

Business, Energy and Industrial Strategy Committee

Oral evidence: Financing energy infrastructure, HC 2019

Wednesday 12 June 2019

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Members present: Rachel Reeves (Chair); Vernon Coaker; Drew Hendry; Stephen Kerr; Peter Kyle; Albert Owen; Mark Pawsey; Antoinette Sandbach; Anna Turley.

Questions 1 – 60

Witnesses

I: James Richardson, Chief Economist, National Infrastructure Commission; Tom Thackray, Director of Infrastructure and Energy, CBI; Chris Stark, Chief Executive, Committee on Climate Change.

Examination of Witnesses

Witnesses: James Richardson, Tom Thackray and Chris Stark

Q1 Chair: Thank you very much to the three of you for coming to give evidence today. As you know, this is the first evidence session of our energy infrastructure inquiry. First of all, what is your reaction to the news today about the Government legislating for net zero? I will start with you, Chris Stark.

Chris Stark: I am absolutely delighted because, at an organisational level, my organisation, the Committee on Climate Change, has worked for a very, very long time on the analysis that underpinned the recommendations we made to the Government in May. By and large, the recommendations have been accepted by Government. The Government have made an important step today. More importantly, I hope that, when Parliament votes on it, we see the same consensus that we saw in 2008 when the Climate Change Act passed. It will become a really important moment for Parliament to set a target like this, because it needs that kind of cross-party consensus to make it stick. I am really pleased. It is exactly the right thing to do.

Q2 Chair: Thank you very much. We share that sentiment. As you know, I presented a Bill to Parliament yesterday on introducing net zero. Chris, to continue with you, do you think the Government are going to include emission reductions from international aviation and shipping in the statutory instrument they bring forward?

Chris Stark: They have not fully adopted our recommendation to include them in the target, but we should cut them some slack, because they have recognised that there are some international frameworks in place for those sectors, which are fundamentally international sectors. They are going to allocate some room in the carbon budgets, which is a technical way of describing that they are going to monitor the emissions. The Act is clear that, at some point, both those sectors need to come under the target formally, but it is reasonable for them to spend a little time trying to make sure these international frameworks work. Let me be clear on this: in the end, we have to reach net zero domestically here in the UK and that needs to incorporate the emissions we are responsible for from international aviation and shipping. At some point, the Government will have to recognise that by bringing them formally under the Act.

Q3 Chair: What do you make of the inclusion of international carbon credits, despite the Government's intention not to use them?

Chris Stark: This is another area where we made a recommendation. In summary, our recommendation was to reach net zero in the UK with a domestic plan that applies in the UK, without the use of international credits. But that recommendation was only a policy recommendation. There is no scope in the Act for there to be a mechanism to mandate the



Government not to use international credits. This is one of those areas where it is reasonable for the Government to adopt the position of saying, "We need to see if international credits work".

I will add two things to that. The UK is one of the places that might well offer those kinds of credits to other countries in the future, which is because we are able to store carbon in the North Sea. That again speaks to the need for a domestic plan that includes those things. Secondly, and more importantly than the economics of using these credits in the first place, if the world addresses climate change as it must, by mid-century when we really need these credits they will be expensive, because every country in the world will be demanding them. Both of those things speak to having a plan that is domestic, in the main, but I do not feel I can be over-critical of the Government for trying to make them work. In London particularly, where there are so many big financial flows, we should be trying to make the governance around international credits work.

Q4 Chair: We overachieved on our first and second carbon budgets. What are your thoughts on using the flexibilities to meet our later carbon budgets? As you know, we are not on target to meet our fourth and fifth carbon budgets at the moment.

Chris Stark: The Committee on Climate Change has many roles, one of which is to offer advice periodically on the level of carbon budgets, which are affected by the interim targets that take us to the long-term target. We offer that advice on the basis that surplus emissions from previous carbon budgets will not be used to weaken ambition in those carbon budget periods. For that reason, we wrote a letter to the Government in February to say the "flexibilities", as they refer to them, from the second carbon budget period should not be used to make the third carbon budget period easier. That continues to be my position and that of my committee.

The Government have reserved the ability to use a little of the flexibilities that they created in the second carbon budget period. We still say that they should not do that, but they told us in a letter that the reason for reserving that flexibility is that they are worried about future revisions that come from their understanding of the science, in particular the global warming potential of various gases and peatland emissions. They are worried about the size of that having an impact on the baseline, and they have told us they wish to reserve a bit of flexibility to do something about that. We are going to give them some advice on how to handle those things, and I tell you now that it is very likely our advice will continue to be not to use those flexibilities. Making future carbon budgets easier is not in line with the Paris agreement and, frankly, loosens the overall framework for emissions reductions in the UK. It is not something I would like to see happen.

Chair: It is not a good start, if we are legislating for net zero, to use flexibilities to meet targets against easier targets.



Chris Stark: I quite agree. It is very important that we see those carbon budgets as fixed whole-economy targets that take us to that long-term target. If they become easier, the long-term target will become harder. Setting those targets at the right level and achieving them is essential in the UK framework.

Q5 **Chair:** James Richardson and Tom Thackray, will the net-zero legislation give businesses and investors the certainty needed to make long-term investment decisions on new long-term infrastructure projects?

James Richardson: That is our view. We have taken a view across a number of areas, and this is a really good example, that long-term certainty about objectives is exactly how you deliver the kinds of innovations that mean things end up cheaper than you might think. We have seen that with offshore wind and we are seeing it with electric vehicles. We need to see it in some other sectors, and certainty from these long-term targets is important to delivering that, so I completely agree.

Tom Thackray: CBI stands squarely behind the net-zero target and is delighted to see it moving into legislation. That is because businesses are already feeling the costs of climate change impacts that are happening through extreme weather events. Their investors and customers are demanding that they take it seriously, so enshrining that target in legislation is the right thing to do and an important signal to investors. On its own it is not sufficient. It is important to say that it needs to be backed up by the supportive policy environment and frameworks that will secure that investment.

Q6 **Anna Turley:** Thank you all very much for coming in today. The question I was intending to ask today is for you to define what the Government's objectives should be when it comes to future energy infrastructure specifically, but it is clear from the announcement that there is one overall objective now, which is to meet that net-zero target. Going underneath that, what should the priorities be for the Government, in the immediate, medium and long term, to obtain that objective, particularly focused on infrastructure?

