HOUSE OF LORDS

# Industry and Regulators Committee

## Corrected oral evidence: Ofgem and net zero

Tuesday 14 September 2021

11 am

Watch the meeting

Members present: Lord Hollick (The Chair); Lord Blackwell; Baroness Bowles of Berkhamsted; Baroness Donaghy; Lord Grade of Yarmouth; Baroness Noakes; Lord Reay; Lord Sharkey.

Evidence Session No. 8 Virtual Proceeding Questions 81 - 87

## Witnesses

I: Lord Adair Turner, Chair, Energy Transitions Commission; Maxine Frerk, Associate, Sustainability First.

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# Examination of witnesses

Lord Turner and Maxine Frerk.

Q81 **The Chair:** Welcome to this second panel of today's session. I am delighted to welcome Maxine Frerk, who is an associate at the Sustainability First think tank. She has published reports on sustainability and regulation in the energy sector. Maxine was at Ofgem for 10 years working on governance and consumer issues. Lord Adair Turner is chair of the Energy Transitions Commission. He was the first chair of the Committee on Climate Change. The Energy Transitions Commission is a global coalition of companies across the energy landscape committed to achieving net zero. So we have two witnesses who know a great deal and have a great deal of experience about this matter.

Perhaps I can start off with you, Adair. We had Committee on Climate Change economists and the CEO here last week, and they took us through their sixth carbon budget in some detail. They were a little shy in revealing some of the assumptions they had made, but we made some progress. You appear to agree very much with their conclusions about the costs and the possible payback. Have you come to these conclusions by developing your own model? Have you used the same model as the Committee on Climate Change? What assumptions have been made that need to be thought about carefully and could alter over the lifespan of this budget?

***Lord Turner:*** Let me begin by saying that the Energy Transitions Commission, because it is a global commission, has not produced a model specifically focused on the UK. Our work is as much focused on the rest of Europe, China and India, where we have done a great deal of work, as the UK. But we have done very detailed work on the analysis in general of decarbonising power systems, steel production, cement production and the global shipping industry.

Broadly speaking, the assumptions that the Committee on Climate Change has made are very much line with our own assumptions, with one or two slight differences that I would like to highlight. In our analysis—for instance, we have done very detailed analysis of the Indian and Chinese power systems—the assumptions that we are making about costs are comparable with the UK. Of course, they are different because you have different geographical situations.

The Committee on Climate Change's sixth carbon budget report is one of the clearest explanations, if you look at the key exhibits, of how to think about the economic impact of climate change. To highlight why I am saying that, I would like to draw your attention to a series of key exhibits. Figure 5.4 on page 257 sets out the cost of getting to net zero in what is called an annualised cost form. That is a technique that we have used in a lot of our work. It produces a figure from the Committee on Climate Change that the cost to the UK of getting to net zero might be about 0.5% of GDP in 2050. That is fully compatible with all our work on economies around the world, but the crucial thing is to understand what,

conceptually, it is. It tries to combine in one figure how much save when you get to 2050 by having lower operating costs and how much you have to invest to get there. They turn that into one figure by annualising the capital investment and spreading it over a period as if you had to borrow the money from the external world.

In a sense, it is far easier to understand the real essence of what goes on by looking at figure 5.3 on page 250, which says, "Think about how much you have to invest to build a zero-carbon economy and what you have to invest in, and then think about what that has done to your operating cost". That suggests that, by 2050, consumers in the UK will be better off because of this transition, in particular because of one very big figure: they will be spending far less on road transport than they do at the moment. But to get to that higher standard of living, you go through a period that peaks in the 2030s when you have to do a significant amount of investment, going up to about £50 billion per annum. That would probably be about 1.5% of GDP in that period, of which the two biggest elements of investment would be investment in the new power-generating system, as well as investment in residential homes to electrify them and keep them better. I really would congratulate the committee on figure 5.3 and encourage you to look at it. It is a way that enables us to understand the core of what is going on.

A higher level of investment in the 2030s is not a reduction in GDP; it is a reallocation within GDP from consumption to investment. It still has an impact on living standards. It essentially means people will have to spend money insulating their houses as an investment that they might have spent on aspects of consumption, but it is the core way to think about the economics. We go through a period of investment that does not reduce GDP or employment—indeed, it might increase both—but still has a consequence for consumers because there is more investment and less consumption.

Broadly speaking, I think the committee has got it right. The cost assumptions that it has put into it, which you can see on table 5.1, are, broadly speaking, correct. Indeed, I think its base case is a little conservative. The base case assumptions for what will happen to the cost of offshore wind are less ambitious than one could reasonably be; it has a variant called "widespread innovation", and I think that is more likely to be the case.

