

Environmental Audit Committee

Oral evidence: Enabling Sustainable Electrification of the UK Economy, HC 278

Wednesday 15 November 2023

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[Watch the meeting](#)

Members present: Philip Dunne (Chair); Sir Christopher Chope; Barry Gardiner; Caroline Lucas; Cherilyn Mackrory; Dr Matthew Offord; Cat Smith.

Questions 45 -138

Witnesses

I: Akshay Kaul, Director General of Infrastructure, Ofgem; Eleanor Warburton, Director of Energy Systems Management and Security, Ofgem; Claire Dykta, Director of Markets, National Grid Electricity System Operator (ESO); and Craig Dyke, Director of National Control, National Grid Electricity System Operator (ESO).

II: Susana Neves e Brookes, Head of Connections, Policy and Performance, Scottish and Southern Electricity Networks (SSEN) Distribution; Roisin Quinn, Director of Asset Operations, National Grid Electricity Transmission; and Gareth Hislop, Head of Market Development and Commercial at Scottish Power Energy Networks.

Written evidence from witnesses:

[ESE0021 - Electricity System Operator \(ESO\)](#)

[ESE0055 - SSE plc](#)

[ESE0056 – ScottishPower](#)

[ESE0063 - National Grid](#)

Examination of witnesses

Witnesses: Akshay Kaul, Eleanor Warburton, Claire Dykta and Craig Dyke.

Q45 **Chair:** Good afternoon. Welcome to the Environmental Audit Committee for our second oral hearing into our inquiry into electricity grid infrastructure and the capacity to meet the decarbonisation of the economy. We have two panels today. I am very pleased to welcome our first set of panellists. I would ask you just briefly to introduce yourselves by explaining what your role is in the organisation that you are representing. We will start to my left with Akshay Kaul from Ofgem.

Akshay Kaul: Good afternoon. I am Akshay Kaul, Director General for Infrastructure at Ofgem. We are the energy regulator that regulates gas and electricity markets.

Chair: Eleanor Warburton, also from Ofgem.

Eleanor Warburton: Indeed. Eleanor Warburton from Ofgem. I am a Director at Ofgem and I cover energy markets and systems.

Chair: Craig Dyke from National Grid from the ESO.

Craig Dyke: Craig Dyke, Director of National Control, the electricity system operator, effectively accountable for the real time operation of GBS electricity.

Chair: Claire Dykta from the ESO as well.

Claire Dykta: Yes, also from the ESO, Director of Markets.

Q46 **Chair:** Thank you. Just an opening gambit, the Government have set a target to decarbonise the electricity system by 2035. That is not very far away. How realistic is achieving that target, and do the proposed changes, which have been brought in through the Energy Bill to the structure of the industry, make that more or less likely to be achieved? Perhaps I can start with you, Akshay.

Akshay Kaul: Thank you. As you say, the 2035 target is only 12 years away and we think it is an achievable but challenging target. Certainly the Energy Act now is very timely and putting in place the institutional architecture that allows us to plan the system properly to get to that 2035 target. We think it is not yet sufficient because it needs to be followed up by a series of further reforms, which no doubt will be part of our discussion this afternoon. Firstly, to the market arrangements themselves, so that we can make sure that we can operate a system that is dominated by renewables in 2035 in a safe and cost effective manner and, secondly, to build the infrastructure that is going to be needed, which is immense in the time that is available to us.

Q47 **Chair:** Could you quantify for us the scale of that build in terms of gigawatts required and/or money required to achieve it?



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Akshay Kaul: Yes. At the moment, this winter we are planning for a peak demand of about 50 GW, and over the 2035 period that is expected to rise.

Craig Dyke: Up towards 2030-2035 we expect—with decarbonisation of energy as a whole—electricity peak demand will probably nearly touch 90 GW, so roughly twice where we are today. In order to achieve that, clearly we then need to connect more generation to meet the demand.

Q48 **Chair:** We will have to double the generation capacity by 2035?

Craig Dyke: Broadly those figures.

Eleanor Warburton: It is perhaps worth saying that because a lot of your generation is intermittent, you need considerably more generation than you have demand. Broadly, both figures you are talking about doubling, it is likely more than that for generation, but your generation will be significantly greater in total capacity than your demand will be.

Q49 **Chair:** Not least because much of our generation at present comes from fossil fuel—from gas in particular. If we try to add replacing that to the equation, what are the comparable numbers?

Eleanor Warburton: We would be happy to write to you with more detailed answers. Broadly speaking by 2035, I think you are looking at about 300 GW of generation, expecting all of that, obviously, to come from renewables and other zero-carbon sources, plus flexible sources, things like storage. Craig, correct me if I am wrong but at the moment the generation on the system is more like 120 GW.

Chair: It is roughly tripling.

Eleanor Warburton: It is a very material increase.

Q50 **Chair:** Do we have an order of magnitude cost per gigawatt of generating capacity or do you not think of it in those terms?

Akshay Kaul: We can see from the CfD auctions what the costs are per megawatt hour of the various technologies. We can see from the capacity auctions what the cost is per megawatt of the balancing capacity that is needed on the system. I do not know whether Craig has any more precise numbers.

Chair: I am trying to get a sense of what the capital cost to the economy is going to be to go from 120 GW to 300 GW in 12 years.

Eleanor Warburton: We do not calculate a total figure that takes everything into account. I think we can probably write to you with it.

Chair: Somebody could recalculate it. It seems a fairly basic question to be able to answer.



Akshay Kaul: I think the Department for Energy will have a system model that calculates the overall costs, and we can certainly get back to you with the figure after consulting them.

Q51 **Chair:** That was very helpful just to help frame the discussion. Moving on, the Nick Winser report made a number of recommendations about removing barriers and accelerating the pace, and you have just touched on that in your opening question. What is your view on the Department's response to that report in the way that speeding up needs to happen? Do you think things have been missed in the Winser report, is that the right way to put it? Who would like to answer that?

Claire Dykta: If I may link the two questions, the energy system as a whole is much today as it was designed, if not at privatisation, then 20 years ago. The networks themselves, the market frameworks and the institutional governance have not really changed. A big thing that needs to happen looking forward—and some of these are included in the Winser report—is institutional governance needs to change. The creation of the future system operator, which the electricity system operator will form, is key to that because that can take a whole system view in line with some of the questions you have been asking—how much does this cost overall, what are the efficient decisions to be made—so that we move forward to net zero at a cost that is appropriate for households and businesses.

One of the main recommendations in the Winser report is the publication of a spatial plan. That means taking us away from the traditional siloed thinking of looking at the gas network or the electricity network, and also looking at the new technologies that are coming along, such as hydrogen or carbon capture and storage, and asking what is the most efficient answer overall that keeps us on that journey to net zero at an appropriate cost. Where would you cluster hydrogen capability? Where is offshore wind going to connect? Then the system operator can then move forward with that and ask out of the back of that what the network infrastructure looks like, which enables the regulator to have conversations with the network companies about what the efficient level of infrastructure investment is in that backbone of the energy system.

Q52 **Chair:** We will come on to governance questions in a minute. In terms of preparing the structure and the realignment of interests within the sector, is that an inhibitor which itself delays taking action to start to build out what is required or can it be done in parallel with the establishment of the FSO, for example?

Akshay Kaul: I think it can be done in parallel and indeed we have already started last year. The system operator prepared a plan—a holistic network design—to connect 50 GW of offshore wind by 2030 and the regulator signed off about 26 projects worth more than £22 billion on the back of that plan. That is the prototype. That is what we are now going to expand for the 2035 target across all the technologies and across the vectors, eventually across gas and electricity. It does not need to wait



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until the establishment of the FSO. We are proceeding with that work in parallel.

- Q53 **Chair:** One of the biggest challenges is the duration of time that it takes to get a project consented and up and running. You took significant action on Monday this week by announcing changes to the queuing system, which is clearly very welcome and pre-empted what would undoubtedly have been a recommendation of this inquiry. Could you characterise for us how that is going to work? You are setting in place a series of milestones; you have obviously got a lot of contractual agreements already with those parties that have a place in the queue. How are you going to ensure that you are not mired in legal contest and challenge if you then start to try to remove capacity from people who think they have it?

Eleanor Warburton: The contracts are held by the ESO. Claire, can I turn to you to answer that?

Claire Dykta: By the end of this year there will be 400 GW in the queue waiting to connect to the high-voltage system. We need about a third of that at the high voltage level to meet a zero-carbon system by 2035. The announcement by Ofgem on Monday of the approval of our proposals means that, as you say, for anyone who has a connections contract with us already or is looking to sign one, there are milestones stated in that contract.

- Q54 **Chair:** Currently? There are already existing milestones?

Claire Dykta: For new contracts, they will go in and, yes, they are stated in the existing ones. What the approval allows us to do is to give an option for people who already hold contracts to voluntarily say, "We are not going to be ready. We would like to move back".

- Q55 **Chair:** Why would anybody do that?

Claire Dykta: If they do not, we have employed an independent engineering firm that will review any contract that we have a reasonable belief will not be ready by the time in their contract. The reviewers will give us an independent engineering view. If the connecting party cannot prove that they will be ready by the date in their contract, we will have the ability to move them back in the queue or ask them to leave.

- Q56 **Chair:** You have that ability within the contract?

Claire Dykta: That is what Ofgem's approval allows us to do.

- Q57 **Chair:** You are not changing the contracts; you are just enforcing the milestones effectively? Is that right?

Claire Dykta: Yes.

Eleanor Warburton: It becomes very contract-specific, but broadly, yes.

- Q58 **Chair:** We are talking about not insignificant amounts of money in these



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contracts. They are, as you said, 22 GW, and we do not know what the cost of that is because you cannot answer the question, but it is going to be billions of pounds. A lot of invested capital will have gone into these projects, and people who think they are going to be producing something, even if it is 10 years away, are not going to walk away from that in a hurry. What confidence do you have that this acceleration of the milestones, which we absolutely welcome, is going to be deliverable?