James Richardson: Not only does it have to be net zero, but we want to do that at the lowest possible cost. That can be done, but it requires taking the right decisions now. Of the immediate things we have set out, which are the priorities, the first is creating a route to market for onshore wind and solar, allowing them access to the contracts-for-difference mechanism. These are the cheapest means of energy generation, cheaper than fossil. They also complement offshore wind. It tends to be sunny when it is not windy, and vice versa. Having a diversity of sites for wind reduces variability, so there are real advantages in bringing them forward, but there is no route to market at the moment. We need to create that route to market and push ahead with deployment of renewables through the 2020s.



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Secondly, we need to accelerate the process around electric vehicles. There is a huge opportunity here. Within a few years, they will be cheaper to buy. They are already cheaper to run and maintain, as well as having carbon and air quality benefits. There is a huge opportunity to be grasped here, but we need to make sure the infrastructure is in place. In too many places in the country, typically the remoter rural areas or places that are more disadvantaged, there are no charge points available. We need to get on top of that. Then we think this will be driven forward by people choosing to buy them because they are better products. The Government's 2040 timetable is far too slow. We need to have the infrastructure in place so that, by 2030, we are at 100% of new sales.

Thirdly, and this has been given even more impetus by net zero, a year ago we said we need to get ready for use of hydrogen. We looked at this specifically in its role in heat, which is one of the hard areas here. We have been pushing for trials in the use of hydrogen and an end-to-end trial of hydrogen and carbon capture and storage. What will come out of net zero is that hydrogen ceases just to be an option and becomes a necessity somewhere in the economy, even if not in heat. That will become even more important. We need to push ahead with that and get it tested, because it is an untested technology. There is no reason to believe it will not work, but we need to push ahead with that.

Q7 Anna Turley: Chris, would those three—onshore wind, EVs and hydrogen—be your top three priorities?

Chris Stark: Yes, I support all that strongly. I will draw back a little to say that one advantage of the Climate Change Act is that it gives long-term certainty, but only about an outcome. The need for a plan to get to it is the key issue for Government, and we need to achieve the net-zero target over 30 years. You might think about three periods, basically three decades, the first 10 years and the next 20, over which we need to make a good plan for infrastructure. A key component of our advice is that, if a good plan is made, the costs stay low. If there is no good plan for the turnover of the UK's capital stock, you will incur big costs at the end in the form of scrappage. You might question whether there will be public support for that kind of step.

Broadly in infrastructure terms, and I strongly support the things James has said, we talk about making decisions on what to do about our gas grid in the next 10 years. We have options, but we need to make those decisions. We need to start talking about expanding vehicle charging and electricity grids to support the increased electricity demands that we will have in the future, along with the supply of low-carbon electricity. I strongly support James's words on the importance of onshore wind as the lowest-cost form of low-carbon generation at the moment.

The only thing to add is that, over the next 10 years, we need to see a plan for industrial carbon capture and storage. That ties in well with the story James told about hydrogen. I agree with James that hydrogen will be essential in the future. Quite how we use it is a question we need to



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resolve over the next 10 years. We might think about putting those steps in place over the next decade, so that we reach full-tilt deployment of these infrastructure assets by 2030, with a clear plan, and then tackle some of the big questions over the next 20 years including, most obviously and crucially, what to do to decarbonise buildings in the UK.

Q8 Anna Turley: That is really helpful. Tom, business needs continuity and a strategy. How could the Government make sure that the immediate, medium term and long term are consistent, and business can get on board?

Tom Thackray: There are plans for an energy White Paper to be published before the Summer Recess. It is important that that materialises and contains some of the things that both Chris and James have talked about, including a route to market for onshore wind. The CBI very much supports that. We also say that a way forward for new nuclear power generation will be important. The financing model for that should include backing the regulated-asset-base model for new nuclear plants. That would be usefully tackled through that energy White Paper.

A key priority for us is closer collaboration between the different Government Departments that are responsible for driving forward change. It is not something that can be driven fully by the Department for Business, Energy and Industrial Strategy; all Government Departments have a stake in achieving the targets, so some kind of co-ordination mechanism will be critically important. In the medium term, there are uncertainties associated with our exit from the European Union, particularly when it comes to carbon pricing and our future involvement with the EU ETS, which is important to resolve before we can secure the level of investment required.

Looking at a short, medium and long-term approach is useful, but the Committee on Climate Change has been clear that you cannot take a sequential approach to decarbonisation across the different forms. Actually, we need to start all these processes in tandem and at once.

Q9 Albert Owen: I will follow on from the responses you gave to Anna Turley regarding the priorities and route to market. You talked about wind, solar and the move to hydrogen. Tom mentioned that the CBI wants this White Paper. Can I start with you, Chris? You set out the framework in your report. What do Government need to prioritise now and how do they take that step forward? Is an energy White Paper the vehicle to do that? I am worried that Departments are still working in isolation. We have BEIS doing a White Paper and then the Ministry of Housing, Communities and Local Government. There are devolved Assemblies in this equation as well. What is the UK Government's priority? Is the White Paper the priority?

Chris Stark: It is hard to know, because I am not involved in the production of that White Paper.



Albert Owen: Just give advice.

Chris Stark: Having a clear and coherent plan for energy that is compatible with net zero is essential. Therefore, if the Government are planning to make a plan, I am happy that the backdrop to that is now the statutory target to reach net zero. That is the first thing.

Secondly, we have time to do some planning for the big energy infrastructure requirements needed to get to net zero. There are still options and choices to make, but also things of least or no regrets that need to be done well over the short term. The most obvious of those is scaling up our electricity system and low-carbon electricity generation along with it. We predict that, by 2050, we will have doubled our electricity demand from all the new uses for electricity we will have in the future, especially heat and transport, alongside something like a quadrupling of the supply of low-carbon electricity. The more that is front-loaded and the Government put in place plans to bring in private investment for that kind of step, the better. Although the White Paper can be useful, our broad view is that the components, in policy terms, are already in place to allow that transition to happen in the electricity system, using the contracts for difference, a capacity market and a high carbon price.

Q10 **Albert Owen:** What about the linkage with generation from the power plants and for transport and heat? Do we need to go back to having a Department of climate change that could look after issues of transport, housing and the built environment?

Chris Stark: I do not know that it is necessary to have that. I do know that it needs to run through Whitehall like a stick of rock that we are trying to get to net zero, because the big choices are infrastructure choices, in the main, and they are not being made in one single place in Whitehall. There is a housing strategy, an energy strategy and a transport strategy, and an environment and agriculture strategy as well. If we are to make the leap required by net zero, we will have to make those decisions pretty soon.

