



Industry and Regulators Committee

Corrected oral evidence: Ofgem and net zero

Tuesday 22 June 2021

10.15 am

Watch the meeting

Members present: Lord Hollick (The Chair); Lord Allen of Kensington; Baroness Bowles of Berkhamsted; Lord Burns; Lord Curry of Kirkharle; Baroness Donaghy; Lord Eatwell; Lord Grade of Yarmouth; Baroness Noakes; Lord Reay; Lord Sharkey.

Evidence Session No. 1

Virtual Proceeding

Questions 1 - 11

Witnesses

I: Professor Catherine Mitchell, Professor of Energy Policy, University of Exeter; Dr Jeffrey Hardy, Senior Research Fellow, Grantham Institute for Climate Change, Imperial College London.

USE OF THE TRANSCRIPT

1. This is a corrected transcript of evidence taken in public and webcast on www.parliamentlive.tv.
2. Any public use of, or reference to, the contents should make clear that neither Members nor witnesses have had the opportunity to correct the record. If in doubt as to the propriety of using the transcript, please contact the Clerk of the Committee.
3. Members and witnesses are asked to send corrections to the Clerk of the Committee within 14 days of receipt.

Examination of witnesses

Professor Catherine Mitchell and Dr Jeffrey Hardy.

Q1 **The Chair:** Good morning, ladies and gentlemen. Can I please welcome Professor Catherine Mitchell, professor of energy policy at the University of Exeter, and Dr Jeffrey Hardy, senior research fellow at the Grantham Institute for Climate Change at Imperial College? They will be helping us to understand the very complex and considerable role that Ofgem has to play in the journey to 2050 and zero carbon.

Can I please start off by asking you a general question? I will do so by referring to two reports that have come out. One last week, from the Taskforce on Innovation, Growth and Regulatory Reform, argues that the scale of changes under way in the energy system requires fundamental reform of the regulatory framework. A recent report by the Centre for Competition Policy echoes that by saying that, "A greater number and complexity of duties raises the potential for conflicts between duties and creates ambiguities around how Ofgem should prioritise them".

I wonder if you could give us your take on what appears to be a very complex and multilayered task that Ofgem has been set.

Professor Catherine Mitchell: That is right. Things have changed considerably since privatisation of gas back in 1986 and electricity in 1990. At that time, it was a top-down, big-kit electricity and gas system, and it moved to customers who were passive and just paid for it. It has completely changed since then, and the regulation has not kept up with those changes. Therefore, there is not real competition, in a sense, because the costs that are in that system are still reflective of the old technologies—so things need to change.

There are four things that Ofgem can do in moving to net zero. Obviously, there is the one that it regulates and delivers, which is RIIO. That is where it regulates networks and so forth. It has a huge part in deciding on the institutions that are there. For example, the current electricity and gas distribution institutions are completely unfit for purpose and need to move into a more active entity. It does stuff to do with codes, which are these very boring, detailed and nerdy things, but they are the things that keep the system going as it is. They are completely out of date and need to be changed.

Then it can decide on what and how it regulates. Currently, the system is divided between this price control stuff, which is the RIIO business, and network charging. Again, network charging suited the old top-down big system and it is completely out of date now. It needs to be absolutely dissolved and moved into the main regulatory system.

Ofgem is central to moving to net zero, but, because of technology change, price change and this move from this top-down, big-kit world into this decentralised, smaller-kit world, there is a distribution gap. There just is not the regulation or the electricity market design to suit the smaller system and digitalisation, which was not around at the time of

privatisation and allows different things and the system operation to be done. That has not happened. So Ofgem is incredibly important. It has these four different levers that it can use, and I am sure it wants to. At the moment it is unable to and we really need it to be able to do so.

Dr Jeffrey Hardy: I have just a few points on top of Catherine's, because I agree with a lot of what she is saying about Ofgem's challenges over the next decade and more. Where we have got to since privatisation is quite staggering when you reflect on it. There was about 72% coal in our electricity system 30 years ago and, today, there is virtually none. At the same time, 30 years ago, there were virtually no renewables in our electricity system: now it is over 40%. We still use a lot of gas in our system, but it used to come from the North Sea and now most of it comes from elsewhere. That is going to increase as we go forward. Our gas consumption relies increasingly on imports.

However, in the next decade, we are going to see much more of the same, in terms of renewables getting into the electricity system and very high penetration of renewables, which means we end up with a very weather-dependent system. When the wind is blowing and the sun is shining, we are going to have very cheap electricity. However, we are also going to be moving through that period of having customers much more involved in energy. So the next bit of the energy system transformation is all about decarbonisation of heating and transport. Those are inherently the public's choices in how that is going to happen. So the challenge is that the energy system is going to reach into everyone's home over the next decade.

Now, Ofgem's challenge in that is how to regulate a system in which every single user has a role in delivering net zero, where homes and devices in homes are going to have to be responsive to these new challenges of managing a very renewables-driven electricity system, for example. When the sun is not shining and the wind is not blowing, electricity will be expensive and demand will have to move around. There will have to be a lot of flexible technology delivering on things.

Also, every user could benefit or be harmed by this transition. Many people in businesses are at risk of being left behind because they cannot afford or cannot engage with this zero-carbon transformation—or they will not. We know that only about half the market ever switches in electricity at the moment, so you have a really big inertia of people's engagement in this. Really, it is a transition that has to work for everyone, or it is not really going to work at all. That is Ofgem's key challenge in all of this. How you make this transition fair, get everyone engaged in it and get the market so that businesses that work with their customers can take them on this fair and good journey through zero-carbon energy? That is perhaps the biggest challenge of all for Ofgem going forwards.

The Chair: In the light of that challenge, Professor Mitchell, do you agree with the suggestion that fundamental reform is necessary to get Ofgem match fit, as it were, for these challenges? Would that extend to having

off some of its responsibilities into a separate entity?

Professor Catherine Mitchell: Yes, there needs to be significant reform. I have been working on this project called Innovation and Governance for Future Energy Systems. We ended up with what we called a fit-for-purpose energy governance framework. In that framework we argued that there should be a new, higher entity, a parallel body to the Committee on Climate Change, which we called the energy transformation commission. You could have it as the “net zero commission” or whatever you want, really. We had it working into the Cabinet Committee on Climate Change. That was a kind of co-ordinator that sorted out complex issues to Parliament and with all the actors in place, but it held the ring in a democratic way. I absolutely believe that.

We also decided that Ofgem should be reduced back to being an economic regulator, so that the complex decisions it gets into, to do with the social and environmental stuff, can be left to the co-ordinating body and the other institution, which is the system operator. In that sense, there needs to be a reset of the way that decisions are taken. Yes, Ofgem needs new duties and so forth, but it can do only so much. You have Ofgem, which is central to all this, but you also really need something that co-ordinates.

Then, as I say, there is this distribution gap and nothing has really happened at the local level despite the technologies, the resources and, as Jeff says, all the stuff to do with people. There is this complete gap at the distribution level, whether it be gas, electricity or heating. A lot of that will be to do with local authorities. It is also to do with policies from government on energy efficiency, say, or what local authorities can do and how they can work with the distribution entities.

We only mentioned in all of that, believe it or not, one new institution—so, in that sense, it is not radical or big. It really is not, but it is essentially saying that everyone’s roles will have to be different and that there will have to be different relationships.

The Chair: Dr Hardy, what is your vision for a reformed regulatory approach here?