Claire Dykta: There is a significant number of projects in the queue that will never connect. History shows us that around 30% to 40% of applications never connect to the system because there is no real project behind it. This process is designed to identify those projects. It does not move real projects; it is to identify the ones that are holding a contract as something that may be useful in the future, but there is no real project behind it.

Eleanor Warburton: Without getting into too much detail, the way this proposal was brought forward did involve considerable industry involvement from a wide panel of people, all of whom will have projects in that queue. These are milestones that have been developed by industry with a lot of consultation, a lot of discussion, and it is something we looked at very carefully to understand that they were reasonable. A credible project that has, as you say, put a lot of money in and potentially started putting infrastructure in the ground, would logically be expected to pass those milestones.

Q59 **Barry Gardiner:** Following up on that, under the ISDS, the Interstate Dispute Settlement System, when a government changes regulation, foreign contractors, in this case, might have a case, if you did not proceed with the contract. Has any analysis been made of how the ISDS might operate in this way and what penalties we might suffer as a result?

Eleanor Warburton: The ESO has independently taken a considerable amount of legal advice on precisely what this is doing and why and how. With huge apologies, you will understand if I say, could I follow up separately and privately on this.

Q60 **Barry Gardiner:** Absolutely fine but, specifically on ISDS, because the treaties that we have which incorporate ISDS could give those companies powers that would impact on the public purse in a most disadvantageous way.

I wanted to speak about the barriers in the system and try to tease out what—given that we have to increase the grid infrastructure as well as the integration of low-carbon technologies in the future—are the biggest barriers to that. Can I turn to National Grid? Mr Dyke, you have your five-point plan to accelerate grid connections, your implementation plans are expected to be published by the end of this month. Give me the timeframe for the completion of the implementation plan.

Craig Dyke: I might have to go away and come back on that. The consultation will run for several months. We will have to take the



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feedback on board and depending on the amount of feedback, we will determine the date of the implementation plan.

Barry Gardiner: Say that again, I did not quite catch what you were saying.

Craig Dyke: We will have to run the consultation, and the feedback from the consultation and the views we have to take into account will determine when we implement it. I will have to go away and write to you.

Q61 **Barry Gardiner:** That is a cheeky answer, if I may say so. Presumably in your plan, you have factored in a timescale for your consultation and, of course, in all consultations, if they are genuine consultations, which very often they are not—they are just a way of saying that we have consulted on this—you must have factored in what you expect to be the time to take into account those consultations and the information received in an overall plan.

Claire Dykta: Specifically for the five-point plan, which is tactical changes to deal with the queue we have at the minute, we are largely expecting that most of the elements of that plan will have been delivered by the end of this year or early next year. There is then a more strategic change, which is saying the entire process of requesting a connection to the system is not fit for the future anymore. That is where we are consulting on changing the whole process. We have run a consultation, we are finalising the proposals now to publish, but that will come out shortly alongside a plan that is also being published.

Q62 **Barry Gardiner:** Can I just be clear that I am disaggregating the correct things here? One is your five-point plan to accelerate grid connections; the other is your connections reform project. Is that right?

Claire Dykta: Yes.

Q63 **Barry Gardiner:** You are telling me that the acceleration of grid connections should be complete by the end of this year, even though the plan itself is only going to be published by 30 November. That gives you the Christmas month in which to have it all implemented and done.

Claire Dykta: The five-point plan is already published. That was published earlier in the year, and it involves the announcement that was made earlier this month and a number of other things. The piece that is being published at the end of November is the longer-term reform of the changes.

Q64 **Barry Gardiner:** The reform project—what is going to be complete by the end of the year?

Claire Dykta: The tactical changes to deal with the queue we have at the minute, the 400 GW that is currently in the queue that is looking to connect. There are a number of changes in that which are moving back some of the projects that I have already talked about that are not ready to connect. It is accelerating battery connections forward. We announced



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last week that we were going to accelerate 10 GW of battery connections. It is changing the way that we model the system when we are issuing a connection offer. On average, most of the queue will move forward and receive dates that are earlier than they would otherwise have received.

Q65 Barry Gardiner: I still need Mr Dyke to write to me about the final date of the implementation plan.

Mr Kaul, the second National Infrastructure Assessment highlighted that it is going to be cheaper for us to move to renewables in the long run; consumers are going to benefit from that. That requires a greater upfront capital cost. Was that the same upfront capital cost that you refused or declined to give to the Chair when he asked the first time?

Akshay Kaul: Partly. It has two component parts. One is the cost of building the generation infrastructure, and the second is the cost of building the network infrastructure. What we see happening to electricity bills is that those costs will become more fixed over time, whereas the cost that is currently variable, which is the wholesale price of power, should become lower because renewables will be very low marginal cost generation sources. If you look at the bill and those two parts, the variable bit will go down, but the fixed bit, the capital bit will go up.

Q66 Barry Gardiner: I suppose what I am asking you to do is to put figures on that. What is the capital cost likely to be? Certain politicians have talked about £28 billion being available—I do not know whether it still is or whether it is not—but what are we talking about in terms of money that government may have to put into incentivising this and pulling it through? What are the costs that the private sector is going to have to bear? What are we talking about in terms of the cost of infrastructure build to produce the gigawatts that we need?

Akshay Kaul: We can definitely write to you with the best estimates that we have of the costs that we regulate, Mr Gardiner, which is the network infrastructure costs. The NIC has, in a sense, directly answered your question. As you said in the National Infrastructure Assessment they have an estimated number of about £40 billion to £45 billion a year of private investment being needed to get to the net zero targets across a range of the sectors, not just energy. We can certainly write back to you.

Q67 Barry Gardiner: Our inbox is going to be very full. Ms Warburton, can I ask you about what you will be doing to encourage and incentivise investment in renewables as Ofgem?

Eleanor Warburton: As Akshay has started to suggest, there are two key areas for us to focus on. The first is obviously to give the network and the connections, and to make sure that those are easily and readily available for good quality projects so that companies can bring forward investment with confidence and bring it forward at pace. The second area is the right market and charging frameworks so that markets are accessible to the different technologies that need to come forward into them. Particularly, we are starting to see much smaller technologies,



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things such as demand response, small-scale batteries and different types of flexible storage, and opening up those markets and continuing to push that will be hugely important.

More generally, recognising that some of the biggest decisions here are rightly ones for government, supporting government to examine whether the market frameworks we have as a whole are going to be right for a high-renewables system that runs on a very different basis from today's. Government have opened a market review project which looks at questions such as locational signals and how you incentivise capacity and security in a renewable world.

- Q68 **Barry Gardiner:** Mr Kaul, at Ofgem you use a performance-based model to ensure that consumers get the necessary investment in energy infrastructure. That is your revenues equals incentives plus innovation plus outputs, RIIO, right? A number of witnesses have highlighted to us that that process tends to inhibit investment into the grid because it pushes for that infrastructure to be minimally sized, and then that requires reinforcement when more connections are required. Do you accept that that is the problem with the model that you are using?

Akshay Kaul: I do not think so.

- Q69 **Barry Gardiner:** Are they all wrong, these people who have written to us saying that it is a problem?

Akshay Kaul: Without seeing the particular criticism—one thing that has been true of the regulatory regime in the past is that it has tended to look at the infrastructure on a project-by-project basis and, therefore, been quite incremental in its approach to grid capacity enhancements. As a result, given the time that it takes to build network infrastructure, we have seen over the course of the last 12 years that renewable generation has far outpaced the rate of the build of the transmission capacity. That is why you are seeing the costs of congestion going up on the grid. The most significant reform, if I may put it that way, that we have made to network regulation is to move away from that incremental project-by-project approach towards one that is founded on a programmatic system plan that looks at what is needed for 2035 and then works back from there.

- Q70 **Barry Gardiner:** What do you see as the biggest bottlenecks? Everything so far you are either going to write to us about or you say it is not a problem. What are the big bottlenecks to decarbonising the system, and what recommendations would you like to see this Committee put in its report to the Government that could assist in getting rid of those bottlenecks?

Akshay Kaul: I will kick off and then colleagues can join in. I certainly think there is a series of barriers to do with the market arrangements that need to be addressed. I know the Government are very much in the lead through the review of electricity market arrangements in tackling those barriers. It is largely to do with the correct incentives for flexible



technologies to be able to balance the system cost-effectively when the sun is not shining or the wind is not blowing.

Q71 Barry Gardiner: What is wrong with the incentives at the moment? What are the recommendations this Committee could make to overcome the problem?

Akshay Kaul: Largely it is a question of providing sufficient revenue certainty so that a full range of different types of balancing technologies can operate competitively in the market. At the moment, the dominant balancing technology is gas-fired powerplants. That is what we are dependent on currently. In the future, we would like to see interconnectors play a balancing role when we have too much or too little electricity. We would like to see batteries being very dominant for storage. We would like to see long-duration pumped storage as very, very important and a business model developed for that and a clear business model for hydrogen as a storage and balancing technology.

Q72 Barry Gardiner: In your response to the Chair at the beginning of the session, you or somebody talked about the hydrogen clusters. The hydrogen clusters that have been identified are geographically divorced from what one assumes would be the priority areas where that hydrogen might be used—the steel and ceramics industries and so on. Is that a problem that Ofgem is seeking to overcome?

Akshay Kaul: Yes. That is precisely the reason why we think it is so important to have a cross-vector spatial plan, which Nick Winser has recommended and we fully support—and so does the system operator.

Barry Gardiner: Thank you very much.

Q73 Cherilyn Mackrory: I want to just ask a few questions, if I may, about grid resilience. I will start with a very open question. How resilient is our national electricity grid, particularly the transmission system? I do not know who wants to start with that.

Craig Dyke: I will take that. The GB transmission system is probably one of the most reliable in the world; 99.9999% reliable. That said, in 2019 we set ourselves an ambitious target recognising the pace of change with more renewable energy coming on and the fastest decarbonising networks in the world and that by 2025 we would be able to operate the system carbon-free. That is in 18 months' time. We are well on track to do that, so that is just 18 months away.