You mentioned transport and the need for an infrastructure plan to meet the low-carbon transport system that we will have in the future. Again, there is time to plan for that, but it starts with a net-zero target and then being clear about the point at which we switch over to zero-carbon transport on our roads, for example. It falls from that that infrastructure requirements can be planned, including, crucially, the network investment necessary to supply the charging infrastructure for electric vehicles. That is all very, very possible and can be done but, if we wait too long to make those plans, it starts to become difficult and expensive overall. In the end, the consumer will pay.

Q11 **Albert Owen:** So it should start as soon as possible. James, do you think Whitehall is fit for purpose for the new agenda we are all talking about now?



James Richardson: It can be, but we have not seen action to date. They have only just agreed the target. We were created as an institution to try to fill in some of the things that Government find difficult. That long-term strategic planning is always difficult, as is that cross-sectoral approach, so we have set out a cross-sectoral plan in the national infrastructure assessment. It does not cover everything that Chris is talking about; we do not look at agriculture, say, but it covers electricity, heat and transport.

The Government have promised us a comprehensive response and a national infrastructure strategy. If that is a serious piece of work, and we have set out the four tests that it needs to meet to be a proper response, it will show the purpose we need and that the system is working. We wait to see. Government can step up to these big long-term agendas and operate cross-governmentally, but the question is whether it will.

Q12 **Albert Owen:** Do you see the energy White Paper as important for energy infrastructure going forward? Can it encompass many of the things that you will be recommending and have recommended?

James Richardson: We do not know what is in it, but we hope it responds positively to the recommendations we have made in the energy area. We have seen that in some other areas, with digital and waste. We have had policy documents from Government since the national infrastructure assessment came out that have adopted a lot of our recommendations, so we hope to see that in the energy White Paper, but we are looking for the national infrastructure strategy to be comprehensive, because I assume that the energy White Paper will not cover all of transport, say.

Q13 **Albert Owen:** What would you like to see in the White Paper, in addition to new nuclear and a finance model, which you mentioned? How quickly should the Government act?

Tom Thackray: We would like it to be comprehensive. It would be tempting to focus just on the power sector and what needs to happen there, but we would like to see elements of the future transport system being brought into that discussion and how we are going to decarbonise heat, rather than taking these things in silos. As we are looking at the electrification of those systems in the future, we would rather they were taken in the round. The energy White Paper seems like a useful vehicle to address those points.

Q14 **Albert Owen:** Have you been consulted on this as a major business organisation?

Tom Thackray: Yes, we have had discussions with the Department about how its plans are shaping up and it is receptive to some of our messages, so we are hoping for a positive document when it comes out. Our major worry is that it gets kicked into the long grass and does not materialise before the Summer Recess. That is what we need more than anything. Business wants to see a sense of urgency with the momentum



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that has built up over the last few months continued. The decarbonisation of heat is an issue that has been talked about for 10 years or more, but we still have no long-term strategy to deal with it.

Q15 **Albert Owen:** Starting with Chris, do you see the nuclear gap as a capacity or low-carbon gap?

Chris Stark: Both are valid. As always, it is hard to give a single straightforward answer to that question. It is not necessary for us to have nuclear power, but it is necessary to have firm power and for that to be compatible with the long-term net-zero target that will be set today.

Albert Owen: In your report, you recommend new nuclear.

Chris Stark: We look at the existing plans for one further nuclear station at Hinkley Point. It is possible for us to have only that in the system, but we would need something else that is not a nuclear plant, which would be carbon capture and storage providing firm power, probably with gas. There are still choices there, but we need low-carbon generation. Basically, the rule for the UK should be to do as much as we can through renewable power generation, because it is cheap, but that cannot be the only basis for our system, because you can only go so far before costs start to rise. You still need firm power alongside that, which could be provided by nuclear or by CCS. There are choices there. Again, these are policy choices that Government will have to confront. Overall, it is possible to do it. The earlier the plan is made, the more quickly the investment can be levered in.

Q16 **Albert Owen:** Tom, do you agree with that? You mentioned we need more investment into nuclear, so obviously you take a different view.

Tom Thackray: We say that the baseload should be provided by new nuclear and that we need a finance model with plans for new nuclear power plants to be brought forward, relatively quickly, to ensure that development can start. That recognises the amount of nuclear power coming off the system over the coming years.

Q17 **Albert Owen:** Yesterday there was an announcement by EDF that the consumer would pick up some of that price. Do you think that is a fair way forward?

Tom Thackray: There needs to be discussion across the movement to net zero about where the costs of that will fall and whether it is fair to put them squarely on consumers. Scotland has set up something called a just transition, which enables the different players in the debate to come together to discuss how you can set up systems that enable the Government to take that cost in some places, businesses to take their share of the cost and consumers, where that is useful. The proposed costs of development of Sizewell C, for example, are way below those we have seen for Hinkley Point C, just because there is a first-of-a-kind cost associated with new nuclear, when we have not produced much for a number of years.



Q18 Albert Owen: Do you agree that the German example, where they have gone quickly to renewables and used coal as a backup, and therefore have not met their low-carbon emission targets, is something we have to be wary of?

Tom Thackray: The German case is a warning about how difficult it is to achieve the kind of decarbonisation targets that we are looking at, when you do not have a baseload provided by nuclear.

Q19 Albert Owen: James, you said in your report that, after Hinkley, there should only be one other nuclear power station. Why have you come to that conclusion? Why one? If the price comes down significantly for that one, why should we not have others?

James Richardson: We said there should be a decision on one by 2025. We are not saying there should definitely be no more beyond that. Our view is that there is great scope for flexibility technologies, such as storage, demand-side response and interconnection, to balance a system with very high renewables. We are learning more about this as we go along and countries build more of these variable renewables into their energy systems. We are learning more about how you can balance those systems without having a traditional baseload approach. That is probably going to be the cheapest option, but there is considerable uncertainty about that, as others have said. Nobody is running a system with 80% to 90% renewables, unless they have hydro, which is very different. We need to learn as we go along.

We think it would be a mistake to say now that we do not need further nuclear beyond Hinkley. We need to keep nuclear on the table, because some of those technologies that balance the system may not come through as we hope. That workforce needs to continue, so we say, "Take a decision on one more". That allows the workforce at Hinkley to move on to the next one. It will not help with the 2020s nuclear gap, because it is already too late. Hinkley will hopefully come on stream but, if you sign tomorrow, you are still looking at 2030, so it is not getting to help with the decommissioning. That is why you need to push ahead on renewables in the 2020s to fill the carbon gap.

Q20 Albert Owen: On price, you are saying exactly the same thing about offshore wind. We went with that when it was 110-plus, and it has come down considerably. Why would that logic not apply to other low-carbon technologies?

