HOUSE OF COMMONS

Business, Energy and Industrial Strategy Committee

Oral evidence: Dieter Helm's Independent Review on the Cost of Energy, HC 738

Tuesday 16 January 2018

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Watch the meeting

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

Questions 1 - 106

Witnesses

I: Emma Pinchbeck, Executive Director, RenewableUK; Professor Jim Skea, Member, Committee on Climate Change; Nigel Turvey, Chair, ENA Open Networks Project, Energy Networks Association; Professor Jim Watson, Director, UK Energy Research Centre.

II: Professor Dieter Helm CBE.

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Examination of Witnesses

Witnesses: Emma Pinchbeck, Professor Jim Skea, Nigel Turvey and Professor Jim Watson.

Q1 **Chair:** Thank you very much, all four of you, for coming to give evidence today to our Select Committee on Professor Helm's review on energy costs. We have a number of questions, and only a short amount of time with you before Professor Helm comes in to give evidence, so we want to make the most of this time. If you could answer questions succinctly, we will try to ask questions succinctly as well. Can I just start by asking you how successful you think the review is, in reporting and making recommendations on how security of supply and decarbonisation can both be met at a minimum cost?

Emma Pinchbeck: Good morning. The review is an interesting footnote to a wider debate that is happening on energy policy, particularly with the industrial strategy and the clean growth strategy. We need to take the review in that wider context. You talk about energy as a public and industrial good and, while the review is very interesting at the level of costs of energy and prices, it often does not engage fully with a wider industrial argument. I am hoping that we can come back to talk about that in the rest of the debate.

Q2 **Chair:** Are there aspects of the review that you would specifically like to see adopted, and are there things that you are concerned about in the review?

Nigel Turvey: In terms of the actual review, from a networks viewpoint, we are already working on many of the changes that he is suggesting at the present time. That is why I am here as the chair of the Open Networks Project, which is looking particularly at the issues of how we look at the whole system across the electricity network, the interface with customers and that transition to distribution system operator.

What concerns me a bit about the report is the degree of structural change that he is suggesting. We are already undertaking change without that structural change. My concern is that the degree of change that he is looking at would result in uncertainty and delays, and if anything would delay us delivering the smart systems that we need to.

Q3 **Chair:** Are there things in the report that you do want to see implemented?

Nigel Turvey: He highlights the challenges that we have, and, as I say, a lot of the things that we are doing are already heading towards addressing those challenges. Developing markets for flexibility, to ensure we look at asset solutions and flexible solutions on a level playing field, is at the core of the work we are doing in the Open Networks Project. We are looking to develop those markets and take that area forward.

Professor Watson: What I liked about it was that he recognises the challenge, and the fact that things are changing fast. Many of the old certainties that drove our understanding of costs and the way the system is going are starting to change: barriers between what is a monopoly and what is competitive, for example. I like that overall framing, and it goes across the whole system.

Overall, our comment was that, although it is a very long report, and it is very closely argued, its argument is from theoretical first principles, and it does not really engage very much with the evidence base out there on what works and does not work, not just in the UK, but internationally, in key areas like innovation. You end up with all sorts of recommendations popping out from that first-principles argument, but without thinking about where this has been tried, the difference between that and what we have and what the impact might be. I do not think there was enough engagement with the evidence base.

Q4 **Chair:** Can you give us a practical example of what you are talking about?

Professor Watson: Yes. In the area of innovation, which we have been quite strongly critical of, he loses his way. He says that innovation is happening, which is absolutely right; it is changing the system, which is absolutely right. But then he draws the wrong conclusion from the evidence base around the world about what has driven innovation and cost reductions in technologies like solar, wind and storage, which has often been very specific policies and strategies by many countries around the world that have delivered benefits for UK consumers.

He puts all that to one side and says, "Well, ideally, we should go to a carbon price", which is what the textbook says you should do, but it ignores the fact that there is this vast evidence base, and the experience of the UK, about what has worked. It does not consider how you build on those kinds of mechanisms to make the next tranche of gains.