The learning we have just over the last five years has put us in a good position as we drive to 2035, in a completely zero carbon market. We have the right technologies in place, the right participants coming into the market and when we get there, we can then move to use those technologies that are not driven by fossil fuels. It is a good position at 2035, going back to your question on resilience.

Q74 Cherilyn Mackrory: Can I illustrate that if I can? My constituency is in



Cornwall. We have quite a bit of wind power there already. In fact, we have too much electricity to export to the rest of the country. My constituents will often see a lot of the wind turbines not going around, even when it is very windy. They would say that that is wasted energy. Does that contribute to the resilience figures that you are quoting or is it just to do with energy that you need to supply? You just need to expand on that because people do not understand it.

Craig Dyke: That is congestion on the network. As I mentioned, the pace of change in the development and network has not kept up with the pace of connections of renewable technologies, such as wind and solar in Cornwall. Back to the question that was asked about what are the barriers or things we should overcome or recommendations, it is how to invest in those new technologies that are not weather dependent, such as long-duration storage, which would allow us to store some of that energy when it is at excess, and then use it in those colder periods of time, later on in the year through the winter. That is one of the big drivers and one of the recommendations we would probably ask the Committee to put to government.

Q75 **Cherilyn Mackrory:** Mr Kaul, the UK needs to attract a lot of private investment. You mentioned a figure—I think I heard it right—of about £45 billion a year potentially. If that is the case, what powers will you need to leverage to allow this proactive investment, rather than reactive infrastructure investment, so that people do not have to wait to connect? What powers do you need to help leverage that investment for us to start doing that?

Akshay Kaul: We do not need any new powers to make that happen. The Energy Act now sets up the institutional arrangements to plan the system in the long term, and we are very supportive of getting the networks to invest in anticipation of the generation needed for these net zero targets. I think getting the investment in a timely way is the big challenge.

Nick Winser, in his review, rightly highlights the time that projects are taking to get through the planning and consenting system as a significant barrier that needs to be overcome. Also getting community support for the scale of the infrastructure bill that is going to be necessary is fundamentally important. We are talking about probably quintupling or sextupling the rate of network investment onshore to get to the 2035 target compared with what we have had in the last two decades. It is going to be vitally important that we get communities to be supportive of that. Nick Winser sets out a range of recommendations in his report on how to make sure benefits flow to the communities that host this infrastructure, which we are fully supportive of.

Q76 **Cherilyn Mackrory:** On 26 October, Ofgem released the decision overview of their future systems and network regulation. Ofgem admitted that networks at both transmission and distribution levels require significant reinforcement and new network build over the coming years to



avoid becoming an obstacle to Great Britain achieving net zero. That is basically what we have just covered?

Akshay Kaul: Correct.

Q77 **Cherilyn Mackrory:** Thank you. So how does the grid need to adapt in order to achieve the 2035 zero emissions sector targets? Any further comments?

Eleanor Warburton: As we see these large new volumes of generation connecting, fundamentally it gives rise to two challenges. The first is one of location, you are not just talking about greater generation overall. As you have said, it is moving to the margins of the system. It is offshore wind in Scotland, it is solar in Cornwall, and all of the things Akshay has just talked about—about greater network build-out. To connect that is absolutely one part of the answer. The other part is this question of intermittency and what happens to the power when perhaps it is very sunny but it is not needed. Is that power being wasted? You do not directly solve that through network build-out, but you very much solve it through both the flexible technologies you attach to the network—the short and long-term storage—and how you use flexible demand.

Historically, demand has tended to be very passive, but if it can start flexing with that, particularly things like industry or certain usages that can make value from this wasted energy, you make the transition much cheaper overall. You potentially also reduce the burden on network build-out, which, whilst we are absolutely committed to making sure it happens, we know it does put some money on consumer's bills. People can find that incredibly hard. I live down on the South Coast where people are looking at pylons and going, "I know they're necessary, but maybe they're not beautiful".

Q78 **Cherilyn Mackrory:** Given all of those challenges—we obviously have a very resilient system at the moment—how confident are we that we are going to be as resilient in 12 to 15 years' time and beyond?

Claire Dykta: We published a report just before Christmas looking at network resilience and resource adequacy in the mid-2030s. That set out the dilemma that you are explaining, which is that we currently design, plan and operate the system for generally the half-hour periods in the winter when it is most cold, and that is when it is not at its strongest. In 2035, there are more likely to be less-frequent periods where you are looking at the resilience, but they will be longer because there will be four or five days where there is less wind or less solar.

What is needed is the long-duration storage in particular, and other clean technologies that are not dependent, which gives you then a diversity of supplies and technologies to allow us to manage that. We are well on the way. The GB market is a world leader in terms of deployment of short-range storage such as batteries but there is a need for policy clarity and business model certainty for the newer technologies that are not yet commercially viable such as carbon capture and storage, long-duration



storage such as hydrogen and things like that. Those things together enable the system to be resilient when the characteristics of it look very different.

Q79 Cherilyn Mackrory: Have you been given any indication from government departments yet as to when you might expect more detail on what you are looking for? Or is that something you would like us to start recommending as part of our report here?

Claire Dykta: With policy decisions for government, some of the conversations are further along than others. The hydrogen conversation is quite far advanced and others less so. It is less clear on long-duration storage in general, and carbon capture is less advanced than hydrogen, I would say.

Q80 Cat Smith: I have some questions on storage and flexibility. I am conscious that in response to other questions, you have touched on some of this, so please do not feel like you have to repeat yourself, but if you have anything to add please do. Obviously we do need to move towards intermittent energy, and that is going to require the rollout of large-scale storage and flexibility technology. I am trying to get a sense of how you can help to enable that in terms of what legislation might assist in speeding it up, what barriers need to be overcome, and potential incentives could help there. That is to anyone who wants to answer it on the panel; I am quite open to this.

Eleanor Warburton: I am happy to open it then I might pass over to ESO because I know they are doing some specific work in some of these areas. We are starting to see significant amounts of short-scale storage coming forward and they are coming forward primarily in the normal merchant markets. They are not requiring direct subsidy schemes in the same way. Long-range storage is not currently coming forward on a merchant basis. It needs that clarity of what is required and what mechanisms might be available to help that. Similarly for hydrogen, again, it is about clarity. Those are rightly decisions for government but the clear direction of travel so we can see that investment come.

I think demand flexibility is an interesting area. We are now seeing some of that coming forward. There are a few retail tariffs out there. ESO has a product, which it ran last winter and is running again to start bringing that together. For that to become mainstream, cheap, fair, and available to everybody, it needs to sit in the context of a wider future vision for the retail market and how, as a country, we want that to develop. We want that to work for consumers. That is the other area that has huge potential. There are different estimates out there, but all of them put its value in the billions of pounds a year. There is a real benefit to getting that right soon, given the rate of uptake of things like electric vehicles.

Claire Dykta: There are two directions from which you can tackle storage and flexibility. One is what is in our gift. We can basically create routes to market for businesses to make money out of flexible



technologies. We introduced our first commercial mechanism to allow us to use battery technology in 2016 and that was a large part of the reason for why we have such a successful battery market in GB. As Eleanor said, last winter we introduced a service that allows homes and businesses to flex their energy usage in return for a commercial payment or value. There is then the opposite end of the spectrum, which is the policy support and the business models for the bigger investments that are needed where they are highly capital intensive or not commercially viable yet, as we have mentioned already. Big, new technologies like carbon capture and storage need policy support before you get to the stage of thinking about routes to the market for commercial viability.

Q81 Cat Smith: How will low-carbon technology impact how the grid balances supply and demand?

Claire Dykta: Maybe Craig could talk from the operations side. As Eleanor mentioned already, there are two sides of it: there is the operational side and the money side of it if you like. In GB at the minute we have what we call national pricing, so the postage stamp approach. Everyone pays the same for their electricity, broadly, regardless of where they are located, and the same if you are generating. Moving to a different system where the price that you pay or receive for electricity is dependent on where you are located or when you are using energy allows consumers to benefit from cheaper energy overall. Ofgem have just published an independent report that they had commissioned, which showed the potential benefits to consumers of tens of billions of pounds, but there is an operational perspective as well.

Craig Dyke: If we look back historically, our role would have been to match supply to demand. Demand was straightforward to forecast and pretty much driven by people. People have their own characteristics. Now you have demand and supply both moving. You must try to match them both and balance them. Traditionally, if you look back, we would be balancing the system using 30 to 40 large fossil fuel power stations. We have hundreds of market participants in the world now. Therefore, there is a lot more granularity to what can be provided by the market.

A lot of that is weather dependent as well, clearly with wind or solar. The whole element of how we take weather into account is critically important to manage that. Recognising you have balancing tools on both sides of the equation—both supply and demand—that flexibility is critically important. Where that comes from, short, medium or long duration storage, from low-carbon generation such as gas, CCS for example, or even from things such as interconnectors, it is about having that whole gambit and suite of flexibility tools that will allow us to ensure that we can meet what we need to allow zero carbon technology, in particular renewable technology, onto the system.

Q82 Cat Smith: The second National Infrastructure Assessment highlighted the need for short-term flexibility storage and longer-term hydrogen storage by 2035, as well as developing a strategic energy reserve by



2040. Perhaps I can start with you, Claire. Will the ESO or the new Future System Operator be able to deliver strategic energy reserves?

Claire Dykta: The Strategic Energy Reserve is one of the questions that the Government are answering through the consultation that Eleanor mentioned, so the reform of electricity market arrangements consultation. That is very live at the minute. If that were to be a policy decision that was taken forward, it would need to be decided how that would be delivered. The system operator does not own or develop assets, so it is not something that we would own or build ourselves.

Q83 **Cat Smith:** Would the ESO be able to deliver it?

Claire Dykta: It is not something that we would own or build.

Q84 **Cat Smith:** So, I suppose, to Ofgem. How can Ofgem, as a regulator, incentivise the rollout of such large amounts of storage?