James Richardson: Nuclear is a bit different from some of the other low-carbon technologies in price. We think the second of a kind will be considerably cheaper than the first, and we have built that into our modelling. We have 60 years of evidence now of what happens to the cost of nuclear power stations. There is good evidence that the second of a kind is, maybe, 20% to 30% cheaper than the first. But what you do not see, and this is true even in countries such as France that have been pumping out a nuclear power station a year, is the continued year-on-



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year decline in costs that we have seen with technologies such as offshore wind and solar.

Q21 **Albert Owen:** Is France likely to meet net-zero targets ahead of any other European country?

James Richardson: Yes, since it already has a large incumbent nuclear fleet, but you do not see nuclear following the same cost path that you get with offshore wind. It is true of big construction projects in general that you do not see the same kinds of cost reductions. Building a tunnel or bridge is not cheaper now, in real terms, than it was 20 or 30 years ago, because construction does not have the same properties as manufacturing, which is largely what solar or offshore wind is.

Q22 **Albert Owen:** My final question to you is whether you support further onshore wind as the commission.

James Richardson: Yes.

Q23 **Chair:** Is that yes from all three of you?

Tom Thackray: Yes.

Chris Stark: It is firmly yes.

Q24 **Antoinette Sandbach:** I will follow up on that. None of you has mentioned energy efficiency. The savings on energy could be the equivalent of six Hinkley Points. Why have you not mentioned energy efficiency?

Chris Stark: I am happy to take that question. It was purely an omission, because we have been talking a lot about big infrastructure in the supply sense. It is the simplest and often cheapest way to achieve decarbonisation. It has the happy benefit of also saving energy for the consumer. It has, however, been very resistant to Government policy so far. It is one of the hardest challenges for Government. Even though it makes sense economically to do energy efficiency, it has not been a very successful exercise in the UK so far. That does not mean that we should not have it and lots of it, so demand reduction for energy and improved efficiency, both through energy-efficient products and especially energy-efficient homes, makes an enormous difference in achieving the target that we will see legislated today.

Q25 **Antoinette Sandbach:** I want to come on to the Chancellor's £1 trillion estimate of the costs of delivering net-zero emissions. Are you able to identify how the Chancellor has reached that calculation, Chris? You took a somewhat different approach.

Chris Stark: He got out his big calculator and added up a lot of numbers to get a very big number. I am afraid I cannot say precisely how that number was reached, but I can say how we approached the challenge. Perhaps we can make some assumptions about how it was reached. We looked in our report at achieving net zero and what we call the resource



costs of doing so. The best way to look at resource costs is to take all the expenditure made in the economy to abate carbon and reduce emissions, plus all the savings from making that expenditure. Think about an electric car: there are the costs of the car, plus the infrastructure, plus the generation of the electricity in that car, minus the savings from not having to spend money on petrol or diesel for that car. Overall, these things are more efficient. It is an interesting story.

In each year, you can add up those costs and savings, and get to a resource cost. From here until 2050, it is broadly between 1% and 2% of GDP each year. At the moment, we are spending something of the order of 0.3% of GDP on decarbonisation. Coming to these figures is an art rather than a science. I think the Treasury has simply taken that resource figure as an annual cost from a BEIS energy system model and added it up over the next 31 years to get a big number.

Q26 Antoinette Sandbach: For example, £1.5 billion in health savings alone are expected from warm homes, if you introduce energy efficiency measures. The potential of those receipts to the Government is not included in the calculation, as far as you can see.

Chris Stark: It is a really important point, because that figure is just the raw cost to the economy. It has no assessment of impacts on GDP from doing those things. You might expect there to be an economic benefit from acting in that way, for example, but it does not include that. Crucially, it does not include what we call the co-benefits of action. Think about people leading healthier lives and having better air quality in our cities. You can make an assessment using Treasury green book rules to monetise those benefits and, indeed, we do so in the report, just from looking at air quality and health. You get to something that looks like it might wash away those resource costs entirely. We did not do that in our work, because we did not want to appear to be offering snake oil. It is true to say that there are real costs from acting to reduce emissions, but there are also enormous benefits from doing so. From washing those two together, you get to an outcome that I firmly believe is a very small cost to the economy overall, if at all. It is very much worth incurring.

Q27 Antoinette Sandbach: Tom, I saw you nodding during Chris's evidence. Do you agree with the Committee on Climate Change, rather than the Treasury?

Tom Thackray: There is a positive story to tell about the way that technology has reduced the cost of renewables already, so we have managed significantly to mitigate what we thought decarbonisation would have cost until now. We are positive about the way technology will help to reduce those costs in the future. It also does not take into account the huge costs that will be incurred by businesses and consumers if we do not meet the climate change targets. From dealing with flood defences to insurance costs for businesses, they are sizeable and investors have cottoned on to those.



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Q28 Antoinette Sandbach: Mr Richardson, how does the Chancellor's estimate compare to other anticipated infrastructure costs over the same period to 2050? Is that comparison meaningful?

James Richardson: We have not seen the details of the sum, but like Chris I assume that they have added up that 1% to 2%. If you add up a large-ish number over 30 years, you get a very large number, but I am not sure that is the way we would have calculated it. We did a similar sum to the CCC, but independently, looking at the cost to consumers and businesses across electricity, heat and land transport. We concluded that the costs for a low-carbon system in 2050 would basically be the same as they are today, so there is a net-zero cost across those three sectors. Heat is more expensive and transport is less expensive, but we do not think those sectors are going to add to costs in the economy overall. We have not covered some of the more difficult things in that, such as agriculture. As others have said, that assumes some learning and that some things get cheaper over time, but not the big step changes that might come through in heat and that we have seen in other sectors. It is a cautious estimate.

Q29 Antoinette Sandbach: Your estimate is cautious, and yet your calculations show that there may be a net gain or zero cost.

James Richardson: It is zero cost, yes. It does not cover all the sectors, some of which are harder than the ones we do cover.

Q30 Antoinette Sandbach: That indicates that the Chancellor's estimate is dramatically out and not a proper indication of the benefits that could flow from approaching a net-zero target.

James Richardson: You have to take into account the sectors that we have not addressed, which are more difficult. If you take 1% to 2% of GDP and add it up over 30 years, you will probably get a number like £1 trillion. Of course, if you add up GDP over that period, you will get a much bigger number. But you are right on the benefits. There are two sets of benefits that are important here. One is the benefits for the UK and the world as a whole from not having runaway climate change, and they are huge. You can go back to the Stern review for that. The other is the co-benefits around air quality in particular and some other things. We did not monetise them, because in the way our remit is set up they are not included in the measures we have, but they are substantial, both for health and for productivity. There is some good evidence now that poor air quality impacts on productivity.