Emma Pinchbeck: That is the point about not recognising the wider industrial benefit that you get from a more interventionist approach in the market than just letting the market, from first principles, do its own thing. The offshore wind prices that everyone was talking about last year in the auction are recognised, but what is not recognised in this report is the more than £18 billion of investment into regional businesses that you get from that. His case, for example, on the CfD talks mainly about low strike prices or low energy prices, but misses the wider economic and industrial benefit you get from having a targeted mechanism for new technologies.

Q5 **Chair:** Professor Watson and Emma Pinchbeck, I think you are saying that Government involvement as a technology emerges is important. I do not want to put words into your mouth, but is that what you are saying, Professor Watson?

Professor Watson: Yes. On the international evidence base, there have been some really good papers out recently that have looked at particularly the role of finance in innovation, and how finance has been used—publicly mobilised, but also privately—at different stages of the innovation process, from R&D to demonstration and helping to bring down those costs through deployment.

It is quite a complex story, so if you do not like complexity it is probably a bit befuddling, but frankly that is the reality of the way these things happen, the way we have made progress and the way that the UK has made progress. One of the things that we found odd was that, in offshore wind, the UK has used exactly that strategy over time to bring the offshore wind industry and the technology to where it is. It has had a huge impact, globally, on the market, in contrast to other technologies, yet that experience is just not said to be important. At least, that is the implication.

Professor Skea: From the committee's point of view, there are many things we like about the report. We like the focus on cost-effectiveness and economic efficiency, which is part of our remit. We like the way that it flags the importance of electricity alongside other sectors of the economy, which is a point we make regularly in our annual reports to Parliament, and we like the emphasis on technical change.

One thing that strikes me is that some of the elements of the proposals are really quite radical. If you think of the big changes that we went through with things like electricity market reform, it is not a process that can just be done through one simple review or report. A lengthy stakeholder consultation is needed to tease out some of the unintended consequences that might come through.

From that point of view, we really welcome the report in the sense of kicking off a debate about where we might be in the future when renewable and low-carbon electricity gets to the point that it can wash its face in the market, in terms of how you organise the market there. It is a really good advance. The one regret we have is that it talked very much about prices, rather than bills overall, and perhaps did not pick up the energy efficiency elements, which is something, again, that we would emphasise in the annual reports to Parliament.

Q6 **Chair:** How well do the review's proposals marry up with those in the clean growth strategy?

Professor Skea: My worry about it is that, if you look at any country that has made progress in international markets and getting its technologies on to global markets, in some sense it has had to bite the bullet, choose a winner and go for it. We can think about wind energy with Vestas in Denmark, and other examples come up. I feel there is a bit of a tension there between the ambition to put the UK on a global market, and a focus on pure cost reduction and economic efficiency from

the consumer perspective. That is one of the things that would need to be teased out a bit as we have further debate about the proposals.

Q7 **Albert Owen:** Good morning. What do you think of Professor Helm's assertion that energy policy has reached "mind-numbing complexity", and that the current energy policy framework is not fit for purpose? I will start with you, Professor Watson, because you seem to think that complexity is great.

Professor Watson: I do not necessarily think it is great, but I do not think it is bad either. If you read it closely, Helm does not say that it is necessarily bad. He diagnoses the problem but misses the opportunity for a more nuanced analysis of what you might do about it. He lists a set of policies and says, "Oh, look, there are a load of policies here; therefore, it is complicated".

Q8 **Albert Owen:** Are you in agreement that the UK energy policy needs reform?

Professor Watson: In some places, of course, because the world changes and so you need to reform.

Q9 **Albert Owen:** Do you agree that it needs to be simplified, as well?

Professor Watson: No, not necessarily. You have multiple objectives here.

Q10 **Albert Owen:** Really?

Professor Watson: You have multiple objectives. You have security, carbon, cost, health and poverty.

Q11 **Albert Owen:** We understand that, but we represent our constituents, and the people of the UK want, I think, three or four things. They want energy security, which the Government say they want to deliver; they want low carbon now, and they want low costs. That is pretty simple, is it not? Should we not be aiming for that, rather than having dialogue and discussion and making it more complex?