The final point I would like to make is the bit where we might have a slightly different emphasis. There is one thing that we think will be even cheaper than they think and one more expensive. It goes back to the balance of investment in figure 5.3. It suggests a significant investment going throughout the 2030s and 2040s on road transport. Essentially, it says that electric vehicles will be more expensive to buy up front than internal combustion engines and that you will have to invest in those to get the benefit of lower-cost operation. I am willing to take a sizeable bet with any of you that, by the end of the 2020s, electric vehicles will be

cheaper to buy up front than internal combustion engines. I think that the cost has been overstated there.

On the other hand, if anything, I have a concern that the cost of what is required for the investment in residential homes has been understated. When I looked at the figures, they appeared to suggest an average investment of an order of magnitude of £8,000 to £10,000 per home to cover buying a heat pump and insulating. I suspect it will be a higher figure.

At the end of the day, the figures for the extra level of investment are broadly right. If anything, I suggest that considerably less investment in new electric vehicles will be required by the time we get to the 2030s. I think there will be no extra cost of doing that, but I would look carefully at what is the biggest and most difficult issue of the transition for the UK, which is the residential heating environment. That is where there are significant costs, and we need to work out how we bear them.

**The Chair:** Thank you. Maxine, what is your overall assessment of the budget?

***Maxine Frerk:*** Sustainability First does not have the resources to do its own analysis, but we hold everything that we have seen of the Committee on Climate Change's work in high regard. Whenever we dig into an area, we see that it clearly has done its homework and have a lot of confidence in the figures that it comes up with, so I have no reason to disagree with what it is putting forwards. I will flag two points that the Committee would acknowledge that it has not really looked at. The first is the wider benefits that come out of moving to net zero, which are an important part of these considerations, in terms of health and what this does to local economies. In its net-zero review, the Treasury has highlighted the importance of those co-benefits.

The other point is to acknowledge the winners and losers in all this. Lord Turner has highlighted that we might expect the costs to be roughly similar overall, but if the savings are in road transport, and the additional costs are in insulating buildings, the issue is that those on low incomes will be much more worried about heating and much less worried about transport. It is about the winners and losers; that is where we are coming from. We might talk about that later.

**The Chair:** We want to explore some of those issues later. Who pays? That is going to be a key question to ask.

Q82 **Lord Sharkey:** We have heard from several witnesses that the lack of clarity from the Government on plans to achieve net zero is a significant problem. For example, Dieter Helm told us that, while some elements of an overall plan are in place, the UK is "a long way adrift" from having a sufficient plan for a transition to net zero. Do you agree that further clarity is needed on the Government's plans for reaching net zero? Which elements of policy are particularly important and urgently need greater clarity?

***Lord Turner:*** There is strong clarity in some areas and not in others, and particularly in one important one. I would say we now have in the UK a very clear plan for electric vehicles, and we include a legal ban on buying internal combustion engines from 2030. I think that will drive the electrification of road transport, which I expect will, in battery electric form, cover not only passenger vehicles, but pretty much the whole of light-duty vehicles. We could do with some more support from the Government for wider charging infrastructure, which in total is not a big expense. Broadly speaking, we are headed in the correct direction on the electrification of road transport.

On the power system, everybody who has looked at it agrees that you must electrify as much of your economy as possible, and we have to build a power system that is both much larger than today and fully decarbonised. For an order of magnitude, we must increase our electricity consumption by two to 2.25 or 2.5 times by 2050. There is a very clear vision of how to get there. I would point out a new set of scenarios recently produced by Scottish and Southern Energy that are broadly in the consensus as to the mix of offshore wind, onshore wind, batteries and hydrogen that will get us there.

Some of the elements of getting us there are clearly set out. There is a government target of 40 gigawatts of offshore wind by 2030 and an indicative target of 100 gigawatts by 2050. All of that is in the right direction. We now need to see the specific auction schedule through the 2020s that will deliver that 40 gigawatts of offshore wind by 2030. These are the details of the next 10 years, but the direction and the overall plans are clear. We might come back, later in your questioning, to the role of Ofgem and the need to develop the transmission and distribution system as much as generation, which we need to focus on. Broadly speaking, the plans are heading in the right direction.

There is honestly not a clear plan at the moment—and, given what I said earlier and the CCC figures, it is the crucial thing—for residential heat. We do not have a clear plan for who is going to pay for this. Let us assume it is £10,000 to £12,000 on average per household. How are we going to deal with the distributional issues that Maxine has mentioned? This will be affordable for some people with higher incomes who will save nearly as much money on transport, but how do you make it affordable for people in houses that are less well insulated today on lower incomes?