Chris Stark: To defend the Treasury for a second, it is important that the Treasury looks at these things in a cautious, sober way. From my reading of the letter, which I have only read on Twitter, because it has not been formally published or put out by the Government, it looks like a response to another letter, which presumably extols the benefits of acting on net zero. It is right to raise the issue of there being costs.



An additional point that has not come out in the answers we have given so far as a panel is that this is not public spending. This is a cost to the whole economy. The question of the degree to which you use public spending or other tools to get to net zero, most importantly private investment, is one that policy needs to address. It is for the Government to make those kinds of decisions. If £1 trillion is even slightly accurate, it should not be interpreted as a public spending figure. It is not.

Q31 Antoinette Sandbach: That is very helpful clarification. Thank you. What climate change-related costs would we have to pay, regardless of whether we adopted a net-zero approach?

Chris Stark: It is extremely difficult to put a number on it and we have not tried, because doing so is speculative. It would be an extremely big number, which we do not face just here in the UK, but right around the world. Nick Stern clearly identified that the global economy faces an enormous economic cost in not addressing climate change. The costs of acting on it are much, much less than the costs of inaction.

At this point, it is worth saying that, even if we achieve net zero—and, now that we know it will be enshrined in law, I hope we will—we still face the costs and impacts of climate change. The issue does not go away. That is partly because this is a global issue and partly because many of these impacts are already baked in, especially to things like sea level rise. With the amount of warming we have already had—just over one degree, we think, since industry started in the world—we can expect sea level rise to continue well into the future and, with it, some big shifts and infrastructure challenges. The costs of that are very difficult to determine, but very large indeed.

Q32 Antoinette Sandbach: Tom, as the business representative, do you think the responsibility for assessing the costs and benefits of a net-zero target, including infrastructure needs, should fall to the National Infrastructure Commission, to the Treasury or to a third party?

Tom Thackray: We are agnostic about that assessment. There have been huge benefits from establishing arm's-length bodies, such as the National Infrastructure Commission and the Committee on Climate Change, to provide that robustness and evidence base free from political interference. To give that robustness and confidence to business, having something outside the realm of Government would be business's preference.

Q33 Antoinette Sandbach: Would you be happy to take on that responsibility, Mr Richardson?

James Richardson: Some of these areas are out of our scope, such as agriculture. Within the infrastructure sectors, it is our responsibility to offer the Government strategic advice and a long-term plan. We have done that in the national infrastructure assessment. Because getting to 80% reduction, the old target, still required you to get pretty much to net zero in energy, heat and transport, our recommendations for those three



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sectors have not really changed. We have done a lot of that in the plan. The CCC is here to set the target. We take that target as given, and give Government a plan. To be honest, a lot of this is up to business to deliver and a lot of these businesses are in the private sector.

Q34 Antoinette Sandbach: You agree with Chris Stark that this £1 trillion cost is not a public expenditure figure. A lot of it is for business to deliver, as part of the overall strategy.

James Richardson: As I say, I have not seen how it has been calculated, but it certainly would not all fall to public expenditure. Many of the costs will inevitably fall to consumers, one way or another, but business will deliver falling costs. That is what we have seen with offshore wind and solar, and that is the real opportunity here. We would emphasise the opportunity more than the costs.

Q35 Antoinette Sandbach: Mr Stark, who would you like to have responsibility for assessing the costs and benefits?

Chris Stark: It is for Government, and it is for Government to tell Parliament. It is definitely not for us, to make that clear, although it is important that, when we offer our advice to Government, we are also cognisant of costs and benefits. We try to do that in a transparent, open and objective way, when we do our work. Key to meeting these targets is that they are whole-economy targets. That leaves space for the Government of the day and politics to determine the plans. The choices that Government take need to be transparent, and their costs and benefits need to be determined, published by Government and assessed by us and others on this panel.

Q36 Vernon Coaker: There is a general welcome of the net-zero target announcement today. Do you have an indication of how long the Treasury's net-zero funding review will take or when it is going to start? It is just out there at the moment. Does anybody have an idea about that?

Chris Stark: We recommended that the Treasury undertake a review of how the costs of the transition to net zero should be handled and allocated across the economy. We did that because there are some big distributional impacts here, which need to be managed carefully, so that we do not have a regressive impact on vulnerable consumers and an impact on the competitiveness on British industry. I do not know how long that review will take, but the Treasury should do it very well and thoroughly. It is for them to decide how to undertake that work, but I hope it will cover the distributional impacts of the cost—how you spread it and do that in a fair way—but, crucially, the appropriate levers to manage the transition.

Going back to an earlier point, how will we use levers to drive private investment into the right kinds of things to deliver net zero? Strictly speaking, that is not a distributional or cost question, but more a question of what the most effective lever is and how we can use it. We



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might get into an interesting discussion about the appropriate use of some subsidies in public spending but, crucially, how we use regulatory measures, standard setting, carbon pricing, carbon trading and those sorts of things that, in the long term, drive whole-economy shifts.

Q37 Vernon Coaker: Tom, would you expect to be involved in this funding review?

Tom Thackray: I would at some point when talking about the policies that flow from it. Chris mentioned protecting the competitiveness of industry and vulnerable consumers. These questions should involve businesses and business representatives.

Vernon Coaker: So you would expect to be involved.

Tom Thackray: We would, yes.

Q38 Vernon Coaker: James, what involvement would you expect?

James Richardson: Likewise, we spend a lot of time talking to Government about these issues. To the extent they are infrastructure issues, we would be setting out our views. A lot of this is in the national infrastructure assessment already. Our role, ultimately, is to advise Government, so that is what we will do.

Q39 Vernon Coaker: I will just ask one question that follows on from that. Who would you expect to be involved that the Government might not have thought of? It is a bit left-field, but do you see what I mean? Often with funding reviews, the Government goes to X, Y and Z. For example, how would you involve the public, so they have a better understanding? It was just a thought.

Chris Stark: This is a personal view, because the committee has not said anything in published form about how the review should be undertaken, but I think those forms of citizen engagement are really important to making these reviews work. I hope it is not just an internal piece of work in the Treasury. First, I hope the Treasury does the review. Secondly, I hope it is not just an internal piece of work.

It is an opportunity to open up some of the big strategic questions in a way that allows deeper engagement on them. If this is going to be done well, it needs that level of engagement. I view it as a big economics challenge, and we know the Treasury does these things well. The Treasury commissioned the Stern review 12 years ago, which led to many of the things we are talking about today. I hope the Treasury gives it that big strategic focus, which would allow the kind of engagement you describe.

Q40 Vernon Coaker: How would the Chancellor demonstrate his independence from this review, given the letter he sent about costs?