Akshay Kaul: Our principal role is to make sure that the market is accessible and competitive to these different forms of storage technologies, and that is very much why we are supporting the Government in their review of the market arrangements and why we continue to want to make sure that the system operator, when they run the balancing mechanism—which is the real-time market for balancing technologies—is also open and competitive to as many technologies as possible. Do you want to comment?

Eleanor Warburton: As we have all discussed, we are in this transitional stage in the energy system between very mature technologies and very new ones. Where these are mature enough technologies that they can come forward in normal markets, we can make sure the markets are accessible, we can remove barriers, we can change rules and we can make sure they connect to the grid. There are some technologies that are not able to move straight into those markets. The Government run a number of mechanisms, the most well-known being the contracts for difference for offshore wind, to give them the confidence to invest. If we are talking technologies that cannot make it at the moment in the normal mainstream market, on some of the ones we have discussed—the questions around hydrogen and long-duration storage, I think everybody would say, are currently in that grouping—there will be decisions for the Government about their ambition for the sector, and therefore what mechanisms they are prepared to put in place to help them make that transition from early-stage technology that cannot do it on its own through to mature technology that is cost effective and is out there in the market with everything else.

Q85 **Cat Smith:** What incentives do you think would be helpful?

Eleanor Warburton: Mechanisms like the CfD have been very effective for bringing offshore wind; capacity markets have been effective in bringing key capacity onto the system for security purposes. I know the Government are exploring whether Ofgem should have a role in these



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regulatory asset base models for things like nuclear. There are a range of options out there but broadly, what all of them do is create certainty of need for the project and some degree of de-risking of the investment.

Q86 Cat Smith: Mr Dyke, what storage options do you think are looking most promising?

Craig Dyke: Certainly today, if we look at the market, the battery market is very prevalent in GB already. There is already a significant number of batteries in GB from a technology perspective. Today, if we look at the market, the battery market is very prevalent in GB already. There is already a significant number of batteries in GB from a technology perspective. Moving forward, one of the advantages as we move into FSO, as the Winsor report recommended, is looking at that strategic spatial energy plan and the advantage of that. That would allow whoever, if it is the FSO who undertakes that work, to look at what other options there are to facilitate new technologies on the system. Let us take Scotland as an example. The more you connect there, the more infrastructure you need to take the power from Scotland into the north of England. That approach allows you to look at other options. We could look at other options, going back to the question from the Minister. Rather than building, do you look at other options at that site such as hydrogen electrolysis, for example? Therefore, rather than request the windfarms to stop producing or build onshore infrastructure, you convert it into another energy source to be used at a later date. That is the opportunity we have through the Strategic Spatial Energy Plan.

Q87 Cat Smith: My final question is open to whoever wants to answer it. What technological developments in transmission, demand management and interconnection with neighbouring grids are going to be required in the future?

Akshay Kaul: The Government have set a target of 18 GW of interconnection by 2030 and colleagues in the Department are working on what targets should be for 2035 and 2050 thereafter. We certainly think that there will remain a strong case for increasing interconnection with other markets. As Craig mentioned, we are going to see many more periods where there is an excess supply of energy on the UK grid. We will want to have some way of exporting that excess supply when there is too much power. Similarly, we want some way of bringing in, in a flexible way, cheap imported energy, electricity as and when there is not enough supply, when the wind is blowing downwards. The business case for interconnection is going to be largely dominated by this flexibility argument and the benefits it supplies to consumers. We are very fortunate in the UK that we have a very tried and tested model now. In 2014, Ofgem introduced the cap and floor regime for interconnection. We have been through two rounds of application for that regime already. Interconnection has gone up from the 4 GW that it used to be for 20 years following privatisation, to something around 10 GW at the moment. We are on track with the third window that we opened up recently to get to that 18 GW target by 2030.



Q88 **Chair:** Just before I bring in Caroline Lucas, I know Christopher Chope has a question. Just on the interconnectors, I should disclose that I am a member of the All-Party Parliamentary Group for Morocco. There is an Xlinks project to bring electricity from the Sahara via solar and wind, but that is envisaged to be one way. From what you say, is it therefore likely to be less attractive to Ofgem to encourage such long-distance interconnection?

Akshay Kaul: I think that particular project, as I understand it, is aiming not for an interconnection status but as an international contract for difference, so that it is an exclusive—it is like an offshore generator.

Q89 **Chair:** That is not relevant in that particular case?

Akshay Kaul: It is not relevant in the interconnection context, at least at the moment.

Q90 **Sir Christopher Chope:** Can I ask about this new system of basically trying to pick winners? You call it queue management. Where does the supplier of baseload electricity fit into that? Do you have a percentage that you say should be baseload, and how does that fit in with new nuclear and other innovative systems, which will create baseload electricity rather than variable electricity?

Akshay Kaul: That is a good question. That is one of the main questions that will come up as we start to introduce greater spatial planning into the system. The Future System Operator is going to look at the optimal pathways to get to these net zero targets, including the question of what mix of technologies would produce the best pathway for consumers. Because we are only 12 years away from 2035, it is highly likely—and ESO colleagues can add to this—that it will be quite a renewables-dominated system so it will be something that has 60 to 65% renewable power in it. There is a question of what makes up the balance in terms of baseload and relatively reliable balancing power. Again, for nuclear, we can see where, at the moment, we have Hinkley Point C under construction and the Government are well underway with introducing Sizewell C as the next project. It is still open as to where the small modular reactors will go. There is a bit more uncertainty around the scale of deployment.

Q91 **Sir Christopher Chope:** So you are not going to give priority to baseload suppliers in your system of queue jumping?

Akshay Kaul: I see what you mean. Not in that sense. The system is non-discriminatory in that sense. It does not seek to—

Q92 **Sir Christopher Chope:** Sorry to interrupt, but will that not inhibit innovation? Aren't you trying to second guess the market rather than letting the market develop itself?

Eleanor Warburton: If your question is around the connections queue and who gets moved forward, who gets moved back, the decision we took on Monday that allows the introduction of milestones into projects



applies to all technologies. It is completely technology-neutral. The judgement being made there is purely, is this a real project that is going to build something and deliver, or—anecdotally I have heard from stakeholders this is a thing—is this a duplicate application? It is better to have several places in the queue for one project. I have heard it suggested that could be a thing. It is not about picking one technology over another.

Q93 Sir Christopher Chope: But will this not inhibit investor confidence in the new technologies, the new nuclear?

Claire Dykta: I do not think the concept of baseload applies anymore. What is important is a diversity of technologies that allows the system to be managed when it is windy and when it is not windy. We should think about queue management from the perspective of it bringing forward the connection dates for those new technologies that are vital to us being able to operate the system. Craig mentioned that we are on track to be able to operate the system for short periods in 2025, zero carbon, and bringing forward the connection dates of new technologies allows us to get to the different look and resilient system of the future.

Q94 Caroline Lucas: Thank you very much. I must say, the reference to the idea of baseload being a little bit outdated now was music to my ears. It was Steve Holliday, I think back in 2016, when he was chief executive of the Grid, saying that going forward the grid that we need is one that is going to be flexible, that is going to be based on smart energy, on battery storage and so on. We need to get away from thinking that we need this constant baseload. My question was going to pick up on the issue of the spatial energy plan. I wanted to ask whether you think that the recommendations for producing a Strategic Spatial Energy Plan would resolve any governance issues, in particular around the division of powers between organisations and how they interact with one another.

Akshay Kaul: I am happy to start. It is very helpful in clearly outlining the roles of each of the three organisations between the Future System Operator, the regulator and the Government. It essentially requires the Government to set the policy targets in terms of what they are seeking to achieve in carbon security of supply terms. It then asks the Future System Operator to spatially plan the optimal pathway to getting to those targets for 2035 and specify the network infrastructure that is going to be needed to connect all the generation and other technologies that are necessary for that target. Then it makes it very clear that the regulator's role is essentially to take that as the needs case and then get that infrastructure delivered through our incentive regimes as quickly as possible.

Q95 Caroline Lucas: Could I just ask whether there is any debate at all about local democratic control of grids as there is in places such as Germany? Has there been any discussion about the future of the grid and so forth?



Akshay Kaul: There has been. One of the live topics I think we have published on this just today.

Eleanor Warburton: I hesitate to say this, but I'm glad you asked me that. About two hours before now, we put out a document with a rather un-catchy title. Essentially, what it deals with is regional strategic energy planning. It is precisely that question that net zero is not something that happens up here nationally, it happens in real places to real people. This is a decision document with a load more work still to be done on the detail but essentially it says we need regional strategic energy plans as well. We think the FSO should have a leadership role in that because it needs to be coherent with the national, but it must bring in both the local networks and the local democratic bodies—the metro mayors, the local authorities—because these plans must be consistent with their vision for the area, for what is going to drive things like transport and housing and heating in those areas. So, I strongly agree.

Q96 **Caroline Lucas:** I shall go away and read that. Does the issue of ownership per se come up in that? I can understand how co-ordination and so forth will have much more conversation and dialogue and so forth. Is there going to be an actual transference of political power as part of that too?

Eleanor Warburton: Do you mean ownership of the actual networks or who owns the vision?

Q97 **Caroline Lucas:** The nuts and bolts, in a sense—the grid itself. There are examples in Germany of where that is the case, or at least they have been leased by the local authority.

Eleanor Warburton: The short answer, if I am honest, is no. This is focused on how you give local areas the right involvement to set the vision for where their area should be going at that local level as well, to essentially define that needs case so that as Ofgem is setting price controls for networks it takes full account of that. It does not open the question of yes, things like public ownership of networks, which rightly would be a question the Government would have to look at.

Q98 **Caroline Lucas:** I have a question for Claire Dykta about what gives you confidence that the future system operator will indeed be up and running by the end of next year.

Claire Dykta: The electricity system operator was chosen as the foundation for the FSO based on our experience, skills and existing capability. As we expand both horizontally into hydrogen and other vectors, but also vertically into local planning, there is a lot of new capability that we need to build. We are already well on the way. The organisation has about 1,000 people at the moment. It will be 1,800 people by the end of next year. We are well on the way to recruiting and building that capability so that we are set up and running in line with those plans.