We do not have a clear plan for that. I have to say I am very surprised that we do not have a clear plan because, in terms of the levelling-up agenda, delivering a clear plan for residential heat ought to be able to create something like 200,000 more jobs over the next 10 to 15 years. Because they are about refurbishing and putting things into buildings, they are by definition not clustered in one or two particular parts of the country. They are spread out wherever there are houses. These are jobs for plumbers, electricians and plasterers—all the housing and small construction trades. This is a major employment opportunity, but we need a plan for how to make sure it happens and for dealing with its

distribution consequences. That is the biggest thing that is missing in the government plan today.

***Maxine Frerk:*** I totally agree that heat is the big missing piece of the jigsaw alongside the net-zero review by Treasury of how we pay for the net-zero transition overall. The heat and building strategy is not going to answer all the questions about whether we go down the hydrogen or electrification path, which is part of what everybody would like to know, because there are inevitably some large-scale trials and pieces of work being done to answer those questions.

As Lord Turner says, there is an enormous amount that we need to get on with in improving the energy efficiency of our buildings. Some early signals about the end of gas boilers, and perhaps a rebalancing of tariffs between gas and electricity, would send the signal in the same way that the announcement about the end of ICE vehicles has got everybody thinking about the fact that we have to make that change. Even if it does not answer all those questions, to get that strategy out and get moving is the biggest challenge that we face.

Q83 **Lord Reay:** Good morning. Who should pay the cost of the investment needed for the net-zero transition? Should it be the taxpayers or the bill payers? Should the Government do more to get buy-in from the general public for what is coming along?

***Maxine Frerk:*** Like many organisations, we would highlight that recovering these costs through bills is more regressive than doing so through taxation. Where taxation is a possible answer, we would support that, but, with a bit of political realism, recovering some costs through the bills is inevitable.

It matters at least as much how you recover it through the bills, and that needs a more transparent and open debate. In his evidence, Dieter said that bills are not that bad because rich people tend to use more energy. That is fine if bills continue to be on a per unit basis but, with the way that the structure of costs is changing, they are increasingly driven by capacity rather than the unit cost of fuel. In his evidence, Matt Copeland raised a concern about the green gas levy being recovered on a per customer basis. If you recover costs through bills on a per customer basis, the analysis that Sustainability First has done really highlights that that has much more impact on those on low incomes.

There are other dimensions around the recovery of the costs for the reinforcement for electric vehicles, which Ofgem is now proposing should be recovered through all customers rather than those who are connecting electric vehicles. Again, we have highlighted that the bottom decile of customers has 35% car ownership. In the top four deciles, it is 90% car ownership. If you get all customers to pay for the reinforcement of the networks, you will hit those on low incomes hardest.

The real debate needs to be taken out of the technical annexes, which is where Ofgem tends to talk about the detail of the charging structures. We

need a proper debate. It is inevitable that a lot of the costs will come through bills, and we need that debate about how, not just whether, they are recovered through bills.

***Lord Turner:*** We will have to have some element of redistribution within the socially acceptable strategy here. By that, I mean that there are some costs that, if you simply said, "The customer must pay for the emissions they are producing and the actions to offset those emissions", would fall to an unacceptable degree on lower-income people. The core of this is the residential home issue.

Dieter Helm is quite right to say that richer people tend to spend more on energy. There is—and we may come back to this—a generalised case for increasing the cost of gas with some taxation, because the biggest users of gas in residential homes are pretty well-off people in large homes who should face an incentive to stop burning as much as gas as they want.

While richer people tend to use much more energy, when you look at the real details, you end up with a very granular picture. You particularly end up with households of retired older people who tend to be at home all the time, whereas richer people who were working, at least until Covid, were spending some of the time out of the home at the office. If these retired people are in badly insulated buildings, they tend to have large energy bills. They may also be in houses that are quite expensive to bring up to a high level of insulation. It is one of the real challenges of this that the distributional consequences are very specific and granular. They are very particular groups of people.

In general, we should have a polluter pays approach, and there is something to be said for putting the costs on to consumer bills. We will have to combine that with specific actions that subsidise retrofitting, whether that is new heat pumps or the insulation that is required, for lower-income households, and think creatively about whether there are ways—Maxine has talked about this—within the consumer pays fashion to make sure that that is not regressive. My general principle is that we cannot avoid looking at the distributional consequences of this, specifically in relation to residential heat.

When you get to electric vehicles, there are less important distributional issues, but they are still there. People who do not have off-street parking will pay for the electricity for their car from public charging places. Because there is a cost involved in that, the electricity that they put into their car will be much more expensive than the electricity that somebody puts in in their private driveway. The people who do not have private driveways are a funny mix of some of the lower-income people in society and some of the highest-income people in society who live, as I do, in nice, terraced houses in central London, but do not have off-street parking. There are those issues in the EV space, but they are second order compared with the absolutely primary challenge that we face in distribution, which has to do with the residential heat environment.