Chris Stark: An important distinction to make is that I hope the review is not just about the level of costs. If it is, it will be an uninteresting review,



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to my mind. It is important to surface where the costs lie. The most important question is to look at where in the economy they lie, and the big costs still lie in buildings. It is important that this is about not just the quantum of the costs, but how they are allocated and through what means. That is the key thing for the review to look at. There is lots of scope for the Treasury and Chancellor to demonstrate a genuinely independent view of those things.

Q41 Mark Pawsey: I will address my question to Tom first. I want to look backwards, in the first instance, at where infrastructure investment has successfully taken place. Which sectors have done well and which have struggled?

Tom Thackray: As has already been mentioned, offshore wind is a great success story in the UK and an example of where Government policy has been instrumental in driving investment. The reason for that is that we have the electricity market review system, and the CfD that flows from that, which has long-term certainty and five-year review periods built in, so it moves with market conditions. It has enabled businesses and their investors to invest with confidence, and we have seen technology leaps as a result, through the competitive bidding system for contracts, which has brought down the costs of offshore wind significantly.

To reiterate, onshore wind does not have that route to market, so we have seen investment in onshore wind stall as a result. For political reasons, it has been excluded from the same route to market as offshore wind and the same goes for solar. The biggest worries for business are that there have been chops and changes in energy policy that have produced that stagnation in different parts of the energy system. For example, we had a zero-carbon homes policy, which was scrapped and is now being reintroduced. We had the feed-in tariffs system, which was abruptly ended and is now being reintroduced in a new format. Those swift shifts in policy have deterred investors, but we have some good examples as well.

Q42 Mark Pawsey: Are policy issues responsible for deterring some of the less mature technologies, for example tidal, carbon capture and storage, and hydrogen? Why have they stalled? Why have they not had the same impetus from investors that we have seen in other sectors?

Tom Thackray: It is about finding the route to market, which has not been quite so obvious. They are early-stage technologies, so the kind of funding and leverage they need from Government is at a different level from some of those other technologies.

Q43 Mark Pawsey: James, has the return to investors been inadequate to bring people into some of these emerging sectors?

James Richardson: It is a bit more complicated than that with emerging sectors. The first question, as always, is whether there is a funding source. Lots of projects fail simply because there is no way of paying them back.



Mark Pawsey: If the rate of return is there, there will always be.

James Richardson: The question is whether there is a source of funding to pay the rate of return. There will always be financing, but is there funding? Often, the problem appears to be one of financing, but is actually one of funding. Nobody is willing to pay for the scheme. Unless you can get past that you are nowhere. The complicated bit is distinguishing where that is a useful signal versus just a problem that needs to be fixed. Sometimes there is no funding stream because the market is telling you this is not a very good technology. Our view is that tidal is probably too expensive. It is probably not coming forward simply because renewables are cheaper, even once you cover the balancing costs.

Q44 **Mark Pawsey:** Is that what people were saying about wind 20 years ago?

James Richardson: With tidal, the challenge is that you do not have the opportunity for mass-production gains. It is a strictly limited resource; it is large-scale construction. The technologies are not particularly immature. We have been building sea walls for well over 100 years and turbines similarly. There is nothing particularly novel in tidal that allows the kinds of transformational changes you have seen in offshore wind and solar. We think it should have a chance to bid for contracts for difference—do not get me wrong—but it is not likely to be the winner.

Sometimes the problem is a route to market for things that have opportunities. That is why things like contracts for difference are so important, because they create a certainty around funding that is otherwise unavailable. We think that is needed for things like electric vehicle charge points. The market is not going to deliver them in rural areas. It will in London, Manchester or Birmingham, but not in other parts of the country. You need to secure that and we think there is a role for Government. You have to distinguish: sometimes the market is telling you, "There is a better option here". You need to understand which is which.

Q45 **Mark Pawsey:** I know one of my colleagues will pick up what changes need to take place to encourage these things, but I want to ask a final question to Tom. It took Chris to utter words about the competitiveness of British industry when, Tom, you represent British industry, many of which are big users of energy, such as steel, ceramics and cement manufacturing. You have given an enormous welcome to the net-zero objectives of the Government. Is there not a danger, and do you not have any concerns at all that the UK, by acting unilaterally, might put some of our manufacturers at a disadvantage to their international competitors?

Tom Thackray: There is a concern and we are alive to it. We hope that the UK, by taking a leadership position, is also using diplomatic efforts to make sure that more countries are coming on board. There are things we



can do around policy to support these sectors more. The situation with the current carbon price and way we use the emissions trading scheme as it refers to energy-intensive industries puts them at a competitive advantage relative to those globally. There are things we can do outside of policy, which are already within our gift and would support these sectors more.

Q46 Mark Pawsey: Is your organisation arguing that case with sufficient vigour to defend British manufacturing and jobs?

Tom Thackray: I hope so. That is certainly our intention. We are making that case through our engagement in Brussels and our offices throughout the world. We think it is important to establish the net-zero target in legislation, as an important signalling post, and make sure that other countries come on board, but we also need to make sure that the competitiveness of industry is protected.

Q47 Albert Owen: Can I come back to what James said? He did not quite answer the question Mark put to him, in that, 20 years ago, people were saying that offshore wind was too difficult and expensive. Many of those people are now saying that it is the flagship of the British energy sector. The same must apply to tidal and other forms of energy. Yes, it is not novel to use the tide, but it is not novel to use wind either. There were windmills in my area over 400 years ago, as part of industry. They were not making electricity by the way, but making grain for bread. That is a serious point: there is no technology or source of energy that has been successful in this country without huge subsidies. Gas had 100% subsidies to make it viable at the beginning, so surely the Government have a responsibility to look at some of these less mature technologies, help them and give them a kick-start.

James Richardson: I apologise that I did not answer the question. I split it in two. We agree that we need the traditional role of the so-called pot two, in the contracts-for-difference system.

Albert Owen: Maybe it is the contracts-for-difference system that does not work, because wind subsidies were before that.

James Richardson: You are right that some were signed before the CfD system came through, but it is the CfD system that pulled through the mass reductions in wind price. The way it was originally set up was with pot one for mature technologies and pot two for novel technologies. That is a sensible way of doing it, but pot one was closed and pot two has been dominated by offshore wind, which is now becoming a mature technology. We said, "Move offshore wind into pot one and make that most of it, but have pot two available for whatever the next new technology is". There may be another technology out there, which could be floating offshore wind, for example, or anything else that comes through.