Professor Watson: Even if you take one of those, security, that is a multi-dimensional phenomenon. You need a policy to make sure you have enough capacity for supply to meet demand for electricity but, if you are thinking about oil security or gas security, etc., that is an entirely different set of policies. It is not that I say you should just stay with what we have, but just saying "It is complex and should be simple" is a bit glib. There are ways—and Government is doing lots of thinking about this—to look at the policies you have and make sure they are coherent. That is absolutely right, and I am sure there is more we could do there.

Q12 **Albert Owen:** I am not saying that, obviously; Professor Helm is, and I am just provoking you to give a response. I have just hosted a breakfast meeting with experts and parliamentarians on delivering clean energy for the future, and it was very interesting, but much of that discussion I had

10 or 15 years ago. We are still having the same complex discussions. If I am defending Professor Helm, it is to say that we need now to move into the delivery stage, as opposed to having a complex discussion. Do you agree with that?

Professor Watson: The caveat to that is that we are not in the same place as we were 15 years ago. I absolutely agree; as a professor of energy policy, we have been talking about this ever since I started in the business. But, compared to 15 years ago, the energy system has changed hugely. We have made huge investments. We have made huge progress in terms of CO_2 emissions, reductions and so on, so it is not like we have stood still and just been talking about it.

Q13 **Albert Owen:** Sure, but are industry, small business and the home consumer benefiting from that?

Professor Watson: I think they are, yes. If you look, for example, at the evidence on bills for domestic consumers, the fact that we have policy costs on those bills has been offset, largely, for most people, by gains in energy efficiency. That is not an artefact of one policy; it is an artefact of a combination of policies.

Q14 **Albert Owen:** Can I ask others, please: does the policy need to be simplified?

Emma Pinchbeck: I agree with Jim, in that energy is complex and policy is therefore complex, because we are trying to deliver multiple objectives. So long as it is simple for the consumer and we are delivering very clear Government targets, I do not think there is an issue with a complex system underneath.

To take one example, the smart system and the speed of technology change is making energy more and more complicated, with more providers, more services and more technologies in the system. The reality is that that very complex infrastructure is expected to deliver to consumers something like £8 billion-worth of savings every year by 2030, so there is a consumer benefit sometimes from complexity.

Actually, if you look at policy and where Government could help, it is in taking more decisions and possibly intervening quicker. I agree with you that there is a lot of debate and it is sometimes slow-moving. Energy policy today needs some immediate decisions, particularly around CfD. We could decide, for example, that as onshore wind is now the cheapest form of generation we have in the UK, we could back the Government in taking another look at it and start running an auction. We could clarify how that £557 million of funding for pot 2 CfD auctions is going to be spent and when, and that will help the supply chain to gear up. We could crack on with the work that Jim and Nigel have mentioned on the smart system. That stuff we could do right now.

Albert Owen: Some of that might come up later.

Nigel Turvey: From a network perspective, the issue he raises concerns about is the RIIO framework. Our perspective on the RIIO framework is that the whole regulatory framework has delivered higher levels of performance on the network, right the way through from privatisation; it has reduced costs; it has increased investment in networks; it has produced a whole series of innovation activity, funded via that price control process; and it has proved very flexible in terms of quite rapid changes we have seen recently. In recent times, we have seen a very large growth in distributed generation, which was not forecast at the time those price controls were set.

Q15 **Albert Owen:** Is it too complicated, and do we need to simplify?

Nigel Turvey: No, I do not think it is. It is showing that it is flexible enough to account for a lot of change that is going on at the present time.

Q16 **Albert Owen:** Professor, in your earlier response, you said we need to pick winners. Does that simplify this process?

Professor Skea: If you were to choose a single winner, it would. Specifically, on the simplicity and complexity point, it is not a binary divide. This is a spectrum here. The committee is quite sympathetic to the idea of simplification where it is possible: as simple as you can be, but as complex as you need to be.

