your climate adaptation concern?

Steve Fletcher: Under the remit we are engaged and work directly for DfT. For both rail and road we meet DfT on a regular, periodic basis at a senior level and throughout the hierarchy of our management structure and that of DfT. We have regular discussions with DfT, on issues of climate change adaptation as well as business planning and asset management, to different levels of detail depending on whether it be road or rail.

Baroness Crawley: I see. Thank you for that.

Q46 **Lord Dannatt:** We have heard that the statutory resilience duty on water companies has led to much more focus on long-term resilience. Are there any reasons why other CNI sectors should not also be subject to a statutory resilience duty, enforced by regulators?

Dr Charlotte Ramsay: For the energy sector, we already have other requirements on the network operators and the system operators that

may have equivalent status. As I described, we operate using standards that we can enforce against, which in the resilience space have been in play for quite some time and have been delivering positive proactive outcomes in encouraging network companies and system operators to think ahead about what investments and procedures they need to put in place. That is not to say that an explicit resilience duty, enshrined, say, in a licence, would not further emphasise its importance, but I think that in the energy sector we already have quite a significant track record of identifying resilience as being important for the companies we regulate.

Emma Howard Boyd: On the change in climate that we are now seeing, today I was given the fantastic example of the River Wye, where since 1795 there have been 15 floods, seven of them since 2000 and five in the last three years. Something is changing, something is happening more frequently. We need to make sure that climate resilience is embedded in the heart of the way we regulate different sectors, because this is changing at some pace.

Lord Dannatt: Staying in your area, earlier you gave a figure for the river mileage—I cannot remember what it was—that the Environment Agency looks after. Quite a lot of them are quite small rivers. Is there a case for saying that they could be de-mained and that inland drainage boards could perhaps look after them rather better?

Emma Howard Boyd: I could check the figures I gave, but I think they would be main rivers. We have been working very closely with internal drainage boards, where they have the right governance structures, to make sure that they are looking after them. These are exactly the sorts of things that we are doing to get the right balance between the work that we do at the Environment Agency and the work that farmers and internal drainage boards do.

Lord Dannatt: Part of the problem seems to be that along the course of a river one agency is responsible for a bit of it, another part of the river is the responsibility of someone else and for another part it is someone else again. Actually trying to get a whole-river management policy in place sometimes proves quite difficult.

Emma Howard Boyd: This is where we have a strategic overview at the Environment Agency. Our flood strategy, which goes to 2100 and is broken down into five-year segments, sets out very clearly how we work with different risk management authorities to make sure that the balance is right and that we see progress in line with the budgets we have secured. We are working on this very carefully to make sure that it is clear who has responsibility for delivering the flood schemes for which we have investment.

For the current five-year period we have just started, far more of the projects are the responsibility of local authorities. Again, we have strategic overview, working with the different risk management authorities, to make sure that the schemes are put in place. That involves

anything and everything from grey infrastructure to natural schemes and property-level resilience.

Lord Dannatt: Given that you have the overall responsibility, do you feel you have enough enforcement powers to make other risk managers fall in line and do what you need them to do?

Emma Howard Boyd: On our flood programme, it is quite clear that we are working together on the delivery of the scheme. Where we need to look more broadly at climate resilience is all the other infrastructure that exists to make sure that it is prepared for the climate change that we are beginning to see. That is where we need to work more closely with other regulators, as well as with operators. Next month I have a visit with the chairs of the Office for Nuclear Regulation and the Health and Safety Executive at a nuclear site to look at some of the work we need to do together on the climate change agenda. I welcome the way we are beginning to work more closely to make sure that we get this right and get ahead of climate change. What is so great about your inquiry is that it is getting ahead of the climate change that we are now beginning to see.

The Chair: We hope so.

Lord Dannatt: I observe that you are making a very powerful case for collaboration to bring all the various agencies together. If we stovepipe it, we will have elegant solutions in some places that are not comprehensive.

Emma Howard Boyd: How we work is very complex. In particular, as we see the integrated impact of the different storms, in the last three storms we have had winds and flooding. In bringing all that together so that our own incident response is resilient to the types of climate events we are experiencing, we are hugely reliant on electricity for warning and informing and for some of the work on our infrastructure that we are responsible for. We need to make sure not only that we are there to work on flooding, but that we can do it in a resilient way.