**Lord Reay:** How can policymakers ensure the interests of future

generations are represented on policy and regulation?

***Maxine Frerk:*** Sustainability First has done quite a lot of thinking about this area. In fact, we hosted a webinar only last week discussing this topic. The reason it is important is that there is a tendency among policymakers towards short-termism. There is an eye to the electoral cycle or the short-term media cycle; this is what Mark Carney has called the tragedy of the horizon. You are absolutely right that we need to get that future consumer voice into the debate.

One angle that we have been exploring is the Well-being of Future Generations (Wales) Act. You have a Private Members' Bill before you that proposes such a piece of legislation, which would put an obligation on policymakers to consider those issues and would establish a commissioner, whose aim would be to ensure that that voice is heard in those debates. That is a regulatory part of the equation, which can be addressed.

Deliberative engagement, as we have seen here with the Climate Assembly and as they have done in Wales, is a really good way to bring that voice in. If ordinary citizens who are struggling with their energy bills put on their citizen hats rather than their consumer hats, they are worried about their children and grandchildren and the future of this planet. These are the kinds of conversations that you can have when you are trying to explore these difficult trade-offs. If you take a group of citizens and spend enough time with them through a citizens' assembly so that they really understand the issues, the insights you can get around those difficult trade-offs are really valuable. They can give confidence to elected politicians whose job is, in some sense, to represent those views that they have the public behind them. That is why, after the gilets jaunes demonstrations, Macron really put a lot of emphasis on the climate assembly that they had in France as a way of getting that longer-term voice into the debates.

Finally, at a policy level, it is about just thinking about who you have in the room when you have these conversations. Again, Sustainability First has hosted a programme called Sustainable Futures. We invited a lot of young people, artists, activists and front-line workers who would not normally be part of these conversations and talked to them about what needs to happen to give effect to the energy transition.

With a different hat on, I chair SGN's customer challenge group for its RIIO business plan. In setting up that group, I wanted the voice of future consumers in the debate. I recruited two young energy academics who were close to the views of young people, but also understood the future of energy, and they were invaluable in those conversations in saying, "From the point of view of young and future consumers, we need to be thinking more about this issue".

I encourage you to look at the Private Members' Bill that is coming your way, but there is also an awful lot that policymakers can do now using different tools to engage that voice in the debate.

***Lord Turner:*** To take future generations into account, we should get on as rapidly as possible with the actions that we know can limit global warming, at least to not totally catastrophic levels. Given how harmful global warming is already and how incredibly harmful it could be by 2050 to future generations, we should treat that 1% to 1.5% of extra investment that we need to make over the next 15 to 20 years as a very small amount compared with the harm that we will otherwise leave for children and grandchildren to deal with. Bluntly, my point of view is that we would be pathetic as a generation if we did not accept it. It is non-trivial and has distributional effects. We have to think it through, but in the scheme of things, and compared with investments our forebears had to make in previous challenges that they faced, this is very small.

That is the biggest thing. If you were an individual living on an island with your family with an island economy, and you had been putting up all this $CO_2$ into the atmosphere, but you knew that you could cut out fossil fuel emissions and hand your children a better economy for the future by investing to insulate your home and develop an electric vehicle, you would do that if it only cost you 1.5% of your income. We have to find a way of doing that collectively for all future generations together.

Q84 **Lord Blackwell:** Could I ask about the role of carbon pricing in this and whether changes are needed to make that fairer and more transparent? In particular, arguments are made that there should be a higher carbon price so that the polluter pays. On the other hand, that impacts on competitiveness. Is that something you favour?

On the other side of the equation for consumers, and particularly households, should we try to make the carbon levy focus more on non-green energy and reduce the levy on electricity, for example, to incentivise it? To what extent can those two balance?

***Lord Turner:*** I have three points. First, carbon pricing is not the only instrument. There are many other instruments of regulation that are more important than carbon pricing in some sectors, but carbon pricing is certainly a very powerful instrument.

Secondly, I would think about the role of carbon pricing in different sectors of the economy. When it applies, for instance, to the heavy industry sector of the economy, steel, chemicals, and cement production, it could and should be an immensely powerful lever. In those sectors of the economy, you cannot know from the centre what the best possible solution or technology is. You need to use the decentralised power of the price mechanism to incentivise professional managers of energy and carbon cost to make good decisions. Carbon pricing in the industrial sectors is one of the areas where it is most important.

In those areas, the distributional impact or the impact on consumers is really quite trivial and is not a major problem. Producing steel in a zero-carbon fashion will probably cost 25% more than producing it in a high-carbon fashion, and will probably therefore require a carbon price of about $70 or $80 to incentivise it. But if you work out what the cost of

more expensive steel is, and what a consumer pays for a car made out of a tonne and a half of steel or a washing machine, it is sufficiently trivial and spread out among all consumers that you do not need to worry about it.