I would agree with my colleagues on the panel that, from the consumer point of view, simplicity is really important. The committee recommends, for example, merging policy on renewable heat and efficiency, because it is a simpler sell for the consumer. But there are some irreducible elements of complexity in the system that we have, and we are seeing clever people come through who can manage that complexity. We have a new kind of business with energy aggregators, which can bundle together the different services that you can sell to the system.

Q17 **Albert Owen:** I do not want to just talk about the big five or big six, but are the incumbents reluctant to change, because of the desire to protect their own interests, and making it difficult for these people to come out with new ideas?

Professor Skea: It depends. They may well try to resist it; they may also try to buy the businesses, recognising that there is money to be made from being in energy aggregation. That is a possibility as well. The market is genuinely changing; technical change is moving it on. The incumbents and others will have to adapt to that.

Q18 **Mark Pawsey:** Can I follow Mr Owen's remarks about what is important to our constituents? Helm talks about the cost of energy. He argues that the cost of energy is significantly higher than it should be, because gas prices and renewable prices have fallen. Do you agree with him that electricity costs are higher than they need to be, and that they should be falling, rather than increasing, which is what we have seen in recent

years?

Professor Skea: With 20/20 hindsight, you can always say that costs could have been lower. In the case of procuring the contracts for renewable energy, the movement from negotiated contracts to auctions has been very helpful.

As you look at it in a rear-view mirror, you can quite clearly see that, for some of the negotiated contracts, we perhaps paid more than we needed to. That is probably unarguable. If you look at the question of gas prices, gas prices went up between 2009 and 2013 before coming down again. Forecasting energy prices is a very fraught activity, which is why most people who are involved with it deliberately do not forecast, and put together different scenarios to cover themselves against different kinds of contingencies.

Q19 **Mark Pawsey:** Government does have to forecast, does it not? It often gets it very badly wrong, and Helm refers to "spectacularly bad outcomes". Should we be able to predict those things more accurately?

Professor Skea: Could I suggest that my colleague Jim Watson covers this? He is on the advisory group to BEIS on fossil prices.

Professor Watson: Yes, I should declare an interest. I am a member of the fossil fuel price assumptions advisory group.

Q20 **Mark Pawsey:** Why is it so difficult?

Professor Watson: It is difficult because of the global nature of the way that prices are set, whether oil, gas or coal. My main response to this is that Government does not predict prices. Helm, I do not know why, wilfully misunderstood the way that Government operates here. Every year, Government publishes a set of price assumptions that cover quite a wide range from low to high to medium, using a methodology, and updates those every year. Then it uses those to stress-test policies.

He is right that, five or six years ago, there was an assumption that prices were high and were going to stay high, and that was wrong. Where he then falls down is criticising Government for somehow clinging to that, rather than recognising that this is what it does. It would have been useful had he made some constructive comments about the methodology and the range of prices that Government used, and whether that was fit for purpose. That would have been incredibly helpful, but he did not do that.

Emma Pinchbeck: I would like to pick up on the idea that we often forecast things wrong, on a positive note, in that we have often failed to forecast accurately the speed with which renewables' cost can fall. Offshore wind last year delivered a price of £57.50 in the auction, but in January it met its cost reduction target with Government to break £100 per megawatt-hour four years early. Those two statistics tell you how quickly the pace of technological development is moving. Of course, that

makes it often very difficult to predict. I would not want to put an accurate price on where the market is going to go next, but I would bet my house on renewables being cheap.

I went on Philip Hammond's delegation to India to talk about exports, and I had a fascinating conversation with the Ministers there. They simply said, "What is the cheapest form of large-scale generation?" In India, that is solar UV and onshore wind. They went, "Right, we will do that then". Sometimes, we lose ourselves in debating and spreadsheets, rather than looking at the obvious. At the moment, it is clear to all of us on this panel that, if you want lower consumer bills, jobs for your constituents, a strong industrial policy and economic productivity, you bet your house on renewables. By 2030, a renewables-led system that is flexible will be the cheapest way that we can provide electricity in this country.