Dr Jeffrey Hardy: Catherine makes some very fair points about clear roles and responsibilities. Let us start with Ofgem. At the moment, you can argue that Ofgem has rather a smorgasbord of duties that it has to have regard to or must meet as part of its principal objective. This means it is pitting all these things, such as doing something on greenhouse gases, against lots of other factors such as cost, security of supply and vulnerability.

The one thing I would do immediately, if I had the power, would be to promote net zero, the Government’s legislated target, into Ofgem’s principal objectives. It would read something like, “The authority’s principal objective is to protect the interests of existing and future

consumers in relation to net-zero energy systems". At the moment, you have real complexity.

I worked at Ofgem for four and a half years. I was head of sustainable energy futures there. I found that it was quite difficult to get decisions taken while balancing out all Ofgem's duties without ending up in a bit of a fudge or a mess, because there is too much for it. It is too complex as a set of duties. I would put net zero up top so that, basically, everything else is in the context of hitting that legislated carbon target. Then you can balance out and optimise against all the other things it has as duties, if you want to keep all of them, underneath that.

The other thing Catherine is talking about is roles and responsibilities. That is really important. There is no convening body for a vision of the future zero-carbon energy system in the UK. It is salami-sliced across lots of different participants. There are lots of things that could happen in a future vision. For example, energy could become a very local issue, so the way in which one place transforms to a zero-carbon place could be quite different from another place. In one place, it might be a very electric economy. In another place, it could be a hydrogen economy. In another place elsewhere, it could be heat networks and all sorts of other things with lots of active travel.

There is a question about where regulation sits, because regulation might be quite different from one place to the next. Do you devolve some of it? There is also that question of big strategic direction or vision that we do not have at the moment, because it is split across a number of government departments, the regulator and industry participants such as the electricity system operator, distribution system operators and distribution network operators. Nobody owns the future and gives that coherent vision. That is also a really important thing that we are missing. Perhaps the new body that Catherine is talking about is one of those essential bits of the jigsaw that could help on this.

The Chair: Thank you very much. We have raised a number of issues that are going to come up in subsequent questions. We will start with Baroness Bowles.

Q2 **Baroness Bowles of Berkhamsted:** Yes, we have already strayed a little into what I wanted to probe on, which is what changes, if any, are needed to Ofgem's objectives and powers with respect to achieving net zero. Dr Hardy has already made a start on that. In Ofgem's 2019 to 2023 strategic narrative, it sets its priority on objectives for the current time period, including protecting consumers, decarbonising and net zero, at the lowest cost, and enabling competition and innovation. It is, as you said, a balance of all these things.

It has also been raised by many stakeholders that Ofgem does not even have statutory objectives relating to net zero. That leaves it, I suppose, in a rather fuzzy situation. How do we stick those together? Is it absolutely essential that it has a statutory objective, maybe with somebody else? How do you make it work, putting the right priorities in

the right place so that it fits together? We are continuing on from, to some extent, where Dr Hardy was already leading us.

Professor Catherine Mitchell: I agree with what Jeff has said. You have to have a principal duty, which could be something like, "The authority's principal objective is to protect the interests of existing and future customers". That is what the current thing is, but I would be a bit stronger than Jeff and add, "while at the same time delivering on legally enshrined commitments to decarbonise", because we need to move past the trilemma. This is about the four principles that Greg Barker was talking about, and minimums. I would absolutely change the principle. I am pleased that there is an SPS—strategic policy statement—which is probably going to be promulgated, but that is not going to be legally enforceable.

Net zero has to be the *raison d'être* of Ofgem. That is also a culture and management thing for the whole system. It has to go down the whole way. There are these things called codes and licences that all participants have to sign up to. In 1990, when they were set up, the idea was that they would be self-regulating because, at the time, it was thought that those in the energy system would regulate in the most sensible way. But we are the only country in Europe or the world that does that. It has meant that the participants, essentially, self-regulate to keep the system as it is. Quite apart from duties on Ofgem, if the codes do not change, nothing will happen. Those code managers have to have a duty for net zero. At the moment, they have nothing to do with climate and it really does not matter that they do not change.

Then you have also raised this really important issue of the grey area between what Ofgem is responsible for and what the Government are responsible for. Hitherto, it might have been that Ofgem wanted to do something, but it was not within its duties or it could be judicially reviewed, so it was self-constrained not to do something. On the other hand, it is the responsibility of the Government to sort this out. Yet, if they are not sorting things out, it is difficult for Ofgem to do something. Within these changing duties, the big write-out of the SPS and all of that, clarity is vital on what the Government are responsible for and what Ofgem is responsible for.

That is on energy efficiency and the future of the gas network. As Jeff has said, 85% of people use gas for their heat and that has to be stopped by 2040. Really, at the domestic level, there is no need for gas at all. Why are we paying this vast amount? As far as I am concerned, Ofgem is asleep on the job of gas regulation at the distribution level. It really is.

Arguably, Ofgem should not be responsible for things such as hydrogen, changing electricity market design, altering electricity distribution and adding in heat; it should be the Government pursuing these things. But there is no hope for Ofgem to deliver net zero unless those decisions have been made. It is very complex and it really needs sorting out and confronting. That should happen before anything else. It is always going to be difficult to pre-judge all these questions, but we ended up saying

that the co-ordinating body should be there to take the decisions that come up at the time.

Dr Jeffrey Hardy: I will say one additional thing. Ofgem is saying in its decarbonisation strategy and its forward plan that the objective is to decarbonise at the lowest cost. I have always had an issue with that, because lowest cost is a very specific thing that you then try to optimise everything against.

However, when you ask people, who are actually going to pay for most of the zero-carbon transformation, they have a much broader range of things that they want to get out of that transition. They want it to be environmentally compatible or even bettering the environment. They want it to be fair, equitable and just. They want it to have all sorts of other things, but the one that I like most, which comes out of a bit of research from the UK Energy Research Centre, is that people want it to be better in some way. If they are paying for something, they want it to be an improvement.

Of course, better means quite a lot of different things to different people. It might be more fun. It might be a better level of energy service—warmer or something like that. It might be a completely different relationship with energy, such as doing it in a community energy group or locally. It is not just lowest cost. In fact, when you ask people, people are interested in having affordable costs and reliable bills that are at the same level throughout the year, as opposed to going up and down a lot. Lowest cost paints Ofgem into a corner where it really does not need to be.

Baroness Bowles of Berkhamsted: Is the problem between Ofgem and government—I am not disagreeing that you need some other steering body—that at the moment nobody wants to be the one that has to take the hard decision and say, “Hey, you can’t have a gas boiler any longer”? Most people would look at that with horror, given today’s electricity prices. When a flat comes up and it is electrical heating, it hangs around for ages in the area where I live, whereas, if it had had a gas boiler, it would have sold straight away. The point about lowest cost has just been raised. Where is reliability in this, especially if we are switching to more renewables? How is that to be built into it?

Professor Catherine Mitchell: There is really not a worry about system operation. Yes, it is different because you have variable wind and solar now, but also, because of digitalisation, which was not there before, it is a much more complicated system that allows far more flexibility. There is a lot of evidence from Germany, in particular, which has had this for a very long time, and Denmark that, because there are so many more points in the system, if something falls over, it has far less of an effect than it would do on a very big system. I really do not believe that system security is an issue at all. That has been done to death. I am sorry; I forgot the first bit of your question.

Baroness Bowles of Berkhamsted: It was about avoiding hard

decisions.