The issue on carbon pricing for the industrial sectors is the point that you made about competitiveness. What is the impact of imposing a carbon price in Europe, the UK or both? Broadly speaking, we are tracking the EU ETS, and I think we should broadly track the EU ETS, in our post-Brexit carbon pricing approach. If we have a price on steel there, but not in Turkey or Russia, will we simply end up with unfair competition? That is why it is legitimate in those heavy industry sectors to say, "Yes, we want a carbon price as a crucial part of our toolkit, but if other countries are not going to impose broadly similar carbon prices we will have to think about border carbon adjustments". There is no value, for our economy or the climate, in steel production in Europe or the UK simply being replaced by higher-carbon steel production in Turkey or Russia.

That is the heavy industry sector. When you get to consumers, there would be value, ideally, in putting a carbon price on methane gas in households. At the moment, we are piling some of the costs of transition on to the electricity price. We are increasing the differential with the electricity price, which is getting cleaner and cleaner as we decarbonise electricity, but we are favouring the gas side with a light tax regime. There would be a benefit to that, but it then combines with what I said earlier about the distributional consequences.

I know that the Treasury always hates the concept of hypothecation, although it seems to have given up that opposition in the latest move on social care, but there could be a strong argument for a carbon tax on domestic gas, where the money from that is clearly hypothecated to provide distributional support for lower-income families in terms of better insulation, which I talked about earlier. Those are some of the things that I think about carbon pricing.

***Maxine Frerk:*** The question about domestic heating is the angle that we have looked at in particular. I totally agree with everything that Lord Turner has said. We need to address that current inconsistency in pricing, but we need to think about the distributional impacts, as well as the idea, which I would support, of hypothecating the tax money and then giving it back.

There are other things. We talked earlier about energy efficiency. If we can improve the energy efficiency before we introduce that kind of carbon tax, that will reduce the pain. Some of it could be about shifting recovery of policy costs from electricity bills on to gas. There are things, such as the warm home discount, that are currently funded through electricity but could be funded through gas. In some sense, you are saving customers money in one place to take it from them in another. Otherwise, we just need to directly address the impacts through some additional support for customers on their bills where they are on low incomes. Carbon pricing is

a really important part of the jigsaw, but we need to think about how we are going to address those distributional impacts.

**Lord Blackwell:** There are some important decisions there about carbon pricing, border adjustment mechanisms, et cetera. Where in the system between the Secretary of State and Ofgem should or could those decisions be made? Who is responsible for figuring that out? Maxine, you have worked in Ofgem.

***Maxine Frerk:*** It is certainly not an Ofgem issue. The Treasury and BEIS are going to take an interest, so it is in the government space, not Ofgem. That is all I can say.

**Lord Blackwell:** Are you are talking to people who are wrestling with this in government? Where do you see the focus of this?

***Lord Turner:*** I do not know, but that is partly because I have probably spent more time trying to convince people in India and China not to see this carbon border adjustment as a form of protectionist, antagonistic policy, but to understand the rationale, and saying, "We really want to have you impose a carbon price domestically", than engaging with the British Government.

The answer is that I do not know. I agree that it is really a BEIS and Treasury issue. I hope there is an engagement with the European Union on this because the European Union has a clear plan to go down the border carbon adjustment route. It is difficult to imagine a coherent way forward that does not have some alignment, whether we are part of that approach or have a roughly similar approach. I can certainly tell you that any European steel company operating in both the UK and Europe will want as common as possible an approach to carbon pricing applying to them, and as common as possible an approach to whether there is a border carbon adjustment. Otherwise, they will be caught in a chaotic situation in businesses that they run in a somewhat integrated fashion.

**Lord Blackwell:** I have one very small follow-up, Lord Turner, on a comment you made about wind costs. You said you expected them to fall much more rapidly. We have had evidence that suggests that wind costs have not been falling and that some of the contracts are being made at unrealistic prices. I just wondered what the basis was for your confidence that wind prices would fall.

***Lord Turner:*** One has to be very careful, in looking at these prices of solar PV or wind, not to get fixated on short-term trends. If I could give you an example, when I chaired the Committee on Climate Change when we got going in 2008, we failed to see how quickly solar PV prices would come down. That was partly because solar PV prices had come down very strongly until 2006, and then it looked as if they had bottomed out. They had bottomed out because there had been a surge of demand for solar PV that had come up against limits in the factory capacity to meet it, and unsurprisingly, the price had gone up.