Q47 **Viscount Stansgate:** We have been told that over the last few decades the key focus of regulators has been to try to keep down consumer prices. Has that been the case? Has it been to the detriment of climate adaptation and resilience? In the context of current concerns about utility bills and the cost of living, is significant government investment required to ensure that resilience investments are made, or are there other ways, in your view, in which you can incentivise investment by operators without hitting consumers?

Steve Fletcher: Yes. The regulator has been driving down costs and encouraging efficiency, justifiably so, and will continue to do so, especially after the pandemic. Has that been detrimental to climate change adaptation? No. Dependence on the funds available does not mean that you cannot be adapting. You can adapt with the funds that you have available.

On the technological advancements and collaborations that exist, more natural capital investment, or hard infrastructure, is a good and efficient way of achieving additional resilience. I mentioned earlier that back in 2013 we demanded that Network Rail produce its WRCCA plans and that we encouraged further investment in particular assets, such as earthworks and drainage, but at the very same time we have driven Network Rail to be more efficient and to do things faster and more efficiently. We will continue to do that and encourage the inclusion of adaptation at the core of the work that is delivered.

Dr Charlotte Ramsay: From an energy perspective, I echo Steve's responses. Keeping prices down has absolutely been a focus, making sure that infrastructure is delivered at the lowest cost to consumers, but it has not been at the expense of delivering infrastructure that is fit for purpose, including resilience. I think I said in previous responses that resilience has been one of the cornerstones of our regulatory price control approach for many years. The approach that we have taken in recent price controls has also been driving higher performance, standards and reliability.

That said, there is still room for improvement, adaptation and change, in particular the imperative for faster change and a faster response that may have begun in 2019 with the Government's commitment to net zero. The investigations and things that followed from that have shown us that we need to continue to make sure that our regulatory frameworks are pushing for more and better. You see that in the development of the distribution network operators' price controls to include the climate resilience strategy, which could well be a step change in the way they approach climate resilience. As we learn things from this approach, we will roll it out to transmission networks and to the system operators, and learn lessons more broadly as to how we can continue to adapt our approach.

On the important point of who pays and how much all this will cost, it will be a challenge because, given the demand for resilience to be there and how much is enough, people in the energy sector do not want to say that we will be off power, off grid, for any time at all, but that obviously costs. Understanding the trade-offs that come from higher levels of resilience versus cost is incredibly important, but it is also about understanding the opportunities for working collectively. There has been an engaging conversation this afternoon about the potential for optimising and reducing the overall cost by critical national infrastructure owners working together to find common solutions. There is absolutely space for that, as well as space for a broader conversation with government, as there must be, about what kind of risks we are prepared to take and the distribution of costs.

Viscount Stansgate: Who do you think should be paying for increased CNI resilience?

Dr Charlotte Ramsay: There is probably a fuller discussion to be had. Energy consumers already pay for resilience in their networks. We see climate resilience turning the dial on the type of resilience we need in

that focus. Undoubtedly, a proportion of the cost of resilience will come from energy consumers. We have also heard in the discussion today how the power sector in particular is becoming an important component part of resilience in other parts of the sector, so who pays for that? Do we need added resilience in the power sector because water, say, requires a greater degree of reliability and resilience? Who then pays becomes a question to push back up to government to see what is acceptable.

Emma Howard Boyd: With water companies, we have seen Thames Tideway as an example of the introduction of long-term funding for what is arguably a climate resilience project. I am keen that we see an economic review of resilience, because there is no doubt that, if we do not build in climate resilience, we will see more disruption to the services that we are talking about and more costs, so the earlier climate resilience is embedded into our critical infrastructure, the better.

To go back to the proposed infrastructure that is due to be built this decade, if we embed that in an early part of the design it will cost far less than if we tack it on afterwards. Understanding the economic impacts of climate resilience, or not, is something I am very keen that the Treasury or the Cabinet Office look into in detail.

The Chair: Thank you. I am afraid we have lost our quorum. Thank you very much indeed for your evidence.