Professor Catherine Mitchell: Yes, that is a real problem. It is slightly a customer decision. I am just going to talk about the gas network at the moment, because I have been trying to become a fossil-free house and that requires getting rid of my gas. I have always worked on electricity, but I have been totally astonished by the way that gas is regulated in order to allow me to become a fossil-free house. We still allow so much money to go into the gas network every year. Ofgem does not take a decision about that, because it is not its place to do so. That money could easily be delivered to people as energy efficiency packages, heat pumps or something, rather than us paying the gas networks to continue when we have to get rid of them by 2040.

There are choices about the money that we are getting out of customers and what we do with it that really need to be taken. Those decisions are not yet being taken. That is, on the one hand, because Ofgem does not have this duty for net zero, but also because there is such a grey area between what government should be saying and not. Absolutely, it comes down to nobody really wanting to be the person who says that. In a sense, people are not saying anything because nobody has taken a decision about it. If only something was sorted out and somebody took responsibility, it would be much easier not just for those people involved but for credible outside people to say, "It is your responsibility. You have to do this because that has been said".

At the moment, for people like me, it is very difficult to do that. I am very sympathetic to Ofgem, because it does not have a duty, but it is the responsibility of government to give it a duty. Everybody is just waiting for the other one to do something. It has been like that, honestly, for about 20 years, certainly in my own experience.

Q3 **Baroness Noakes:** Professor Mitchell, a moment ago, you said that net zero ought to be Ofgem's raison d'être. I want to explore what giving a strong objective to Ofgem around net zero would do to its existing requirement to protect consumers. Consumer protection has been at the top of Ofgem's list right from the outset.

In particular, I want to explore what that does in relation to the costs that consumers bear in the journey to net zero. I accept that there is a difference between affordable cost and not doing it at lowest cost, but it is the case already that quite significant costs have been loaded on to consumers in the name of, for example, renewable subsidies. The costs that will be involved in getting new nuclear will end up with consumers. There is a point at which these costs could be very considerable for consumers, either directly because it will go on to their own energy bills, or indirectly because it will end up in higher prices via industry bearing the costs. How do we handle that issue? It is not an inconsequential issue.

Professor Catherine Mitchell: I am sure Jeff has lots to say about this. There is a key issue to do with confronting the fact that there will be

costs in the transition, but those costs are up front as opposed to later on. For example, if you are trying to have an energy-efficient system, you have to pay the costs of turning the system into being energy efficient, and then your bills disappear. I live in a Passivhaus-type house, so I had to pay for energy efficiency for my house, but now I have almost no energy bills whatever.

The cost question is about how you pay for it up front. That is not an Ofgem question; it really has to be dealt with by government. But there is an awful lot that is an Ofgem question and is not being dealt with. As I say, at the moment the price controls are allowing money to go to the distribution companies or wherever to do certain things that are unnecessary and in fact should not be done, given the move to net zero. Were there to be a clearer duty on Ofgem, at least all these extraneous costs, which are not inconsiderable, could be got rid of and that would help customers.

There is definitely a confronting that has to go on, because the distributional impacts of the move will be tougher on more vulnerable customers. Those customers have to be, in a sense, targeted and given alternatives to that. That is more than just money. Again, it is part of this local authority and government thing because, if you have a vulnerable customer, you want to make sure that their house is energy efficient, so that the total amount of energy they use and, therefore, the bills are as low as possible. It is not Ofgem that does that. That is a combination of government and local authority. We cannot continue not doing the stuff that Ofgem has to do, which may put up the price—so the answer is to confront the issue.

I am sorry, Jeff, because this is your area. This is not about a trilemma. We used to be in this trilemma of trade-offs between environmental, social and economic issues. Then Greg Barker, when he was Secretary of State, set out four pillars in his four pillars speech, which basically started to say, "You can't trade off the environment for costs any more. You cannot trade off social concerns for the environment. You have to have a minimum for all these areas". That is completely right, and it means that we have to be much better at dealing with our fuel poverty. That will require money, but that is not something that vulnerable customers should pay for. I personally think that should be general tax.

Dr Jeffrey Hardy: Catherine is being disingenuous; she knows an awful lot about this area. I will say a few things on top of that. First, all the modelling that the Government, the National Grid and academics do shows the same thing about a net zero energy system. It shows that the lowest-cost way to get there is to have a very flexible system and to bake in a lot of energy efficiency in order to drive down overall demand. That is really important. It is exactly what Catherine has done in her house.

Secondly, yes, it will cost. Consumers and users of that system will bear those costs. The overall costs of delivering net zero are quite low in GDP terms. A report is going to be published at 11 am today from Good Energy, which shows that you can get a 98% renewable energy system

for about 1.5% of GDP annual investment between now and 2050. That is relatively small beer if you consider the financial impacts of Covid, for example.

So it is achievable, but those costs will fall on users of the system, consumers, households and small businesses et cetera, because, at some point, homes will need to invest in some of the technologies that deliver on that, putting in a heat pump instead of a boiler, for example, or buying an electric vehicle.

This is one of the biggest problems we have with the regulatory system at the moment. You are really saying to those users, "You are going to have to invest in these technologies, which you do not understand particularly and you have very low salience about." That is what most surveys show, particularly about zero-carbon heat. "It is going to cost quite a lot up front to do that and you are probably going to have a slightly more complex relationship with energy because, with renewables, the price will be going up and down all the time".

The system is crying out for businesses or organisations that can come in and help those disengaged customers, consumers, users and small businesses through this transition. Ideally, they will take away the pain of up-front costs so it can be accessible to all. They will probably spread those costs over much longer contracts, a little like we do for new mobile phones. They will have an energy service proposition, rather than selling you a commodity on top of that—a service to keep you warm, mobile, illuminated, entertained or whatever it might be.

So for £50 or £100 a month, you will be warm and they will take the price risk. They will take the risk of the up-front cost. They will take on board all these new risks, such as running this kit in a flexible manner to follow these prices, in return for consumers ceding a little control over some of their devices, without losing the service. We cannot do that service at the moment, because the relationship with energy suppliers is one of selling a commodity where switching is the thing you have to do as often as possible. You cannot be locked into a contract; you cannot have this long-term relationship.

We are going to have to think about what a supply licence looks like in the future and what sorts of business models are going to be allowed to have these relationships with consumers. Without those intermediaries taking away the complexity and taking consumers with them on these zero-carbon journeys, we are not going to get anywhere very fast.

There is a risk of those who cannot afford these technologies being left behind. Catherine is spot on: that is not a role for the regulator, it is a role for government. To my mind, the simplest thing to do would be to ensure that those who are going to benefit from it most, but would not necessarily benefit from it first, can be subsidised to go first on this transition, so they will get the benefit earliest.

Baroness Noakes: What you describe all sounds very fine, but who

makes that happen? This will not spontaneously appear. Is this something that Ofgem or somebody else should be doing, to create this new market environment for “disengaged consumers”? Most consumers do not want to get involved in the kind of things that you talk about.

Dr Jeffrey Hardy: Ofgem can get it going now; it already has some ability to create some space. It is called regulatory sandboxes, whereby businesses can try out some of these novel propositions today. That needs to be accelerated and, if a sandbox proves to be successful, a business should be allowed to continue with that proposition going forwards. At the moment, the regulations that were turned off to allow you to do something innovative are turned back on again at the end of your trial and, therefore, you have to stop. Ofgem can create more space for these innovative business models to get going at the moment and then think a little harder about what happens if they are successful at the end of their trial.

Baroness Noakes: How do you avoid the problem of today’s consumers bearing these costs?