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Q99 **Caroline Lucas:** Do you think that the electricity system operator has the right powers, and does the FSO have the right powers? Do they need any other powers in order for them to be successful in their different roles?

Claire Dykta: As we have mentioned a few times, it is a huge move forward for the energy system as a whole to go to the next step in governance, if you like, by setting up the FSO, because it creates a clarity of roles between the FSO, Ofgem and the regulated monopolies. There is a lot of work that has happened. There is probably a bit more to happen around just clarifying those boundaries, but it is definitely a benefit and the clarity of roles helps for sure.

Q100 **Caroline Lucas:** Can I just get a complementary view from Ofgem? Would you agree with that? Do you have any concerns about the interface between those two different bodies?

Akshay Kaul: It is very helpful in terms of clarifying the respective roles of the government department, the regulator and the system operator. One of the things we will need to be careful about is the speed of the transition to these new arrangements. I am very conscious we are collectively going to be asking a lot of our colleagues in the system operator, not only planning the national system but also engaging with local authorities in planning the regional system while keeping the system operating and balancing in real time and facilitating the various market arrangements to do so. It is a question of calibrating the speed of that transition to make sure that the FSO, as it beds in, can deliver its functions properly. In terms of powers, we think the Energy Act gives us collectively what we need to get on with it.

Q101 **Caroline Lucas:** We have touched on net zero already a couple of times. Obviously, you have the net zero duty that you have welcomed. Can you say anything more about how that duty and the new powers under the Act will materially affect Ofgem's decision making?

Akshay Kaul: Yes. It is a good question because we welcomed, as you say, the net zero duty. We already had, prior to the net zero duty, a duty to future consumers, which we interpreted on our own as being entirely consistent with getting to net zero. We also had duties to ensure the reduction of greenhouse gases and a sustainable energy sector. The net zero duty, in a sense, makes it very explicit that the meaning of all that is that we have to pay close regard to the need to meet the carbon budgets.

That clarity is very welcome and it will strengthen our hands as a regulator when we take a lot of action to speed up the progress of the system towards those net targets and make the trade-offs that need to be made.

Q102 **Caroline Lucas:** I will just push you a bit more to try to understand what you will be doing differently now that you have this duty that you were not doing before. Is there an example that you could give?



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Akshay Kaul: Yes. In anticipation of something like this, we had already started to change the foundations of the energy system, as I said, from one that was regulated in an incremental project by project way, largely focused on avoiding the stranding of assets and keeping the cost to consumers as low as possible. We have already made the change from that to a system that is spatially planned. It is much more anticipatory and it is looking at the best way to get to these long-range net zero targets. To the extent that there are obstacles in the way or challenges to the various initiatives that arise in taking this action, the net zero duty only strengthens our hand because it gives a very clear mandate to the regulator that you are required to do this by law.

Q103 **Caroline Lucas:** Do you think that you collectively have the skills and the capacity to manage the new powers that have been given?

Akshay Kaul: As the regulator?

Caroline Lucas: Yes.

Akshay Kaul: We think that we will need to adapt as an organisation. We will need to bring in new skills, and we have already started that transition by, in a sense, establishing a function for system planning within Ofgem, which will work very closely with colleagues in the ESO. We are upgrading our expertise and our capacities on the operation of the market and working with the Department on market arrangements. There are new rules that have come to Ofgem quite recently that we are gearing up for, including our role as a competent authority for cyber regulation and potentially in the future also taking a closer interest in areas like climate resilience and so on. It is an evolving picture but we very much recognise that we have to increase the range of skillsets we possess to deliver on the duty in full.

Q104 **Caroline Lucas:** My last question is about financial resources. I was just noting that as a whole National Grid paid out £9 billion in dividends to shareholders over the last five years and £9 billion might have been quite a handy thing to have. Do you have enough financial resource, do you think, to make this transition?

Akshay Kaul: Again, do you mean as an organisation, as a regulator?

Caroline Lucas: Yes.

Akshay Kaul: We are growing quite a lot as an organisation. We have doubled over the last five to six years in staff strength. Given the range of roles and the scale of the roles that we are taking on in future, that will need to continue so I think that—

Caroline Lucas: You have the resource to do that? That is not a problem?

Chair: I am sorry to interrupt. Caroline, I think that you were referring to National Grid and Ofgem is answering and probably not best placed to



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respond.

Caroline Lucas: All right. Okay.

Akshay Kaul: Do you mean National Grid as a—

Caroline Lucas: I was only giving National Grid as a whole, just talking about the fact that it is obviously the one that is paying out £9 billion in dividends over the last five years. It was a segue into the question about resources generally. You were explaining that Ofgem in particular was going to be increasing the number of staff that it needs—did you say doubling?—by a lot, so it was more a question about finance for Ofgem. If you do not have enough money to be employing all these extra people, you will need to be implementing all these extra roles that you will have.

Akshay Kaul: At the moment, yes, we have a settlement from the Treasury that we are proceeding with. We will be making the case to the Government to keep our resources proportionate to the scale of the roles and challenges that we are taking on. I think that we also need to be alive to the fact that we are in a sector where there is a lot of competition for labour and we need to be a competitive employer. Making sure that we can continue to attract and retain talented expert people, both within the regulator as well as with the future system operator, which will be a not-for-profit public entity, will be vital.

Chair: That brings our first panel to a conclusion. Thank you very much to Akshay Kaul and Eleanor Warburton from Ofgem and to Craig Dyke and Claire Dykta from National Grid. If you could move back and the second panel could come forward, we will go straight into the second panel.

Examination of witnesses

Witnesses: Susana Neves e Brookes, Gareth Hislop and Roisin Quinn.

Q105 **Chair:** Welcome back to the Environmental Audit Committee with our second panel. We are talking to representatives from the network owners, looking at the distribution companies. I am pleased to welcome each of you. Perhaps you could tell us what your roles are in the respective organisations, starting on the right with Roisin Quinn from National Grid's ESO.

Roisin Quinn: I am Director of Asset Operations for National Grid Electricity Transmission.

Chair: What geography does that cover?

Roisin Quinn: That covers England and Wales at the high voltage end of the power system.

Chair: Thank you. In the centre is Susana Neves e Brookes from SSEN.



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Susana Neves e Brookes: Yes, I am from SSEN Distribution. I am the Head of Connections, Policy and Performance.

Chair: Gareth Hislop from Scottish Power.

Gareth Hislop: Good afternoon. I am the Head of Commercial Operations and Market Development in Scottish Power Group, responsible for transmission and distribution covering Scotland, England and north Wales.

Q106 **Chair:** Thank you. We have just heard from the regulators and the ESO. I am not sure whether you were present for that panel, but much of the discussion was about what we need to do to gear up the electrification of the economy, and the grid plays a vital role in that. The reason we are undertaking this inquiry is because we are concerned at the capacity of the whole grid, including the distribution operators, to be able to meet the challenge of decarbonising by 2035. Could you each illustrate for us what the main barriers and blockages are to the development of the grid in the areas that you are responsible for?

Roisin Quinn: We are very clear that networks are critical to deliver our net zero future and to provide Britain's homes and businesses with the clean and reliable power that they want. We have already embarked on the greatest overhaul of the grid in decades. When we think about this, we can see that we are clearly in the delivery phase of this transition. We have recently connected Dogger Bank, the world's largest offshore wind farm. We have connected transmission-connected solar farms. We are very focused on our responsibility through this and our responsibility to communities and customers.

We are conscious that systems that were fit for the past or even fit for the present are not necessarily going to be fit for net zero. While there has been significant progress, now we have to start to tackle some of those bigger questions: strategic planning, planning reform, connections reform, and then regulation. I can expand on them further if you would like.

Q107 **Chair:** We will come on to some of those in a moment, but perhaps you could just highlight how you look at tackling this problem from your perspective. What are the main things you need to get right to allow the others to flow?

Roisin Quinn: We think about it as a system of quite interconnected pieces. If I look at connections first, there is an awful lot of oversubscription in the pipeline. The way the connections process runs, where there is oversubscription, where there is loose contractual discipline and first come, first served, it allows stalled projects to get in the way of viable projects and delay their connection to the grid.

There is a series of tactical actions that have been taken, working with the ESO, with Ofgem and with industry. We have been very clear that there is a need for wider reform. Some of that would look like moving



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away from first come, first served to connect or move. We need to be able to take action on the pipeline as it is now. We need to make sure that there are more credible entry criteria to get into the queue in the first place. We also need to recognise that some projects will need something different. Where they are nationally significant and they meet set criteria perhaps a fast-track process would be appropriate for them.

When I think then about planning, we would again see that the process has been fit for purpose but there is now a volume question, the number of significant projects that will have to go through this process. It is a process that has parts of it that could be subject to delays. We would welcome seeing the designation of the national policy statements. We can see that there is space to streamline that process, making sure there is more resourcing for the planning inspectorate.

Chair: Local authorities do you mean?

Roisin Quinn: Anyone who is involved in that planning process, making sure that they are fully resourced so that we can all benefit from swifter decision making. Finally, making sure that the community benefits framework is understood and is implemented promptly so you have that right balance of what you need to build and where, balanced with community needs.

Q108 **Chair:** For my understanding on the way that the queue operates, are we talking about two separate queues here? Is there a queue operating at the transmission network operator level and a separate one at the distribution level?

Roisin Quinn: There is. As a customer, you will come forward via the ESO and will apply to connect. You will pick your location. You will specify your technology. You could have applied for multiple connection points at transmission while also applying for the exact same project at distribution. You do end up with two parallel queues. One of the big moves that has been made this year has been led by the Electricity Networks Association to reimagine how that interface between transmission and distribution works so that you can better manage that interface, give more clarity on how those queues would interact, and then find ways to decouple a smaller generator connecting a distribution from the swathe of significant infrastructure needed on transmission.