About two years after we were a bit too cautious, the very process that meant the price had gone up unleashed a wave of investment in new solar PV manufacturing, which then produced a glut, and then the prices absolutely cascaded down. We should expect to see some of these hog cycle economics in batteries, electrolysers and mineral production. Where investment does not catch up with demand, you get a surge in prices.

I would just be careful of it and, therefore, I would try to look through to the long-term determinants. When we look at the ability in engineering terms to build bigger turbines and go to higher turbine levels, particularly in the offshore space, we can see cost reductions in turbine manufacturers. I should perhaps state an interest here. Well, I probably should not, because I am talking as a witness and not as a Member of the Lords, but I am an adviser to a major Chinese wind turbine manufacturer. I can tell you that, when you look at the long-term potential to reduce wind turbine costs, they will keep on going down. Crucially, in the offshore space, the higher you go, the higher the capacity factor goes and the more hours per year you produce.

Those long-term, fundamental engineering facts mean that, when I look at table 5.1, where they are talking about the cost in 2050 being £40 per megawatt hour, and I think about the fact that last year there was an auction round at £39.90 per megawatt hour, I think £40 per megawatt hour in 2050 will turn out to be conservative. That is the sort of logic that I try to think about. But in everything, whether we are talking about the cost of lithium or solar PV, we have to try to look through what are bound to be significant cycles on the downward path.

Q85 **Baroness Donaghy:** My question is around whether a new regulatory or co-ordinating body is required. Catherine Mitchell of Exeter University has called for a transformation commission, and the former chief economist of Ofgem Joe Perkins thought that Ofgem should take a system architect role. Dieter Helm suggested that Ofgem could be abolished, but otherwise it could just be confined to regulating networks, as it does that so well. Do you have any particular views on regulatory and/or co-ordinating bodies?

***Maxine Frerk:*** The scope of Ofgem's remit at the minute is broadly right. It needs to carry on doing what it is doing in regulating the networks, but also, as you heard from Citizens Advice, playing a really important role in protecting consumers in retail markets, which some of your witnesses have played down a bit. However, it is not just about what it does but about how it does it and making sure that it has a clear duty to give appropriate weight to achievement of net zero.

When you look across the landscape, you have a number of other players that are doing important roles. You have the Committee on Climate Change, which is looking much more widely than just energy to get the full picture, identify actions and monitor progress. It is an important part of the landscape. You have the system operator, and BEIS is absolutely right in making that role fully independent. They come at things from a more technical point of view and can look at the details of what is needed

in terms of network investment and operating the system. You could find a slightly better way of reorganising those responsibilities, but it feels to me like we have enough on our plate to try to deliver the policy that incremental moving around of the deckchairs is not what we need to do. It is a big distraction. As far as I am concerned, we do not need a new regulator.

The other gap that was highlighted by Chris Stark was at the local level. If you are talking about delivery, there is a missing piece of the landscape, particularly on heat and buildings. Driving forward how we are going to deliver energy efficiency, where it might make sense to have district heating, and ultimately, perhaps, choices between hydrogen and electric, will really come down to local housing stock and what other resources are available in the area. Is there an industry that is using hydrogen already? What waste recycling facilities could be a source of heat? That kind of planning needs to be done at a local level alongside thinking about wider aspects of transport beyond just EVs: active transport and public transport.

There is a real role at a local level for supporting the net-zero transition. At the minute, local authorities do not have the resources or capabilities to do that. I am not sure that the answer is another layer of local governance, but there is clearly a need for a new, overarching co-ordination body that is focused more on the delivery than what might be considered the traditional regulatory role. I do not see a fundamental problem with what we have there at the minute.

***Lord Turner:*** I would agree with that and would be wary of suggesting that the answer to the problem is to create a new body. The Committee on Climate Change has the overall strategic view and does that well. Ofgem has broadly the appropriate remit with, as Maxine as suggested, the need to have a clearer responsibility to help drive the process towards net zero.

Where this matters, and could change the specific decisions that Ofgem makes, is the issue of how to invest ahead of demand in an integrated rather than a case-by-case fashion. This is most important in relation to transmission and distribution, where there will have to be significant investments in the long-distance transmission system and the reinforcement of local distribution grids. If you simply leave the process of approving the investments that the National Grid and the local distribution companies have to do until the demand is there, it could be too late. You have to be willing, to a degree, to say, "These are forecasts of growing demand. They are credible. They will have to occur if we're going to get to net zero, so I am going to allow the relevant companies to invest in the transmission and distribution grids, even if the demand isn't there today, just given the lead times".

There is then an issue about the integrated approach. In particular, if you look at the offshore North Sea development, there is a very strong argument for trying to think through whether we should build some sort of integrated offshore, undersea grid. If every time somebody does a

wind farm you try to say, "Okay, that requires a link back to land, and then maybe an overhead line to get back to the really high-capacity pipes in the grid network", each one of those then is a cost, and may lead to a debate about planning and "not in my back yard".