Professor Catherine Mitchell: Just because I am older, I think, I am much less sanguine about all this happening. I have pretty much been saying the same thing for about 30 years and it does not happen, because the companies in the system want to keep it going as it is and it is not in anybody’s interest to rock the boat too much. Governments do not want to be really unpopular and all the rest of it. I am a real supporter of markets, but not to the degree of getting this going.

Germany, for example, has something called a KfW system, with zero-interest or just over zero-interest government bonds that are eventually paid back by people. You can apply either as individuals or as local authorities. It is low-interest money and it allows local authorities to set about doing all these things they have to do for the disadvantaged or vulnerable. That is the way forward. I am a well-paid professor and I was shocked at how much it cost me to get rid of my gas connection—it was £800—and then to put in an electrical vehicle charger, which requires all sorts of things to be done to the electrics in your house to make sure that they are suitable.

At the moment, the whole thing is not co-ordinated and the costs involved have not been sorted out to reduce them anyway. That is one area that has to happen. Basically, it has to be something like low-interest bonds from government.

Baroness Noakes: You mean it goes on to general taxation, in effect.

Professor Catherine Mitchell: It does. Then you can have the people Jeff is talking about who, in some way, can access those funds and then come to the ordinary person, or a local authority can do a street-by-street conversion or whatever it is. It simply is not going to happen anyway, never mind at the speed that it needs to happen at, if you just leave it up to individuals to do these things. As I say, the costs

come down overall for a customer, but people have to have that up-front money and they just do not.

Q4 **Baroness Donaghy:** Good morning. Thank you very much for those answers to Baroness Noakes's question, which covered quite a bit of my area. I wanted to probe a bit more the issue of this complex relationship that will be taking place under any new system. Baroness Noakes is quite right that the majority of us do not want to be active participants. That is even more so at the level of those who have affordability issues or ability issues to access what is available, such as lack of choice and the increase in the private rented centre, where local authorities may have limited powers to intervene.

Do you think Ofgem has a role to be better at identifying the vulnerable and putting together packages of protection in addition to these low-cost bonds? I get the feeling that we are not adept at identifying those who are really vulnerable and are being exploited with poor deals by the companies.

Dr Jeffrey Hardy: The industry and the regulator have been slow on getting to grips with vulnerability. One example of that would be that all network companies, be they electricity, gas, water or other networks, maintain something called a priority service register. That is a list of those who would suffer most, through all forms of vulnerability, including medical needs and so forth, in the event that water, power or gas were cut off.

Those network companies are only just starting to collaborate on sharing information between them. Essentially, each company had to maintain its own list and not talk to anyone else on this. That is slow in even understanding vulnerability today, but the thing that is coming down the road very fast is vulnerability in the future. As we have been talking about, this net-zero journey could be very different for lots of different people in different circumstances. Some could be very much left behind, not just because they cannot afford to be involved, or cannot get involved because of digital exclusion or for other reasons, but because they will not get involved as they are not involved in energy today. They are not engaged; they are not at all in that.

We produce local and national future energy scenarios. We do not link those to future vulnerability and with what might be a change in vulnerability as a consequence of a zero-carbon transformation. That is one thing we are not on top of. We are not on top of vulnerability now and definitely not on top of where it is going to be in the future. There is a lot more emphasis on this. Ultimately, we are talking about recognising what vulnerability looks like in the future and almost segmenting the classes of vulnerability so that net zero works for everyone. You can put in place policy and regulation where required so that everyone can benefit from net zero, not just certain segments of the population.

Professor Catherine Mitchell: Fuel poverty really is not my area at all. I do not think this is an Ofgem issue. If a company is cutting off

customers and so forth, Ofgem should be responsible for making sure that that does not happen and that companies that do things like that suffer severe penalties. But fuel poverty is to do with buildings, incomes and the cost of energy primarily. It is a combination of the three and it is quite difficult to target people within that. It is absolutely shameful that about 10% of this country's homeowners are in fuel poverty. Fuel poverty is not just being a little bit cold. It is when your health is affected by it. That needs to be sorted out.

The first step in sorting out fuel poverty is energy efficiency, which is also the first step in moving to net zero, so it ought to be something that comes together. Because of the different levels of homeowners, it is a problem that needs to be sorted out with different actors involved. There really needs to be a delivery unit to do that. We said that sorting out energy efficiency in buildings, which is the first step to net zero and for fuel poverty, ought to be one of those six things that this co-ordinating body should do. That is not going to happen without money from central government.

As I say, one of the quickest ways to do that and get as many sorts of people involved as possible is through low-interest government bonds that can be accessed by local authorities, social innovation companies, individuals or local communities. That is not an Ofgem thing. I have never believed that it would not be possible to target those people, were government to sort it out with, say, the DWP or whoever. You know the individuals and postcodes that need the most work.

I lived in Brixton after the riots in 1981. Then there were the second riots. Then Lord Scarman did a wonderful report on why these riots were happening and the GLC set out, in certain postcodes, to sort out buildings. I was part of that because I lived there. I was a poor student, so, in some ways, I was not somebody who should have benefited from that. But I can tell you, it was organised, street by street. If we could do that back in 1982, we can definitely do it now.

Q5 Lord Eatwell: I have been puzzled about the role of Ofgem with respect to systemic risk; that is, the system falling over. It does not seem to have a clear strategy with respect to the risk to the system as a whole. There have been lots of stories about the transition to net zero and the way that that might increase the vulnerability of the system because you are susceptible to the weather. It was commented earlier that this has been sorted out—okay, good. But it seems to me that vulnerability of the system as a whole is not at the centre of concern. Has it been pushed to the centre because of the nature of renewables? If so, what is the core solution?

If you were sitting in Jersey a month ago, you would not have thought it had been solved at all. Of course, Ofgem is not responsible for Jersey. If you are sitting in California, you do not think it has been solved at all. What confidence do we have?

I must say I was a bit disturbed when Dr Hardy talked about all these

different methods that were going to be used in different localities. That sounded to me like a system that would become vulnerable simply because there was no overarching vision of security defining how the whole thing worked. So can you give me some reassurance that, in this movement to net zero, the issue of vulnerability is addressed appropriately by Ofgem? How does this diversity, which you referred to, fit into the problem of the whole system falling over?

Dr Jeffrey Hardy: While it might feel as though increased diversity and different approaches place to place could lead to security or vulnerability issues with the energy system, diversity could be its strength as well.

Lord Eatwell: Only if you have a fully interconnected system.

Dr Jeffrey Hardy: Yes, indeed. The vision I am laying out does not mean that different places are going to be unconnected to one another. Two things are going to have to happen in a future system. First, we are going to need even more flexibility within that system than we have today. Second, that flexibility is going to be provided by way more assets and behaviours than it is today. Traditionally, back around privatisation, system security and flexibility was National Grid picking up the phone to 50 or 60 large generation plants or industrial centres and asking them to turn up or down. It was quite simple to maintain the security of a very large system.

What we are looking at in the future, to deliver that flexibility at reasonable cost, is a system where prices are put out and many millions of devices, including everything from electric vehicles and heating systems turning up and down through to these large industrial sites and plants, do the right thing in response. It is far more complex, but you have a lot more diversity.

Lord Eatwell: This is the last thing that citizens want. They do not want prices jumping around all the time. They do not want to respond to complex price signals. This is exactly the reverse. It sounds to me as though you are designing a nice system based on renewables and its security is going to be based on the connection to the French atomic power system.