Q109 **Chair:** You referred to fast-tracking. Are you envisaging individual projects being able to jump the queue in certain conditions? How might that work without getting into a scramble of madness from all operators insisting on getting the fast-track access?

Roisin Quinn: One of the things that we are conscious of at the moment is that every project is incredibly special to the customer who is coming forward with it. Having a framework that is transparent, that is set out in advance, that sets out what the criteria are, things like the number of jobs that might be created, the local community benefit, the location of



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it, linked to a strategic energy plan, would be very important. It must avoid being a scramble. It must avoid being any sense of preferential treatment or being able to force your way to the top. Our licence condition is very clear that we should not unduly discriminate, so we are keen to work with Ofgem and with government around what that framework would be, how it would be implemented and how it would be implemented fairly, transparently and consistently.

Q110 Chair: I will come to you in a second, but I am interested in community benefit. One of the big challenges is ensuring that there is public acceptability to additional capacity coming in, particularly for overhead cable systems, which are always controversial and never popular within the locality. Are there some emerging themes and clarity being given to operators about what is meant by community benefit and how the communities will understand what it means if someone is proposing to put a pylon in front of their view?

Roisin Quinn: We are very conscious of the need for balance between the need for the infrastructure and making sure that communities feel fully engaged. We welcomed the Government's consultation on a framework for community benefits and would like to see that implemented properly so there is transparency on what to expect and there is consistency.

We also welcomed that there is some flexibility within that. It is important that local communities have decision making on what they need and what they would benefit from in their community. We can see this as a real opportunity to be able to perhaps fund emissions reductions programmes within an area and energy efficiency within an area, but local decision making by the communities within that framework is very important.

Q111 Chair: I am sure that Barry Gardiner will come on to this in a moment, but does that include a structure, for example, for offering a proportion of relief on bills for people who are immediately affected within a community from new infrastructure?

Roisin Quinn: I think that within the government framework there is facility for doing all that. We are keen that you do not end up prescribing a single solution and that feeling enforced on a community, but that there is flexibility within the framework for a local community to be able to make that decision on the support they need and the benefit they would like to see from that community benefit.

Q112 Chair: One of the purposes of this Committee is to come up with recommendations for government. In your answers, if you have specific things that you feel we should be recommending, that would be very helpful to us. Thank you for those answers. Can I turn now to Susana and ask for your top barriers and blockages in the system that you would like to see resolved?



Susana Neves e Brookes: I will try to not repeat what Roisin said about connections reform; that is the first one.

Roisin said the system is broken in terms of how we do it. It is first come, first served, the two queues, where we have a transmission queue and then the distribution queue where I exist. We have the smaller projects, the community projects enabling someone to have a wind turbine in their back garden to help with their electricity bill. We need to resolve the connections problem. And then we have to go from a system where one size fits all, to something that delivers a different process for different needs, for different outcomes. That is one of the key things.

Alongside that, we need to make sure that we are looking strategic investment that enables net zero. We should have net zero by consumers for consumers. We should be thinking forward looking. We should be looking at strategic investment, perhaps look at the regulatory framework because it has been five years now. Do we need to do something different in that space to make sure we are looking far enough and identifying the strategic investment early enough and working with transmission to develop the network because the situation can develop up to a point but it also has to work with transmission. That is why we welcome the ESO moving to an independent system operator and also the announcement today of the regional energy system plan because hopefully that will come together to cement the need for strategic investment because that is what we should be delivering, the network for future needs and stop the reactive approach that we have probably been adopting for the last few years or so.

We have that and it is enabling flexibility. We have to enable flexibility for optimisation of the use of our network. We have a network that is there 24/7 and we need to make sure we are using those assets 24/7 to their ability and also bring consumers, households and businesses to be more able to participate in flexibility markets. We need to create the tools and the capabilities so there is a whole part of the investment to enable greater flexibility, the setting up of our networks, the setting up of data, sharing the data, information, creating the platforms to bring the flexibility to the market to become something that is just a day-to-day given so we are making the best use, in real time, of the availability of capacity on the network.

I picked those three from a distribution perspective because I am not going to repeat everything that Roisin said so far.

Gareth Hislop: I am afraid that you are going to hear a whole lot of the same messages here.

I think it is important, when you are identifying solutions that you are clear about what the perceived problem is. The queue just now when we were talking about transmission and distribution is over 500 GW—I think there is a question in my mind about what is the need for that. If you look at some of the UK winter demand for 2022-23, it was 60 GW. The



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first scenario the ESO published suggest a range of between 123 GW and 150 GW for net zero compliance. So there is a volume of significant gigawatts in the queue that needs to be decongested. First, we welcome the CMP376, which was the queue management decision given by Ofgem at the start of the week, which now allows for contracts to be terminated and for the zombie projects that were alluded to by row to be taken out. Ultimately projects are construction based so it is everything that is associated with construction. When you talk about manufacturing, the ability to procure, the ability to do that in a timely manner and a manner that is a fair representation of cost—in order to actually attract the manufacturing we need from copper, to lithium, to construction, to cement, to actually the physical resource of people—that is something that needs to be constructed and looked at as well.

Q113 Chair: On that, if I may, is there industry consensus within the trade association of what the supply chain challenges are both in terms of skills and labour as well as the physical components that you have been talking about?

Gareth Hislop: I would say yes, there is, not just here but also across other DNOs. There are similar supply chain constraints. We are competing, as the world is, to get to net zero so that naturally produces tension when the scarcity costs obviously as well. So there is that.

Linked to that, obviously—and again it is project based—is the planning consenting regime that exists. There are timescales that need to be defined and to be clear. In Scotland, the Beaulieu-Denny line took 10 years to consent and build. Five years of that, 50%, was linked to planning. That is the 400 KV line that goes through the heart of Scotland, delivering energy to demand centres. It is a good example of where things can get frustrated and bogged down.

I think the recommendations in Nick Winser's report are very strong particularly for England but for Scotland as well—the link to statutory timescales associated with section 37, and the consenting with that, the link to an automatic public inquiry, when the planning has been rejected. I think it is about achieving the right balance between the community benefits aspect and the stakeholder aspect and the impact in the communities we are proud to serve. Equally, it is about the delivery of net zero. There is a balance to be struck there.

Q114 Chair: Thank you. In terms of skills and what the Government can do to encourage this, does anybody have an estimate of the extra engineering capacity required, the jobs, in order to deliver these ambitious targets?

Gareth Hislop: We are recruiting over 1,000 people in SPEN for our ED2 and RIIIO-2 plans but it will go beyond that if you extrapolate that into 2035 and obviously the recent net zero targets have been achieved; it is going to be significant. Without putting a number on it, I think it is important to look at what we are doing at universities, what we are doing to encourage and retain talent within the UK. Equally, what are we doing



to attract talent from overseas? The engineers in our company will tell you that there is a difference in age between those who are about to retire and those who are coming through the universities and it is that sweet spot that we do not have. So in terms of solutions, it is looking at how we can recruit people from abroad that have key jobs to—

Q115 **Chair:** Is this a designated shortage occupation?

Gareth Hislop: Sorry?

Chair: Is the electrical engineering capacity you need regarded as a shortage occupation from the visa point of view if you are going to get people in from abroad?

Roisin Quinn: It is worth thinking about. We require many different skills to identify, develop, commission and build this entire network. That is one of the things we would be pleased to write to you about and tell you exactly what it looks like.

We have also commissioned a report with National Grid on the skills needed for net zero and will be happy to share that report as well. It works through what the types of jobs are and where they might come from. We are quite conscious that we will build this in partnership with the supply chain so we think about capacity, we think about cables and transformers and exactly as Gareth said, this is a global challenge so how can we think about programmatically procuring in such a way that we get the capacity but build the skills base at that same time? We see a real shift towards much more collaboration and are very much welcoming the work we do with Ofgem on the ASTI framework—the accelerated strategic transmission investment—which allows this but there is more space to work with government around how we might be able to book capacity in some of these factories and do it so you build the skills base. We have also wondered if there is way to create incentives for companies to come and build their factory in the UK and to start to create that homegrown basis of both capacity and the skills that will necessarily go with it.

Chair: Thank you. We have half an hour and three sets of questions. I think that is 10 minutes for each.

Q116 **Barry Gardiner:** This morning, the Energy Security and Net Zero Committee heard evidence that suggested the skills-need simply to replace at the existing level was 50,000 and if we were to upgrade to the sort of electricity capacity and generation that we wish to have, that the Government have predicated, we would need between 60,000 and 150,000 extra jobs. Are you familiar with those figures? Perhaps you could send us your own estimates so we can compare what you say with what the others said to the net zero Committee this morning.

Gareth Hislop: If I may ask, did they provide any information about the breakdown of the types of jobs within that range?



Q117 **Barry Gardiner:** We asked for that, yes. Indeed.

I wanted to ask you, probably Ms Quinn, about network leakage. Can you tell me, from National Grid, what is your percentage of leakage from the network each year?

Roisin Quinn: Just to make sure I am talking about the right thing, this is about transmission losses. I will need to come back to you with specific figures. We are very conscious of the need to run a reliable and efficient power system and are constantly innovating about how to do that. A lot of the losses in the transmission system are driven by the location of the generation and the demand rather than by the technology. When we are doing upgrades, we are very conscious of what technology we put in, what kind of conduction we put into an overhead line, what kind of assets we put on it.

Q118 **Barry Gardiner:** But leakage is a problem; losses on transmission are a problem, as is congestion, as you have said. Would it not make more sense to have energy generation closer to its end use so that the flexibility in the system was there and you did not have those losses or that congestion in the system and it would reduce the need for great additions to the main transmission network if you had local generation?

Roisin Quinn: Just thinking about the transmission system overall, one of the things we would see as a benefit from a Strategic Spatial Energy Plan is being able to draw out those questions about where significant demands of hydrogen should be placed, how do you consider the network overall so that what you are building in terms of infrastructure is absolutely needed and that plan would be able to tell us what we need to build and where. Echoing words from others, I welcome the establishment of the FSO. I think it is very important that it has that accountability for a network, for an energy plan that can be the backbone of network. We would then like to see that linked to a plan that has standing in planning legislation so that we can make sure of the network that is required which would reflect where generation should be sited, where demand could be sited most efficiently, which can then get locked into your network need and how that would be built.