If you were to do this as rationally and low-cost as possible, you would probably commit in advance to putting in a lot of cabling that linked up a lot of wind farms offshore, and then bringing it back to shore in one or two really fat pipes. You might then be able to afford the undergrounding that often reduces the local opposition. In local environmental and cost terms, that strategic vision as to the sort of future network we need—a transmission network that is offshore and coming to onshore—is a bit difficult to do at the moment given the way that the Ofgem investment approval processes work. In terms of the remit it has, we need to create the space for it to be willing to support these longer-term strategic investments ahead of demand.

**Baroness Donaghy:** Can I ask you about Maxine's comment that one of the gaps could be co-ordination at a local level? Do you have any suggestions about that?

***Lord Turner:*** That is an interesting point. I have to say that I have not thought about that, because it is a degree of localism that I have not really focused back down on, given my global focus. Maxine is quite right that, when you get to the issues of the home and the residential heat space, there is clearly a need for an integration between planning rules and building permit rules. There are issues about the supply of skills to deliver this.

I do not think there is a need for new institutions, but we need an overall strategy for the residential building sector to clearly think through the totality of who has to do what to enable this to go forward as quickly as possible. Yes, I could well imagine that, down at local level, and particularly in relation to building, there may be some frictions in the current division of responsibilities. We need to work out whether there are ways to overcome them.

Q86 **Baroness Noakes:** My final question is about investment in the system. Lord Turner answered some of the question just now, but I will press ahead anyway. We know that we will need to have significant investment in the energy distribution system. We have been told that we need a much bigger system. As Lord Turner pointed out, we need to invest ahead of demand. There will be a need to do some investment in speculative, or not certain, technologies, and mistakes could be made.

At the moment, investment is controlled by Ofgem. Like many regulators, it has put the thumbscrews on investment because it knows that it has sometimes been a route for ineffective investment, and certainly increases in prices, which regulators are desperate to avoid. If we need to encourage investment in a more relaxed way, how is that going to be achievable within the system of price controls that have been operating in order to protect consumers?

***Lord Turner:*** Just to expand briefly on what I said before about the need to invest ahead of demand, the approach in transmission and distribution, as you know, is essentially a rate of return type regulation, whereby you have a rate base and an asset base. You are then allowed to earn a rate of return on that asset base with various mechanisms to create incentives for cost reduction. Therefore, one of the crucial things that Ofgem does is decide whether you can increase your asset base because that, when multiplied by the rate of return, determines what you can charge.

The challenge is that they want to keep that as small as possible so that the bills are as low as possible. They have been operating for the last 20 years in an environment where electricity demand has been either flat or falling. We have had all sorts of new efficiencies. Our lightbulbs are more efficient. Our appliances have got more efficient, so total electricity demand has gone down. The focus has been on cost minimisation: "Meet this stable demand for electricity at the lowest cost for consumers".

We are now on the verge of what is absolutely certain to be a very big increase in our use of electricity. For an order of magnitude, from about 300 terawatt hours per year today across residential and business, we have to imagine a system that will produce and consume 600 or even 700 terawatt hours by 2050. There is no credible route to a zero-carbon economy that does not involve that deep electrification of the economy, which, by the way, also has all sorts of side benefits of local air quality, reduced pollution, et cetera.

We need a new mindset that asks, "How are we going to plan the investment in transmission and distribution that supports that expansion?" The crucial thing, therefore, is to set a net-zero objective for Ofgem, to say, "You have to design what you are doing in the pursuit of net zero," and to require Ofgem to describe its intended approach to the amount of investment that it sees as required over time to eventually support a 600 or 700 terawatt hour system. What, therefore, is its vision of what it will support out to 2030 and 2035?

Up until now, Ofgem really has not had a requirement to set out that long-term vision and make sure that its approach to improving is consistent with that long-term vision. We have to find a way of forcing Ofgem to describe that long-term vision and how its investment approval process and specific decisions are compatible with delivering that.

***Maxine Frerk:*** I totally agree with all that Lord Turner said there. Inevitably, the regulator is trying to make sure that it is not allowing too much investment given the impact on customers' bills, but that it is allowing enough. For a number of years, Ofgem has always been a little more focused on trying to keep that investment down, worrying about stranded assets, and worrying about customer bills in the short term.