Dr Jeffrey Hardy: We are connected to Norway now as well. It is rather handy because there is an awful lot of hydropower in Norway, so, when we have too much wind, that can go up to Norway to fill up the hydro stations. When we do not have enough, it can come back the other way. It is good to have that interconnection. However, interconnection is not the only thing that keeps the system up. It is going to be a mixture of zero-carbon thermal plants, demand-side response, electricity and other storage on the system all working together in beautiful harmony. I suppose that is what I am saying.

From a customer's point of view, I agree with you entirely. Customers are not going to be watching the smart meter and worrying about the price of electricity every half hour. This is where business has to be stepping in to

take away that complexity, so that your service as a customer is what you signed up for—your level of comfort, mobility and all those kinds of things. You are paying a fixed price per month, more or less. That is the sort of thing you are seeing coming through in heat, energy or mobility as a service.

You are right. I watch my electricity price every half an hour, I have solar panels and a battery on my house and I am a complete geek, but most people are not. This has to work for everyone and, in many ways, is probably going to be quite invisible.

Lord Eatwell: It sounds as if it is going to be quite risky, because somebody is carrying the risk, and if somebody is carrying the risk, they will want to be paid for that.

Professor Catherine Mitchell: Honestly, Lord Eatwell, you are right to raise these big country issues. California fell over and was absolutely disastrous in 2000 when it tried to privatise the system. It established a cost that had to be paid for electricity even when electricity could be found that was cheaper. It has really scarred California and there is now a complete fear of liberalisation. It was a disaster and you are completely right to raise that.

On the other hand, if you look at New York, in 2012 when there was Hurricane Sandy, that caused the system to completely go down, also for six weeks, and it was an absolute disaster. They have now moved on into a version called the New York Reforming the Energy Vision, which is a highly interconnected system. Their view was that that is the way to reduce risk.

You are completely right. The problem is that, if we were to stay with the old system—for example, had we continued with coal—we would still face the systemic risk that exists within that system, for which we pay so much money. If we do not keep up with what are now the cheapest technologies, which, through digitalisation, allow us to run the system in a much more efficient way than we could before when there were 60 big pieces of kit, the customers will end up paying for that.

It is not like this is new. This is happening around the world. That level of system operation is in the hands of the ESO. I said, "It's not a problem". I am sorry about that, but, genuinely, there is so much experience in other countries that have far higher levels of renewables. Denmark routinely has 150% of its total demand from wind. With that extra 50% of demand, it puts that very cheap electricity into its heat pumps, which means that it has very cheap heat and the overall cost of the system is coming down. That has been allowed by digitalisation, which we did not even think about 20 or 30 years ago.

You are right that risk is greater now because it is much more complex than just having 60 big pieces of kit just going from the top down to the bottom. Yes, it is much more complex in that way. On the other hand, it is enabling a much more energy-efficient system, which is really bringing

the costs right down also for people and allowing the move to the sustainable system. I do not think anybody would have changed the system if it was not for climate change. We have no choice in that. This is all about dealing with what we have to get on and do.

Lord Eatwell: Just as a complete off-the-wall question, is a connection to Iceland feasible?

Professor Catherine Mitchell: I think so. I once did a blog. I worked out what the cost of the high-voltage whatsit for 1,000 kilometres would be and I think it came out as way cheaper than a nuclear powerplant. Do not take my word on that. That was on the back of an envelope, but it is a good idea.

Q6 **Lord Curry of Kirkharle:** Again, you have covered to some extent the territory I want to explore, but perhaps we could drill a little deeper. The three key objectives that Ofgem and government face are security of supply, affordability and decarbonisation. It seems to me that, over time, these three are vying for priority. Some of us are old enough to remember when the lights went out and the three-day week, when security of supply was the key factor and took priority. Now we are moving towards decarbonisation at the top of this triangle.

You have outlined, I think, that security of supply is going to be terribly complicated, with lots of local generation, involving individual households, as we know, and decarbonisation is the driving force. Affordability, perhaps, is the one that may well suffer and, as a consequence, consumers may find themselves having to pay for all this stuff. I know you have touched on this in terms of the role of government.

I was struck by a number of things from your presentations and thank you for them. Dr Hardy, you have outlined what is an extremely complex structure that we face going forward. Professor Mitchell made what I thought was a really stark statement, which may well inform what we want to consider within this committee. You said the infrastructure is not fit for purpose. It seems to me that, if you share that view, we should be starting with a clean sheet of paper and deciding what Ofgem should and should not be responsible for. Is it still appropriate for it to have these three objectives or should we remove one of them from its remit?

Professor Catherine Mitchell: I have been quite clear that the current energy governance system framework in place in GB, excluding Northern Ireland, is not fit for purpose. On the other hand, in order to make it fit for purpose, we did not feel that there needed to be a huge number of changes. We thought that there needed to be a co-ordinating body and that Ofgem should be reduced back to an economic regulator. There were things that we said that it should be doing very differently, but it is already doing those things. For example, on the way that it regulates the networks, we do not think that RIIO or performance-based regulation is a bad thing. It is just that it is not tough enough. The extent to which it is requiring decarbonisation through the price control is simply not tough enough.

We were not saying, "Have a whole new way of regulating". I definitely want you to think that the current energy governance is not fit for purpose, but I do not want you to think that it is an incredibly difficult thing to sort out, because it is not. Now, today or tomorrow, BEIS could set up a delivery unit to be the precursor for an energy transformation commission. Tomorrow, it could start thinking about putting in place something to co-ordinate everything. The duties have to change, but, having changed that, it could then start to say, "Within RIIO-2, electricity has to be decarbonised by 2030. Within the gas side of that, a certain number of homes have to be moved out of gas". A changing of roles and a new way of incentivising net zero are very important.

Lord Curry of Kirkharle: Do you think that Ofgem is capable of fulfilling this expanded role?

Professor Catherine Mitchell: It is not an expanded role. Currently, it dabbles in social and environmental. Because of the way government is, government takes these top-level decisions, but it does not do the details. It hands that over to Ofgem, which then has to do the details. It is not accountable at all. It is not democratically elected. Its choice means that the costs fall on different bodies and it should not be taking those decisions. This is why we were saying, "Strip them back to being an economic regulator and have this co-ordinating body, which, in effect, does the discussion of how to do that". It does the politics.

One of the issues is that different companies are going to do well or badly in the future. In a very simple way, I would say that, in the last 30 years, government takes a decision, does not do the politics and hands it over to Ofgem, which also does not do the politics, nobody likes it and nothing happens. We have to move beyond that. We have to move into the world where we are actually creating a process that allows an output to happen.

Dr Jeffrey Hardy: As I was saying up front, for Ofgem to place net zero into its principal objectives would, in some ways, be to put zero carbon above security of supply and affordability. It is not that they are not important; they are both incredibly important, but it would mean that you are optimising both of those against that goal of zero carbon. Most of the modelling work on the costs of future energy systems, from, say, the Committee on Climate Change or my colleagues at Imperial College London, shows that the most cost-effective way to get to a zero-carbon future is, first, to have an emphasis on energy efficiency and driving up the energy productivity of the system, and, secondly, to have a really flexible system.

In such a system, all the aspects that have a role to play in system security and delivering the lowest-cost energy—be it the interconnectors, flexible thermal plants, demand-side response, batteries on wheels, electric vehicles and all those kinds of things—can participate and that value can be realised. As a person acting very flexibly in the system, I should be rewarded for that role by lower energy prices, for example, even if I am sharing that reward with a third party who is doing it on my behalf. That is the real key thing that we are trying to deliver here.