I will leave it to distribution colleagues to speak more about very local generation but we are very excited by the work we did with the ENO to fix that interface between distribution and transmission, making a much easier path for flexibility on the distribution system to be able to access the full suite of markets that the ESO operates.

Gareth Hislop: In SPEN's patch, I am very proud to say our performance is 99.999% so our losses figure is very low. Building on what Roisin was saying there, I guess there are other things. There is innovation as well, different ways of working. For example, in Scotland, we have the difference in temperatures and that can unlock some capacity in the wires as well, the cables themselves. There is a question about innovation. Equally, however, that needs to be balanced with recognising that



transmission national infrastructure and the consequences of not getting it right are fairly serious, as we have seen during recent events in 2019.

Q119 Barry Gardiner: I am trying to focus on what you see as the future for local generation, because the Energy Utilities Alliance said that the view from the industry is that if we are unable to create a decarbonised and resilient national grid, the chances of achieving it at a local level will be difficult. How would the mini-grid feed into the national grid and if there is a connection, why does all the electricity not just come from the national grid? But then they would say that, wouldn't they?

Susana Neves e Brookes: From a distribution perspective, we have to have both. We have to have local generation and we have to have generation sited on to the transmission system. We need the combination. The Nick Winser report said that local generation is part of the solution to manage local demand, that flexibility, especially as we are building the big transmission networks that take a longer lead time to deliver. We need local generation to enable maintaining the response for the demand that we have seen growing—housing, local businesses, the economy is picking up again and we see that at local demand centres, with energy centres facilitating low-carbon transition as well. That is why we mention the very important work we have done as part of the NA. DNOs coming together on electricity is not always easy, but we did as DNOs and, with transmission owners and ESO, we unlocked a new way of enabling local generation to connect even when we have constraints on transmission, we found new ways to bring that generation locally and we are currently deploying the first phase, or the first couple of phases, of that programme and we are working with local generators to bring battery storage in and bring local solar farms in—anyone who says they are ready to connect in a different more innovative way, because we have to go there where it is more flexible, able to make those projects viable and able to help with managing the demand needs locally.

Q120 Barry Gardiner: I want to focus on the recommendations that this Committee might make. You will know that the energy system has categorically stated that local energy systems can facilitate decarbonisation, accelerate uptake of low-carbon technology, derisk investments in infrastructure, improve local energy resilience and reduce bills. Given that, and given that you suggest that that is broadly in line with what you have just said, what are the recommendations that you would like to see this Committee make about the role and importance of local grids and local generation in future?

Susana Neves e Brookes: We have not had the time to review the announcement that came out today of the regional energy system planner, the document that was released by Ofgem. Once we review that, we will probably be able to confirm if that is taking it far enough in the strategic piece. With the strategy to enable us to be able to develop the local network to accommodate that generation, does the creation of that body enable to cover the gap that we have of the strategic local plan fitting in with the national plan? If it delivers on that, then I think that



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your approach is to say that it should support this local energy system planner to cover the gap and again, more strategic investment and supporting the strategic investment for net zero.

Gareth Hislop: I think that it has a role to play certainly, if I can answer it on a transmission and distribution level. Transmission from Scotland, bringing down renewable energy to demand centres south of the border, are critical to maintain security. Supply at a local level means regeneration absolutely has a role to play. Within that micro generation element—again, I referred to innovation earlier on—you are looking at things such as flexibility services. To refer to one of our demand shift projects with Octopus, in which you are doing things at a different time and changing consumer behaviour, that can have a positive impact on the local constraints, for example. Another project I think was 2.5 MW—

Q121 **Barry Gardiner:** Is that one of the ways in which you are seeking to assist your householders, your bill payers, to take advantage of local systems to decarbonise?

Gareth Hislop: Yes.

Q122 **Sir Christopher Chope:** Can I ask you about planning and local people? Obviously, we are in a democracy and if someone has their house, which is their castle, they need to be protected against arbitrary interference with their rights and the community needs to be protected against arbitrary interference that will damage the local environment and local amenities. The system that we have to protect those interests is called the planning system, and however important the national infrastructure is, it has always been subject to planning. I used to be the Roads Minister and I know full well that however important the national road network is, it was always subject to being able to get planning permission with appropriate support after a public inquiry. The same with railways and with airports. Are you suggesting that energy networks should be in a privileged and different position?

Gareth Hislop: I will answer that. No. I certainly recognise—and our organisations recognise—everything you said. I think that the legislation seeks to strike a fair balance between the rights of the individual and local communities. It also promotes engagement with those communities. I know that my colleagues in other organisations and my own will go out and speak to local stakeholders. We will try to take them with us, we will explain what is happening and the impact on their community. There is a balance to be struck, but equally we are now under legislative requirements to drive to net zero to get these gigawatts on the bars, to drive that decarbonisation to promote the economy. There is always a balance to be struck and I think that the law seeks to do that.

Where I think perhaps we are coming at is, under the Nick Winser report, the recommendations of some of the timescales and the resource backing up some of those timescales from the decision makers who are doing this. I think that is an acute problem that perhaps needs to be looked at



to gain some certainty around that. Equally, we referenced community benefits earlier on as well. Looking at the DESNZ report that came out recently, that seemed to strike the balance correctly, in our view, between community benefits being seen as something that is positive and enduring but not something that is a persuader for people to give up their land rights. I think that is important as well.

- Q123 **Sir Christopher Chope:** So cheapskating is not something you are promoting? Obviously, there is a suggestion that where new networks could be introduced, they should be put underground rather than in the form of pylons. If that is the best solution, in the same way that it was found to be the best solution for tunnelling on the HS2 bit from London to Birmingham, would you accept that tunnelling and underground cabling is a reasonable solution?

Gareth Hislop: I will let other colleagues speak as well here, but I would not say it is the best solution from an environmental point of view. When you look at the damage it has caused the land, if you look at the width that is needed, and equally as well, there is still infrastructure required at either end in the form of cable sealing ends, so there will still be visible structure on the ground. Equally, when it comes to the security of supply point of view, it is imperative that we can get access to the network as quickly as possible. You have might buried the problem, so to speak, but you are now required to go in, dig it up and actually joint it again. It is probably a reasonable one, but the question here is: is it the best one for all?

- Q124 **Sir Christopher Chope:** I find that an extraordinary answer because I have often passed the work that has been done between Dorchester and Bridport, which is a major construction job carried out by Morgan Civil which is actually to remove the pylons on that very attractive part of southern England and replace those pylons with underground cabling. If it was good for that—and that project has just finished and it has massively improved the landscape—why are you suggesting that in other parts of the country, far from being able to have the stuff put underground, they have to suffer pylons?

Roisin Quinn: Can I perhaps address that one? The first thing I would say is that we understand and we appreciate the anxiety the communities feel, but to reiterate, we are bound by the laws. The national policy statement at the moment has a presumption towards overhead lines. It is a question of balance. We have to be able to demonstrate that there is a very clear need for new infrastructure, and that means getting the most out of the existing assets, looking at different commercial tools, and looking at innovation. Where there is a need for something new, balancing that with community and environmental concerns.

The project that you referred to is one of the visual impact schemes. That was part of our regulatory settlement with Ofgem, which went through a significant period of scrutiny and the cost benefit assessment for those communities. When we go through the same regulatory scrutiny and the



same engagement with communities, we address these questions, starting from the presumption of overhead lines as per the national planning statement. We then work with communities around where the opportunity might be, where we can keep things further away from communities and from individual settlements, and where it might be possible to put barriers in place. We are very sensitive to that need and engage significantly with communities, but we are conscious as well that the planning process—and a robust planning process is vital. We are not at all suggesting that we should move away from that. For that robust planning process, to make sure that we can have a network that is fit for net zero, we see opportunity to make sure that we can streamline in places, so there is resource to allow decisions in quicker time scales, but that there is real clarity within the national planning statements to give people clarity of what to expect and how we should proceed. If we can lock the need down in a strategic energy plan so that need is understood, it is a question then of how you deliver it and how you go through that process. We think that will be hugely helpful.

Q125 Sir Christopher Chope: I do not see how you will take the people with you. One way you might be able to would be to concentrate on intensifying existing pylon schemes, for example, where there is already a set of pylons, increasing the capacity of those pylons rather than blighting new communities with this infrastructure. Fortunately, under the planning system, the Navitus Bay, the Christchurch Bay offshore wind farm was defeated and withdrawn from further consideration. Even as part of that, the national park was insisting that any cabling should be underground rather than overground. Why are you insistent that cabling should be overground rather than below ground?

Roisin Quinn: As I say, we are bound by the legislation and the presumption of starting from overhead lines. We engage with communities. We will look at national parks and we will go through all of the right checks and balances in the planning process. We are also very conscious that as the generation mix moves to decarbonised, the location of that generation fundamentally is shifting. That means that there are areas of the network where we will need infrastructure to be able to move these new green megawatts to demand centres to homes and businesses as part of this energy transition for Great Britain.

Q126 Sir Christopher Chope: People who use gas rely upon gas coming through underground pipelines. You are just suggesting that you will go for the cheapskate solution, which is putting overhead powerlines in.

Roisin Quinn: I think that it would be wrong for us to think of it as cheapskate. We are really mindful of what is the right solution to be able to deliver resilience. We are regulated heavily on costs and we have to keep that balance reaching consumers in the cost of the infrastructure and how best to do it. There is a significant additional cost to underground cables, and that is not to suggest that we are going for the cheapest, but we have to be mindful of the cost to consumers of picking up the tab.



Q127 **Sir Christopher Chope:** On that point, there was obviously significant extra cost in putting tunnelling under the Chiltern Hills rather than putting the HS2 line above ground, but that cost was thought to be a reasonable price to pay for the delivery of that particular infrastructure project. Do you not think that the same consideration should apply to your projects?