You have to draw a distinction between technologies that essentially involve large-scale manufacturing processes, such as solar, and those that are large-scale construction. We have not historically seen big cost savings in large-scale construction. Look at tunnels or bridges; you do not see these things falling by 50% or 60%.

Albert Owen: You do not under the current modelling, but there may be a new model.

James Richardson: We have been building these things for hundreds of years. You do not see it with nuclear and we have been building nuclear plants for 60 years. It is inherent in the nature of the technological process that not every technology goes through the same cost curve. There are plenty of technologies out there that have relatively flat cost curves, although you always get a benefit between the first and the second. There are plenty of technologies out there with really quite flat cost curves, and there are others where you see big economies of scale, which is what has happened with offshore wind. It is essentially economies of scale. Turbines have got bigger and we manufacture more of them.

It is difficult to do that with tidal, because you cannot install a tidal power station in one day, as you can with turbines. It is predominantly construction, and construction of an already quite mature technology, so you are not doing something that is novel. I agree the windmill is not a new technology, but offshore wind only bears a passing resemblance to a windmill that produces bread, it is fair to say.

Albert Owen: I want to say on record that that was a disappointing answer.

James Richardson: It may be disappointing, but those are the facts.

Q48 **Stephen Kerr:** I want to build on what Albert Owen and Mark Pawsey have been talking about, the conditions that need to exist to attract investment into energy infrastructure, in general, and specifically the difference between mature and immature. We have begun that discussion. What changes do we need to see happen to deliver that investment?

Tom Thackray: Are you talking particularly about immature technologies?

Stephen Kerr: If you want to divide them into the two buckets that James was talking about earlier, please do.

Tom Thackray: Making sure the right categories of technology are in the right pots for the contracts for difference is an important first step. If you are talking about very immature technologies, you will need R&D investments to make them market-ready propositions. We have always said that the balance of R&D investment in the UK is weighted too much towards early-stage research, rather than bringing those ideas to the



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market and putting them through funds that agencies such as Innovate UK are responsible for leading. We would support weighting more of that funding to pull them into the market.

Stephen Kerr: Is there anything else?

Tom Thackray: No, not for the immature technologies. For mature technologies, it is about taking the politics off the table, particularly for onshore wind, making sure it has a route to market and, as I said in my earlier answer, providing a funding model for new nuclear through the regulated asset base.

Q49 **Stephen Kerr:** Can you be more explicit about taking the politics off the table? Let me understand what that really means.

Tom Thackray: There was a Conservative Party manifesto commitment that no new nuclear would be taken forward. As a result, it has been excluded from the contracts-for-difference process. Onshore wind is not able to bid through that process. You can still produce developments outside of the contracts-for-difference process, but it is more difficult to get finance because of the irregularity of returns.

Q50 **Stephen Kerr:** Are there any other political considerations?

Tom Thackray: I mentioned earlier the stability of policy frameworks and making sure things do not chop and change. CfD has been successful because it has a five-year in-built review process.

Stephen Kerr: It is medium-to-long-term policy.

James Richardson: I would echo most of those points. Long-term stability is crucial. Part to the reason we exist is to try to bring more of that. Taking pot two for CfDs back to its original purpose, bringing in onshore and solar, and that route to market, is crucial. I would add that, if the UK loses access to the European Investment Bank, we should have a UK equivalent. The EIB and the GIB played an important role somewhat later in the process that Tom was describing, at the point when technologies are relatively mature, but the financial markets are still uncertain about them. There is a big fixed cost from being the first person to invest in them. You have to do a lot of due diligence, which all your rivals will free ride off. Bodies like the EIB can put on that stamp of approval and do that due diligence, to pull those technologies through.

Q51 **Stephen Kerr:** It is surprising to me that we have come this far into the evidence session before the idea of a national infrastructure or investment bank has been raised. Where is the resistance to this idea? It seems so sensible to me.

Tom Thackray: It needs to be well targeted. Technologies that are mature enough to be financed through the private sector should be.

Stephen Kerr: What if it is genuinely additive?



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Tom Thackray: It can be, if set up in the right way. EIB has some good examples of that, and the Green Investment Bank did also. We support what the National Infrastructure Commission is saying.

Q52 **Stephen Kerr:** Would you support that as well?

James Richardson: Yes. We have made a recommendation on this. Since the EIB provides this, if we lose access to the EIB, that will be important. As Tom said, it is about that additive thing. It is relatively limited but really important because, if you do not bring those technologies through, it is very hard for a private company to justify being the first investor in something so uncertain.

Q53 **Stephen Kerr:** What feedback have you had from the Treasury to the idea of a national infrastructure bank?

James Richardson: To be fair, they have met the first part of our recommendation. We said they should launch a consultation in early 2019, and they have launched the infrastructure finance review to consult on this. We wrote in to restate our position on that. That is a small tick: they have launched a consultation, but we wait to hear the outcome of that. Hopefully it will form part of the national infrastructure strategy. They are at least engaging with it.

Q54 **Peter Kyle:** James, I have been interested in listening to you talk about the investment differences and challenges between construction and manufacturing approaches in terms of long-term pricing. I have not considered that before. Where do small nuclear modular reactors fit into that? They were talked about a lot a couple of years ago, but it has gone quiet and nobody seems to be talking about them any more.

James Richardson: The hopes of the nuclear industry are that, with small modular reactors, they become more like manufacturing. They are trying to make them as standard as possible, but you would have to have some caution about those hopes, partly because we have consecutively heard from the nuclear industry, right back to the 1950s, that the next technology will be the one where costs keep falling and that has not been the experience. There is still quite a lot of construction involved in a small modular reactor. It is not that small and not that modular, in truth. It is about the size of the original Magnox reactor, sort of the size of Wembley stadium.

Peter Kyle: Compare it to Hinkley, though.

James Richardson: It is a lot smaller than Hinkley, but it is still a big complicated piece of engineering that has to sit on the ground somewhere and be immune from seismic shocks. The industry is trying to make it more modular, but you would not bank on it succeeding, at this stage. The interesting question is that it will take 10 to 15 years for these things to exist. They do not really exist, at the moment. Submarines have small reactors, but they do not exist as a civilian proposition. By that time, it may well be the solution to a problem we do not have, if



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renewables and flexibility have come through. If they have not, it may be quite useful. We think you cannot make big decisions on it now. You may want to do the R&D side, but you would not want to rely on it.

Q55 Peter Kyle: To Chris and James, there is a crowded field out there, from Treasury to Ofgem to BEIS to your respective organisations. Are you co-ordinating? Do you feel co-ordinated? Are you singing from one hymn sheet on the big issues?