Digitalisation, data, ICT and all those important things to make that a really smart system are essential in doing this.

Q7 Lord Sharkey: I would like to return to the question of Ofgem, the energy mix and the ESO. When Mary Starks gave evidence to the committee, she said that Ofgem regards the ESO as the expert authority on the energy mix, taking the view that the ESO is the right body to take decisions on which sources of electricity are needed. Is the ESO the right body to take decisions on the energy mix? Is it sufficiently independent to do this in a satisfactory way? How else could it or should it be done?

Dr Jeffrey Hardy: Catherine, I know you have written about this a lot.

Professor Catherine Mitchell: Yes. I totally support an independent system operator. I support an independent and integrated system operator, across both gas and electricity, so that the gas system operating side of it would also be part of that. When they hived off from National Grid Group into ESO, they left gas behind, which is a great shame.

In terms of the energy mix, they should not be the choice. Ofgem should not be the choice. The market should be the choice. We have a market. Our electricity market, and indeed our gas market to the degree that there is one, has to be redesigned. As I say, there is this distribution gap. There is nothing about markets at that distribution level. As a result, you have, at the national level, markets to do with flexibility. A lot of that flexibility is down at the distribution level, but there is no way that the value of that flexibility can be picked up in this national market. It is too complex. You have to have local markets at the GSP and they have to be run by the distribution entity.

The ESO is not about that. This is all about getting markets right. In the ways we have been talking about, the current electricity market design that we have is based on big kit that does not tend to be variable and does not really need to have lots of flexibility. We want markets that value flexibility and the demand side, and valuing storage really matters.

Lord Sharkey: What should Ofgem's role be in all of this?

Professor Catherine Mitchell: This is another of these grey areas that we have talked about. When privatisation happened, that happened in the Ministries and the regulators were then created. Then there was something called NETA and, since then, there has been BETTA. All of those were led by the equivalent of BEIS, DTI or whatever, and were then handed over to Ofgem. Usually, the view is that market redesign has such an impact on so many people that it should not be an Ofgem thing; it should be a Ministry thing. That is one reason why we are stuck. Ofgem will say to you, "Yes, we know we have to really sort out market redesign particularly at the local level, but we cannot do that. The Government have to do that", and you are just stuck there.

That is why we think that you need this co-ordinator who basically says, "We've just got to do that". They can be the group that is really looking

after that. As I say, there is a number of grey areas. The parallel one to sorting out electricity market design and inputting this local-level market is sorting out the distribution entity that would be the operator of those markets. They effectively act as a customer in the wholesale-level market.

Dr Jeffrey Hardy: What Catherine is saying is spot on. There need to be markets where all these valuable services to the system, such as flexibility and location-specific energy efficiency that helps networks, are created. Some of them will need to be local. On top of that, the key thing is that all the markets can speak to one another, so there is good transparency as to what actions are being taken across the system and you do not end up doing or paying for the same thing twice.

All the assets that could contribute to these markets, such as your electric vehicles, the heating system in your home or a big battery connected to the grid, need to be visible to the system and interoperable. They need to speak to the same language, understand the rules of each market and be able to play across all of them. We will get ourselves in a terrible mess if all these things are happening independently of and invisible to one another. The digital, transparent and interoperable layers are critical.

Lord Sharkey: Could I briefly ask about KfW, which sounds like a fascinating operation? Is KfW a kind of liberalised version of what used to be the Public Works Loan Board here until the Treasury subsumed it, of course?

Professor Catherine Mitchell: I do not know about that. It came out of the Marshall plan in Germany originally. Once the Marshall plan stopped, Germany continued to put money into a pot for which people could apply for different things. Then, when there were concerns about the environment, they created a separate pot for various environmental activities. It has just grown and grown and grown. It is now part of the German system. You can get them via local banks. It has become a very easy way for individuals, local authorities or companies to get hold of a 0% loan. It has become large; it is a very big pot of money now. There are a few others in Europe, but that was the original one and I like it because it is very simple.

Q8 **Lord Burns:** Could you give us some more background, please, into how Ofgem's price controls work at the moment, particularly in the context of investment programmes? Following on from that, how should they adapt this in the future to the huge investment that is going to be needed in the context of net zero?

Dr Jeffrey Hardy: I will start to tackle how they work and then Catherine can pick up on how they could be evolved. At the moment, the price controls work whereby the network companies, transmission, distribution, gas and electricity, put forward a business plan against a set of rules and questions that Ofgem is asking them. That business plan is

to deliver all the capacity required at the right security standards to meet all the demands of their customers.

There is a big process going on for the electricity distribution networks at the moment. The gas and transmission networks have recently submitted their plans, which are being scrutinised at the moment. That is also working its way through the Competition and Markets Authority. Ultimately, it is a business plan that says, "As a network company, I need to invest X amount in my networks in order to meet all the energy services that my customers demand, and to do so in a way that meets a set of outcomes that Ofgem has prescribed", such as environment and social outcomes, including on vulnerability. It is really a business plan.

These are very big business plans. They are getting increasingly complicated. Distribution ones that I have seen are running at 1,500 pages or so at the moment, across a swathe of documents. In all of this, it is becoming clear that network companies are being asked to pick up more and more responsibilities and deliver more and more aspects that, traditionally, they did not do. They are thinking about consumers in vulnerable situations and this increasingly two-way electricity system, for example, where lots of people have generation and are going to be connecting new demand, such as electric vehicles and heat pumps.

It is becoming quite complicated from their point of view. Things are moving so incredibly rapidly that any scenarios about what the electricity system is going to be like in the future, and what its users are going to be doing in the future, get out of date really quickly. For example, in the last price control for electricity distribution, all the electricity distributors signed up to a common set of future energy scenarios. Those scenarios got the deployment of low-carbon technologies wrong by a factor of 80%. Only 20% of them came forward in the actual plans, so the scenarios were wrong and it potentially caused some overinvestment.

At the start of ED1 in 2015, when I was working at Ofgem, there were also scenarios for how much solar photovoltaic was going to be deployed in the UK. Those scenarios were blown out of the water six months from the start of ED1. At the start of ED1, there was something like 10 gigawatts of solar PV deployed, which is where it was expected to be at the end of that price control, after eight years. Six months into the price control, the scenario was also wrong on that to a great extent. That is because there was a big government subsidy in place. So it is really complicated as a role for electricity distribution operators and all other network companies.

I am wondering whether putting together five-year plans is really going to work, when there is so much uncertainty around at the moment. There are other jurisdictions that do price controls whereby it is not a five-year plan. The price control is set against a set of incentives, efficiency drivers and that kind of thing. It just maintains until circumstances change. Then everyone sits down and thinks about what it needs to be for the next period, but it is not fixed into this cliff edge that you must have a business plan and it must be precise for the next five years or so. That is

a bit of a long explanation. I am going to stop at this point, because Catherine has done an awful lot of work on this internationally and I would like to hear about that as well.

Professor Catherine Mitchell: As Jeff is saying, there are two bits to this. RIIO is the fundamental incentive on networks, but there is a separate programme, which is known as the network charging programme. Back in 1986, when this was fundamentally set up, you had very few big plants, which were moving down through the system, so it was okay, if you added another big plant into the network, to work out what the effect would be on the network. That is why it started like that.

Nowadays, that combination is completely ridiculous, because we have lots of energy efficiency; we have storage and electric vehicles coming on the system; we have small solar on houses. We have every single one of those, so the cost of running a network now cannot be separated from the incentive of that whole network. The first thing that needs to happen is for the network charging programme, which completely screws up the economics of running the network, to be put into the RIIO programme.