There was a bit of a sea change at the end of last year when the Secretary of State wrote to Ofgem around the distribution price control to say that it was important that network infrastructure was not a barrier to the transition to net zero. We have seen a more open mindset around

distribution investment since then, but I would like to see that kind of guidance set out in a Strategy and Policy Statement rather than a letter from the Secretary of State that has no legal standing. The equivalent guidance that Ofcom has been given in that sector is that, where there is a trade-off to be made, the priority is to make sure that the focus is on investment and not on short-term bill reductions. Some of that steer has to come from government around that balance, perhaps even if Ofgem had a clearer net zero duty.

In practice, that means Ofgem having a slightly different mindset. It is not always going to be able to have the same level of evidence to support a bid for investment in transmission network as it did previously because it is not always going to be clear exactly where the new generation is going to connect, but we know there is going to be a hell of a lot of it. Ofgem has to shift its mindset and the standards of evidence that it allows and be willing to take a bit more risk, as one of your previous witnesses said.

In the work that Sustainability First has done, in a report on the Fair for the Future project, we looked at regulation, the mindset around adaptive regulation, and how you move away from trying to tackle these things as a series of big, one-off decisions. Can you encourage the companies to think about what they need to do to keep all options on the table, recognising that uncertainty remains around the extent of electrification and whether we will have electrification of heat? The companies need to think about how to handle that uncertainty themselves. So that is about real options thinking and thinking about what you need to do to keep options open so that you can reach whatever scenario unfolds in the timescales that you need to. That requires a rather different way of approaching some of these investment decisions.

Q87 **The Chair:** Perhaps I can just make one observation. The upcoming Treasury review of costs is going to have a considerable bearing on the investability of this sector, who is going to invest, and the distribution of pain, if I can put it that way. Who is going to pay what? That will address many of those issues.

I just have one question that came up on an earlier panel about the role of nuclear in the transition. Hinkley Point C is being built, somewhat expensively, and we have plans for two other reactors. Mention has been made by a number of witnesses of local modular nuclear. Does either of you see any significant, possibly growing, role for nuclear?

***Lord Turner:*** Our point of view on nuclear is as follows. If you have existing nuclear plants, it is certifiably mad to close them down before end of useful life. I would say that to people who I might otherwise admire in the green movement if they were here at the moment. There is no environmental benefit to closing them down, so let us keep our existing nuclear fleet going for as long as possible.

The question is new nuclear. When we first did the work at the Committee on Climate Change, if you had asked me, "How do you get a

decarbonised power system?", I would have said you would be crazy not to back three different technologies. One was renewables, another was carbon capture and storage on fossil fuels, and the third was nuclear. At that time, we saw roles for each of those in new investment. Over the last 10 to 12 years, there has been a truly dramatic reduction in the cost of wind and solar, with batteries to provide diurnal back-up and hydrogen as a potential mechanism to deal with seasonal back-up. The facts have changed, and, when the facts have changed, you should change your mind. I would now say that it is absolutely possible to build electricity systems that rely as much as 70% or 80% on variable renewables such as wind and solar, while balancing that with hydro and hydrogen burnt in gas turbines. You do not absolutely need nuclear. That said, if new nuclear is cheap enough, you should not exclude it. Certainly, one principle of electricity systems is that it is good to have diversity. The balance challenge gets easier the more diverse and different your sources, but you do not need it, so it does now, in a way, have to depend on price.

As I look at the price of large fission sites around the world, it is quite simple. If you do a relatively small number of new designs, they will be very expensive compared with renewables. The tariff at Hinkley now looks very expensive indeed versus offshore. If, like the Chinese, you commit to building 100 large fission plants of pretty much the same design, you can probably deliver nuclear electricity at 6 cents per kilowatt hour, in which case it is an economic part of the system.

My own gut feel is that new large nuclear will play a relatively small part in the UK system going forward. On small, modular nuclear, the jury is out. The argument is that the costs of implementing it get much lower because the challenge of making it safe is much lower. I do not have a firm point of view either for or against that. It is worth trying to develop the technology. I am not convinced it is necessary for the system, but, if people can develop that technology, that is fine.

Finally, the joke has always been that fusion has a great future and always will have. But there are believable reasons, to do with the impact of massive computing power, that we may be on the verge of an acceleration of progress towards fusion. Again, we do not absolutely need it within the system, but it is certainly worth both private and public money—and both are flowing in—going into developing fusion. If we can develop limitless, safe fusion, that will be an extra addition. In summary, we do not need nuclear in the way I thought that we did 10 years ago, but I certainly do not exclude it if the cost can work.

***Maxine Frerk:*** It is not an area that we have looked at in depth. My only reflection is what consumers at large are interested in. I have done some work on green tariffs. Consumers are very supportive of renewable energy, but much warier about nuclear. If you want to go down a nuclear path, you have an added challenge in getting consumers and citizens onside.

**The Chair:** Thank you very much for an extremely informative and

helpful session. That brings today’s meeting to a close.