Chris Stark: I think we are. I will not speak for James, but I think the Committee on Climate Change and the National Infrastructure Commission are pretty well co-ordinated. Interestingly, we have been doing a job of looking at infrastructure provision over the next 30 years independently and coming up with similar answers. That tells you that, through independent routes, you get to similar conclusions. That is a good part of the UK institutional framework overall, because the Government, who in the end have to make some big decisions about this, are getting a good, strong independent voice from two sources, telling them similar things. In that regard, we are well co-ordinated.

When it comes to questions of infrastructure provision directly, it is right that the Committee on Climate Change takes a step back, because our principal job is to be advisory and to look at the carbon impacts. We have a view on what sort of plan would be cost-effective to get to net zero. I hope that is useful to James in the work he does. I hope that, in the future, that will be the basis for even more co-operation. We stand behind this work. It is very important that it is done by the National Infrastructure Commission.

Q56 Peter Kyle: There will be an overlap in the experts that you are consulting and forming your opinions from but, individually, you will also have access to thinking that is unique to your organisations, and the pedigree and culture from which that thinking emerges. Are there formal links between your organisations and Government organisations as well, James?

James Richardson: There are no formal links, but we have worked closely. Chris came to our commission quite recently and we seconded a member of staff over to the CCC to do net zero. As Chris said, we work very well together and there is also some benefit from the fact that we are both providing advice. Yes, we are working together and often talking to the same experts, but these are two sources of independent advice saying very, very similar things. There is strength in that.

Q57 Peter Kyle: How does it look through your eyes, Tom, when you have these semi-non-governmental organisations and the Government ones as well: Treasury, BEIS and Ofgem, the regulator?

Tom Thackray: I said in an earlier answer that the independence of the National Infrastructure Commission and the Committee on Climate Change has been welcomed by business. The critical point is how Government react to the advice they get from them. If they have just



been set up to offer their opinion, which then is not followed, that will be quite damaging in the eyes of business. There is a question on the regulatory side about whether our current economic regulation system will be fit for purpose for the integrated nature of the whole-systems approach in energy. Look at how transport is regulated relative to energy, with different objectives and procedures in those regulators.

Q58 Peter Kyle: Has there been any instance where you have had conflicting advice from different bodies, as a business organisation? Have you had to pick and choose?

Tom Thackray: An example is that Ofgem's statutory requirements do not currently have a need to consider decarbonisation in its decision-making process. That has led to some quite odd decisions over the last few years. The way things are going policy-wise, that seems like a gap that should be addressed.

Q59 Peter Kyle: James, what led to the future of regulation study? What was the driver behind it? Are you looking at the effectiveness of regulators?

James Richardson: We are looking at the effectiveness of the regulatory system. It is not just about individuals. This is a study commissioned from us by the Government, and part of our role is to look in depth at the issues the Government ask us to, which is why we are doing that work. The backdrop to it, as Tom said, is that there are well-understood challenges. It is interesting that, when we created the regulatory system, we were largely looking at regulating static networks that already existed and were not undergoing big changes. We now see, in energy, telecoms and a bit in water, though not quite so much, really big changes to the nature of the networks and the challenges they face. The regulatory system has not been set in stone in the meantime, over 30 years, but it was set up for one purpose. The question is whether it is right for these new, quite different challenges that the networks now face. As Tom said, there is no clear requirement on Ofgem around carbon targets, for example. That arguably does not make sense in a world of net zero.

Q60 Drew Hendry: James, you said earlier that, in the 2020s, we need to push ahead with renewables. I think that was agreed by everyone on the panel. There have been a couple of slight mentions of solar, but we never really got into it. How important will onshore wind and solar be during that 2020s push? What would you want Government to do differently to support them, if they are going to be important?

James Richardson: We think they are very important. We have set a target of 50% renewables by 2030. You might want to be more ambitious than that and say at least 50%. The offshore wind sector deal says 30% offshore wind. I think offshore wind could probably do more than that but, if you take that number, it gives you 20% onshore wind and solar. That gives you a rough magnitude. There is some already, but that would be a significant increase. The issue here is that onshore wind and solar



are the cheapest technologies, so why would you want to exclude them? Why would you want to make electricity in the UK more expensive than it needs to be? As somebody said earlier, this feeds into our whole economy, so you are undermining the competitiveness of the British economy and adding costs to households if you make energy more expensive.

There are also complementarities. Solar is only going to work on some days of the year. We are not Nevada. But it is typically sunnier when the wind is calmer, so there is a real benefit in having both of these in reducing variability costs. In the same way, onshore wind allows you to access different parts of the weather. The correlation of wind speeds at long distances across Great Britain is low, which is a benefit because, if it is calm somewhere, it is windy somewhere else. Onshore allows you to access a different part of the weather system and reduce that variability. There are real system advantages as well as the cost. The key issue here, which we come back to, is the route to market through contracts for difference. These technologies are available, and people will happily invest in them if they know they can get a return, and CfD does that.

Chris Stark: That was beautifully put by James. I agree with all that. I will look again at the long-term plan. It is important to front-load electrification and do as much as you can in the short term. It is essential that that happens, because it opens up options in the future. There are several ways to get to net zero but the more we are electrified as an economy, the more relaxed I am about our ability to get to the goal in the end. In the short term, we know there are fully consented onshore projects that are ready to enter the market. We lack a pot-one CfD auction and, crucially, that auction can discover a price. My strong suspicion is that some of those projects have been ready to go for so long that the price we discover, if an auction is held, would be very, very low indeed. That is a benefit to the consumer. We should do as much of this as we can in the short term. Those projects that are ready to go are typically onshore projects, and I know we can do more of them.

In the long term, the scale of production required to reach net zero means we will not be able to do it all onshore. It is the volume we can produce offshore that matters. The current commitment by the Government is to have 30 gigawatts of offshore wind by 2030. That is just about on the path to get to where we need to be by 2050, which is 75 gigawatts of offshore wind. At those kinds of scales, onshore wind is a small part of the overall pot. I see the value of onshore wind as something you can do quickly, so that you open up those options in the future. Therefore, we should do it as quickly as possible and release that in the market.

Tom Thackray: I cannot add too much to that. As well as the generation benefits from decarbonisation, there are huge economic benefits in the supply chain from bringing onshore back as a viable proposition. That has been hollowed out in recent years while there has not been a route to



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market, but we have the expertise, assets and weather that make it a viable proposition, so it seems foolish not to exploit that fully.

Chair: Thank you very much, all three of you, for coming to give evidence to the Committee this morning. I am sure we will see more of you in the future, as we look more at these areas and the additional measures that need to be taken to meet the new targets that the Government are setting out today. Thank you very much.