The RIIO programme is notionally a performance-based regulation programme. As Jeff has said, the companies say, "This is what is going to happen over the next year". They look at National Grid scenarios. "We think X, Y and Z, so this needs to be maintained and this is how much it's going to cost". On the whole, they say it is going to be an awful lot. Then Ofgem comes along and says, "It's not going to be that much", and there is this game that does not help anybody. The way to move away from that is to have proper performance-based regulation in there.

First of all, the stringency of RIIO has to be much greater. For example, with electricity distribution, Ofgem should be saying that, at the end of RIIO-2, it expects those networks to be capable of holding a 100% decarbonised electricity system, which is what we need to do from the CCC budgets. It is absolutely not saying that. On the one hand, it should be saying that, so that the vision for these distribution companies is much clearer and tougher. We currently have performance-based regulation whereby the companies say, "It is going to cost £1 billion over five years. I want to have £1 billion over five years", and Ofgem says, "Okay, that's fine and, if you do that, we will allow you another 6% because you're being so good by doing that". That absolutely should not happen.

What should happen is this. Say it is going to be £1 billion. Ofgem says, "Okay, you can have £700 million and, if you do all of these things that we are going to set you to do, which are the outputs that people and society actually want, you can have that other £300,000. If you don't do them, you don't get it". The system is so soft on these distribution companies, which there is so little risk in running, and Ofgem needs to become much tougher.

That is just with electricity. It honestly has not even started on the gas network. British customers paid £8.5 billion for five years in the last price

control for a system that we, effectively, at the distribution level, have to get rid of by 2040. These are big numbers and the companies have been used to a very risk-free, comfortable life. Until Ofgem sorts out those distribution entities and its incentives on them, we are not going to move to net zero. Anyway, the cost of it is going to be far higher than it has to be.

Lord Burns: You have been discussing a traditional system hereto where the bulk of the investment was made by the distributors and, therefore, it was a question of ensuring that they did the investment and got an adequate rate of return. You have also been describing how, in this new world, quite a lot of the investment is going to take place at the level of the home and is going to be heavily distributed. Is there going to be a need for price controls of some kind in that area as well?

Professor Catherine Mitchell: The network is completely different. When it was originally set up, it was very transmission-based and the distribution system was just the stuff that delivered to customers. It was really all about maintaining it and making sure that it was safe. Now we have moved into this completely active period where, because we are having more variable power, we want it to be two-way and flexible. We want storage to be shut off, brought in and so forth.

The network needs have become very different, and so it has shunted from the transmission down into the distribution area, which is not complex from an engineering or system operation point of view. I think it is complex, but they do not. The system operation bit reacts to markets in order to make sure that that area is run as cheaply as possible. That kit is very different. For an example of this, in RIIO-2, Ofgem is talking about allowing what Jeff is calling visibility at the highest level there, 132 kilovolts. That is not where very much flexibility or anything else is. The stuff that we need to have visibility on is right down at the home level.

Ofgem should absolutely be saying to the distribution companies, which do not want to do this because it is far more difficult, "You've got to do this. This is necessary for net zero. Other countries can do it. Why can't you do it?" We have been talking about this for a very long time. Ofgem should require them to do that. I had another point then, but I have forgotten it.

The Chair: We are going to be running out of time shortly, so I wonder if we could speed up a little. Is there anything else you want to ask, Lord Burns?

Lord Burns: I was going to move on to the issue that I was originally going to ask about, which is the implications of the relationship between Ofgem, government and Parliament.

The Chair: Can we have brief responses, please?

Lord Burns: The classic model here, which I have worked on in the past, is that objectives are set out in legislation, regulators have operational

independence, and the Government set their strategic priorities and might do some of the tasks on their own. You are now raising a much more complicated set of arrangements.

Basically, do I take this co-ordinating model that you are discussing to be, essentially, a government operation, so that the notion of the regulator and its operational independence will be separate from that? How does that compare with the present arrangements where, by and large, we try to set out in legislation the objectives, powers and how they are going to be operated? Does that still follow in your model or does quite a lot of that flexibility switch into this co-ordinating body, so that rather less of it is set out in legislation?

Professor Catherine Mitchell: No. Ofgem is still an independent regulator, but we need to speed up the move to net zero. Therefore, we thought that the best way to do that is to have this new co-ordinating body. At the moment, you have the Committee on Climate Change, which talks about the science. It is linked to BEIS and reports to Parliament every year. We thought there should be an analogous one to that, which is the delivery body. It would report to the Cabinet Committee on Climate Change, which is in existence now, to allow that complete co-ordination, and would also report to Parliament every year. That is the democratic side of it. Once this iterative process has happened and the Cabinet Committee on Climate Change has decided what should happen, Ofgem, the economic regulator, then regulates that.

Lord Burns: That co-ordinating mechanism basically becomes part of the government operation.

Professor Catherine Mitchell: That is right. Ofgem then moves out of the very grey and unfortunate area that it does not want to be in, which is, *de facto*, making policy. It does regulate. We also said that the ESO was an important body. For example, if you are saying we have to have a million electric vehicles every year, this co-ordinating body can say from the Cabinet Committee on Climate Change, "That's what we're doing". It then executes that. The ESO has to have a system that can enable that, and then Ofgem regulates that system to enable that, whether it be at the transmission or distribution level.

Lord Burns: Is Parliament not going to feel left out of this? At the moment, they have quite a lot of influence over the whole setting of the legislation, objectives, what the powers are *et cetera*. It sounds to me that you are weakening that role and putting more flexibility in the hands of government.

Professor Catherine Mitchell: No, I am trying to get democracy and accountability into the whole process. As we know, energy is unbelievably political because of the interests and value of it. We will never get rid of those politics, but we can at least try to get a process that enables more and more people to input into it, so that decisions can be made from evidence rather than interest.

Q9 Lord Grade of Yarmouth: Would it be an unfair criticism to say that the lacuna here is that Ofgem, seeing net zero coming its way at a rate of knots, really should be grasping this and coming up with a plan of its own? Ofgem and the Government are not short of advice, including serious expert advice from specialists like you. I have written thousands of questions on a piece of paper here, but I have one short supplementary. Do you not think that Ofgem should be grasping this, telling the Government the way to go and being a bit more proactive?

Dr Jeffrey Hardy: Yes, Ofgem is there to protect the interests of existing and future consumers. That is its duty, so it must be representing the interests of those consumers back to government and Parliament, as and when is required.

Lord Grade of Yarmouth: Do you see any evidence of that?

Dr Jeffrey Hardy: I see that Ofgem now has a decarbonisation strategy. In that strategy, it seems to be interpreting its duties in a slightly more forthright manner than perhaps is written in the legislation, but it needs to do more. At the same time, we lack, as Catherine is alluding to, a GB/UK vision of where we are going in this energy transition. Coming back to the Parliament question, democracy has to deliver upon that vision.

Lord Grade of Yarmouth: Is Ofgem not closest to this? Should it not be leading on this and showing a way forward?

Professor Catherine Mitchell: I have talked to both sides about this. In 2010, Ofgem essentially put out a vision of what it thought the future was. It was not called project horizon; it was called something else, but, for some reason, I always call it project horizon. The woman who wrote that, Kersti Berge, is now the senior civil servant for sustainable energy in Scotland. She would be a good person to talk to. She wrote that and then Ofgem got into an enormous amount of trouble for going ahead of what the then Government thought was its role. It is still such a spectre now within Ofgem that it does not do that. Again, this is one of these middle issues.