Roisin Quinn: I think that this has to be captured within the national planning statements so that we have real clarity on what we should be building, how we should be consulting, and how we should be doing that with local communities.

Q128 **Chair:** Can I ask one more question as a follow-up to that? It is about the concept of capacity hubs. Could you explain how capacity hubs will help resolve some of the very real problems that Christopher identifies?

Roisin Quinn: Yes. Perhaps if I start from the transmission point of view in England and Wales, currently within the connections process, I talked earlier around how there are reasonably loose contractual obligations on customers. If we look at the pipeline that is looking to connect, that would require us to build, in England and Wales alone, about 100 new substations and a significant volume of infrastructure. With the current regime on connections, they risk being only 20% used. That is a lot of substations where a customer is not connecting but the connection point has their name on it. It is why we were so passionate about connections reforms so that customers must connect or they must move.

With capacity hubs, we are looking to rationalise the number of substations that we would build. There might be three or four in an area that you would build, you would be able to connect customers when they are ready, in order to have readiness for these capacity hubs. In doing so, you end up with a substation that is full to the brim and is well-used, rather than having more substations, more than you need, because they are half-full. These capacity hubs will provide a vehicle to make sure you are able to funnel that investment in the right way. It would have to be linked to the strategic energy plan to make sure that it addresses where demand should be versus generation, where customers want to connect, and to draw out some of those considerations and balance earlier in the process.

Q129 **Chair:** It would not just mean that the generating capacity tends to be concentrated around the hub to minimise the access. At the moment, if you are trying to put up a solar farm, you can only do it when you are approximate to a substation or you have existing overhead capacity going nearby. Would the capacity hubs also lead to more concentration of generating capacity?

Roisin Quinn: It may also lead to that effect. At the moment, a customer can apply to connect without sole use agreements on the land. They can apply to connect wherever they want. By providing these



capacity hubs, it should direct those connection requests to somewhere where there will be capacity for them and made available ahead of need.

Q130 Cherilyn Mackrory: I want to talk again about grid resilience if I can. Roisin, what would you say is the least resilient aspect of today's electricity grid?

Roisin Quinn: This is a great question. When we think about it from a transmissions point of view, we have to remember that it is a grid and we design it so that any individual asset can break and we can fix it before consumers feel an impact of it. For each individual component of the power system, it will have a design specification, a maintenance regime, all of those aspects so we can make sure we know how it is and how it should behave. At a transmission level, it is designed so any single organism can fail. That means we do not think about it as having a least resilient part. The key for our obligation and to continue to provide the world class reliability that we do is to think of it as that system of assets and make sure that we understand it in that way, and that we manage it and manage the assets in that way as well.

Q131 Cherilyn Mackrory: Slightly on that theme—Gareth might want to come in here, or Susana as well—one of the greatest bottlenecks within the UK energy system is the connection between the Scottish transmission system and the English and Welsh transmission system. I wondered if anybody wanted to comment on that and how we overcome that.

Gareth Hislop: Yes, you are absolutely right. I think that from the SSE's patch through to our patch in central and southern Scotland, it is getting the renewable energy away quickly and securely. If we think about what is going on just at the boundary, we have 6.6 GW transfer capacity from the north to the south, but that is of course contingent upon across the border being able to receive that as well. In addition to that, you have the western link, which is 2.2 GW of transfer capacity bidirectional, north to south as well. From a security supply point of view, that is positive.

I think that Roisin mentioned the ASTI framework earlier on, which is the signal from the regulator to go ahead and build the infrastructure that is required to support the numerous gigawatts that will be coming in from the offshore wind farms as well. There is no question that there is the scale of a challenge here, but I think that if you look at the investment plans across our companies, the significant amount of money and resource that will be dedicated to facilitating this is a step in the right direction. I think that you can say that under the plans there is more to be done, certainly.

Susana Neves e Brookes: I was just going to add from a different perspective, we signalled already in our ED1 and ED2 plans for the build of new links between mainland Scotland and the islands—such as with Shetland link and Orkney link—to enable the security, and to bring more generation and capability. That is both resilience and to enable more generation to the local communities as well. The schemes with the



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regulator are supported and we are now working with transmission to deliver those schemes to get that added resilience.

Q132 Cherilyn Mackrory: A lot of this has been commented on already, but what further adaptations do you think you need to make in order to meet the 2035 net zero target?

Roisin Quinn: Possibly a repeat of some of those things that we have covered. The ESO published the holistic network design, which set out the first set of required investments under the ASTI framework. We are now working through them as a programme which will allow us to engage with the supply chain differently.

We have talked about connections reform. We talked about planning reform. We are also thinking what is next for our next regulatory settlement, how we make sure that we continue to build on this sense of collaboration and being able to get ahead of need.

We also think about climate resilience and adaptation for 2035. We do a lot of work with academia and other experts across the globe to make sure that we are benefiting from their experience and their resource. This is looking at things such as flood defences and what investment is required there, and looking at innovation of how you might identify faults and have a faster response to them. We are continuing to think about what climate resilience will look like as well as network development.

Q133 Cherilyn Mackrory: On that, and leading on to my next question, how was the performance during Storm Babet and Storm Ciaran? Are there lessons learned that we need to tackle much more quickly?

Susana Neves e Brookes: I will pick up because it impacted our region in the south and also in the north. We took the lessons from Storm Arwen that some of us will remember. We remember—not fondly, I would say—but we do remember and take the lessons learned. In our ED2 plan we already included a climate resilience strategy and we are further adding to it when we go to the reopening in 2025, because we added further work that we can do to be more resilient. However, what we witnessed is that all the lessons learned have been applied. We have much better sight of the priority services register. We have been able to restore the majority—in the tens of thousands of our customers—within three hours. We are able to be ready to respond so there was no reaction. We were ready for the storm. We were already prepared because we had done the work to the network as well to be able to. As Roisin was saying, by using automation to make our network more intelligent in order to react to faults that happen because of high winds or trees touching in the line, we are able to respond much quicker to sectionalise and restore customers a lot quicker as well.

Q134 Cherilyn Mackrory: My constituency is in Cornwall. We had about 8,000 homes out at one point, I think it was. Actually, the visibility was very good, the connection was quicker than it used to be, but it still—



Susana Neves e Brookes: Just because we like numbers, we are investing in our network strategically year upon year during this regulatory framework around £400 million. We are doing proactive tree cutting. We also do a lot of investment in flood defences because it is part of the problem, and we continue to look at what else we can do. We know that we are not completely there yet, but we are certainly on the way there.

Gareth Hislop: I think that there are practical things that you can do as a company as well. For example, on SP Energy Networks, every employee has a storm role. We have guys and we train them—and I am sure for the rest of the guys as well—whether it is additional call-handling, because people are trying to phone in to find out if there is a fault and when they will be back on power. We have priority services registers obviously to make sure that we are focusing on the areas that we need to, to make sure vulnerable customers are targeted and put back on power as quickly as possible.

Q135 **Cherilyn Mackrory:** Do you all have the correct resource? Are there improvements that need to be made in supply chains for this sort of work or are we in pretty good shape?

Roisin Quinn: From a transmission point of view in England and Wales, the network held up well during the storms. We had exercised, we had people in the right places. We go through this as a winter preparation exercise routinely. We go through site of prior duties routinely and have measures in place if there are any concerns that we would address quickly.

Within our distribution business, which covers your constituency, we did have 55,000 customers off supply during the storm. I think at the maximum it was 10,000, but the response was really good. As you say, the repair time was good and every customer call was answered within 15 seconds. We were able to provide that quick clarity to customers on where they stood. To have the ability to be ready so that we are not responsive, to be proactive, we do exercises, we make sure that we have spares in place, that our back-up diesels are working, that we have fuel on site, we have flood defences and people know where they need to go. We do that routinely to make sure that we are ready to deliver for our customers.

Q136 **Cherilyn Mackrory:** Can I just ask one final question? How can technologies such as batteries and smart meters help with this sort of resilience planning? How does it help you?

Susana Neves e Brookes: I am trying to think from a distribution network, of course, when you have a power cut, what happens during storms, the power is off.

Q137 **Cherilyn Mackrory:** Can you see straight away when areas are off or do you have to wait for customers to tell you?



Susana Neves e Brookes: It depends on the type of—

Gareth Hislop: There are monitoring systems in place, actually, in the substation and on the cable as well, so we generally know about them. The communication we get from our customers can be pretty rapid as well.

Susana Neves e Brookes: It is more the remote customer who is on their own. We do know that they are off. Where batteries will help is if someone at home has a battery then it does help at that point in time when they are off supply and the network is off in that region. Of course, if there are flexible services, and we have our DSO team, our distribution system operator, which is constantly looking at other ways where we can evolve and bring innovation to use flexible services, such as battery storage.

Q138 **Cherilyn Mackrory:** Yes. I was going to say that in the last panel we heard that one of the asks of Government was that we needed marketing incentives for things such as battery storage. On a more strategic level, is that something that you would welcome in those sorts of scenarios?

Gareth Hislop: It is always contingent on the network being intact, the ability for those batteries to deploy battery shift, power and time. By their nature, they are putting things out when the other things are not putting things out, in very simple terms. I think that it is all about the intact network integrity of the cables and the overhead lines. If anything is underground, the heat in the ground or the cold in the ground can affect the cable performance as well and quickly getting access to those things, digging up the road and things like that. These are all factors to be considered.

Roisin Quinn: I would link it back to connections as well. The work that we are doing to accelerate the connections has allowed transmission within England and Wales to bring forward 10 GW, and it is about the same with the distribution system as well, another 10 GW in National Grid Electricity Distributions patch. They have to be able to connect and operate in the markets day to day to be able to be there for resilience, so we are really pleased with that work and the success of that.

Chair: Thank you very much. Thank you, Cherilyn. I would like to thank our panellists, Roisin Quinn, Susana Neves e Brookes and Gareth Hislop for joining us today, and Alex Farnsworth for preparing our brief. Thank you all.