I am absolutely with Jeff about needing a vision. I really wish that Ofgem would do that. I talked about New York after Hurricane Sandy. The government in New York, which is 19 million people, with 10 million people in New York City, had a New York Reforming the Energy Vision. There was policy and planning for the whole lot, and each part had to write its own bit of it. The New York regulator, the PUC, wrote its bit, the New York Reforming the Energy Vision, which became this clarion call for what had to happen to the infrastructure and the future for energy.

They are now at the forefront of the world in terms of a vision. They have set out these two-year blocks of what they expect to happen so that, if something happens to change that, they can change it and it can be flexible. Basically, the industry and everybody involved in it know where they are going. I would really like Ofgem to write a GB REV. That would

be great. It comes back to this combination of who wants to take responsibility for doing this. The PUC has ended up being seen as this really forward-thinking, zippy organisation because it has set out a plan and a framework for how to get there. Everybody here in Britain is too scared of doing that.

Lord Grade of Yarmouth: I will ask a quick yes or no question. When there is massive structural change in the industrial sector, there are inevitably losers. The losers, to me, from a distance, would seem to be our pension funds and the institutional investors, who are going to be expecting to maintain their present position, which is getting a decent return from the energy market. Do you see that as a serious impediment to progress and keeping to a timeframe?

Dr Jeffrey Hardy: No.

Professor Catherine Mitchell: No, they should be optimistic that things will change. I am definitely going to say no.

Q10 **Lord Reay:** I have a question on transparency and scrutiny. Professor Mitchell touched on this in response to Lord Burns's question. In your view, is Ofgem sufficiently accountable to Parliament and is there scope for improvement in this regard?

Dr Jeffrey Hardy: It is a good question. Honestly, I cannot answer whether it is sufficiently transparent to scrutiny. I know that it is an independent regulatory authority. Therefore, it has that prescribed independence. However, if we are going to have the sort of ambition that we need for this zero-carbon transformation, everyone needs to have really clear roles and responsibilities, and everyone needs to be accountable for delivering on those. That is partly coming from my ignorance about how accountable it is now, but everyone needs to be accountable going forward.

Professor Catherine Mitchell: They are totally not accountable. They absolutely need to be more accountable. There are so many interests basically trying to keep the system going as it currently is. Ofgem is under a lot of pressure. It has very opaque duties, which can be judicially reviewed and so forth, so it very much self-constrains, but then it also tends to take the middle way. We are pootling along at this level; we should really be having a policy at that level; and it goes somewhere in the middle. It probably makes everything worse by doing that.

There is absolutely no accountability on whether that was right or wrong or what the effects of that are in terms of costs. Essentially, if you keep taking the easy option, you are throwing your money away because you should be spending that money on getting where you need to get to. Independent or otherwise, you need to be accountable for your actions.

Lord Reay: At the moment, there is a BEIS Select Committee that scrutinises Ofgem and all the different parts of BEIS. Do you feel that there ought to be more regular scrutiny of Ofgem?

Professor Catherine Mitchell: Obviously, there are internal ways that money is spent. It has not done anything wrong against its duties, if you see what I mean. Ofgem feels that it has to take no decision about anything that can be seen to be a policy, so it does not take a decision about where the system is going in the future or whatever. Its economic analyses are basically short term and static. They are not over the long term and are not about dynamic changes, which is what is needed.

Against what it does, it is not going to be found to be irregular; nor is it going to be judicially reviewed unless it is unlucky. It is definitely trying very hard not to be judicially reviewed. That is not necessarily the right thing for society because it is taking these very cautious decisions that are not getting us anywhere to net zero.

For example, there was a couple of years when decisions that Ofgem was making about costs related to being an embedded generator and the distribution became a seriously big issue, which, in terms of wanting to have more sustainable energy on the system, was undermining that decision. It was completely the wrong decision but suited the way the system ran. We did a lot of work on that. There is nothing you can do about it, unless you want to judicially review it. As an academic, I am never going to be able to judicially review Ofgem.

Q11 **Lord Allen of Kensington:** Good morning. One of the things the committee is very interested in is whether there are any other countries, jurisdictions or international organisations to which we can compare Ofgem. Are there any lessons to be learned? Dr Hardy talked about digital sandboxes. We have read about some of the stuff that is happening in Germany, France, Singapore and Australia. I am keen to understand whether, as you look around the world, there is anywhere that would be useful for us to look at lessons learned for Ofgem.

Dr Jeffrey Hardy: There are lots, generally speaking. Catherine has already talked about the New York Reforming the Energy Vision programme. For examples on really getting the rules on flexibility right, also in the US, there is the PJM, which is one of the market arrangements they have got going. New Zealand has been operating a zero-carbon electricity system for years. The New Zealand energy system is 80% renewables and it has nodal pricing, so it has different prices in different parts of the country on the transmission system.

Australia has been at the forefront of embedded generation. There is a really high rollout of solar PV and batteries in homes, with lots of people disconnecting. They got some of their grid charging really badly wrong, so some of the network charges are really high in Australia. They are thinking about market rules at the moment with the Australian Energy Market Operator. There are lots of things going on over there. One very good thing that they have done is to put in place a body called Energy Consumers Australia, which is championing the consumers in this net zero transformation. They have a really forward-thinking customers' charter, which is well worth a look at because it is thinking about the role

and rights of customers in this net zero transformation as well. There are loads of examples around the world and lots in Europe.

Professor Catherine Mitchell: I agree with that. Looking at it in different ways, there are loads of other countries. Ofgem is very big compared to other regulators. The last time I looked at it, it was 800 paid people plus consultants, which is very big. It has a very different role to Denmark or Germany, both of which have about 40 people in their regulatory system. The US regulators, the PUCs, are very independent and are related to price. Anything to do with energy that comes to do with price is their remit. They can do really interesting things. They can look at it over the long term or the short term, but it is about price, so it is a very simple way of doing things.

They have commissioners. In a very large state, for example, there are seven commissioners, so there is not one regulator. In small states, there might be three. They are always odd numbers. For a long time, I was saying, "Please let us have a commissioner style in Britain". I really like Jonathan Brearley, but it is this autocrat, who is good and might manage to do something, versus a process whereby you have more people there to take decisions. One of the issues for the regulator, for Jonathan, is that he has to take all those decisions that are in there. It is down to him and him getting through everything with 800 staff is huge. The commissioner way forward is another way of doing it.

There are loads of ways of doing it and that is an absolutely huge topic. The fundamental problem with Ofgem is that it is huge. It is very difficult to get a real management change in there that this is about net zero rather than about least cost and economics. That is the thing that really needs to change. I have definitely given up on them in a wider sense. I want them to go back to being an economic regulator. That would make life a lot easier. Whether they can change the management to net zero comes down to whether the duties on them are strong enough and then how they are held accountable for those duties. It is no good having a duty if they then ignore it.

Lord Allen of Kensington: I am conscious we are running out of time. Maybe you could reflect on who might be good witnesses for this committee and could give a different perspective across those countries. Obviously, with Zoom, we can spend some time with them. Would that be helpful, Chair?

The Chair: It would be very helpful. If I could add another piece of homework, which you can do either separately or together, please set out what you regard as the revised remit for the new, reformed Ofgem and how the challenges that it does not include would be distributed to other agencies and regulators.

On that note, thank you very much indeed. It has been a fascinating session. The highways and byways of Ofgem are not roads that many of us have travelled. It is a very interesting and challenging role, so thank you very much indeed for your contributions today.