Q21 **Mark Pawsey:** Is there an imperative on Government to do more, to be able to forecast more accurately? Do you think that that is achievable, or should we just say, "Well, we are never going to be able to do that. We need to work around the fact that we cannot predict where costs will be in five years' time", to take a ridiculous example?

Professor Watson: It is more a matter of risk management than accurately forecasting, because, as we have seen over many, many years, forecasting prices is a mug's game. Futures markets only go out to about 18 months; beyond that, you are really stuck with other things, looking at fundamentals of supply and demand.

Q22 **Mark Pawsey:** Would any of you be able to suggest what this inability to forecast might do for the UK's plans for security of supply and decarbonisation? If we cannot predict beyond 18 months, how are we going to manage these processes of change?

Professor Watson: For me, the main thing to do is, when you have a plan and policies, you stress-test them against the different price scenarios, so you have contingencies. The mistake that was made five years ago—and Helm rightly points to this—is that there was an assumption of a certain trajectory of gas prices, and that fed through into an impact assessment of what impact things would have on consumer bills, rather than saying, "Well, actually, it could have gone here; it could have gone here. Here is the range of possibilities, and here is what we are going to do to mitigate some of the more negative outcomes, if they arise".

Q23 **Mark Pawsey:** Mr Turvey, what can we do?

Nigel Turvey: From a network perspective, we have seen a great deal of uncertainty in the growth, particularly, of distributed generation. We are expecting uncertainty in the growth of demand associated with electric vehicles, and potentially a degree of movement towards heat from electricity. It is partly in response to that that we want to develop flexibility. This is giving us options that do not embed investments for the next 40 years. Developing flexibility gives us that ability to see what

happens and use that flexibility to respond in the short term, while we actually make the right decisions for longer-term asset investments. That is partly why we are looking for that.

Emma Pinchbeck: In, I think, Dick Cheney's phrase, there are some known unknowns that we can plan ahead for, and one of those is the potential capacity gap. You can look at where we know there will be fleet retiring in the 2020s. We also know, therefore, that we need to have new procurement auctions 10 years before that gap emerges, so we can build infrastructure in time, and we know that part of that is going to be met by 3.6 GW of new nuclear, but not all, so there are some problems that we know that we have to address.

As Jim and others have said, there are a variety of approaches to solving that, and we can look at all of them. That is when the price conversation comes in, because you could do the cheapest or best-value thing at that point. I would start with the known issues and then work back to the unknown bits.

Q24 **Mark Pawsey:** Sticking with decarbonisation, Helm asserts that a carbon price linked to our carbon targets would be the most efficient way of cutting UK emissions. Professor Skea, do you agree with that?

Professor Skea: Yes. The committee is really keen that there be a carbon price, because there are some kinds of emission responses that cannot be achieved without it. Carbon capture and storage would be the immediate one; unless you have a carbon price, it cannot happen. In other sectors of the economy, other mechanisms may well be the most efficient way of moving forwards.

In principle, a carbon price is a good thing, but there are many different mechanisms by which it can be transmitted. You can do it through a tax; you can do it through a price and emissions trading scheme; or you can embed it in things like power purchase agreements or implicitly in the contracts for difference. They all have implications for the responses that people will make in the market. The advantage of doing it in power purchase agreements or contracts for difference is that it will lower the cost of capital for people who are investing in the low-carbon projects. That is the main argument for doing it in that way.

Q25 **Mark Pawsey:** Helm suggests two ways of having a universal carbon price, which are the generalisation of fuel duty to all fossil fuels and a carbon price across the entire economy. Which of those two frameworks do you consider to be the best for the UK?

Professor Skea: We would probably regard that binary divide as being quite theoretical. The world is probably much more complex than that. If you take energy markets and look at, say, fiscal interventions, they are not just there to deal with climate change. If we take fuel duty, it can cover congestion, air quality and climate change in a simple revenue-raising device for the Treasury. We need to take account of that

complexity. It is very difficult to answer that question in a straightforward way.

If you were to introduce an upstream tax—say, a carbon tax on natural gas that was used by consumers in their household—the response would be extremely muted. It would just be seen as a price increase. You need to think of other ways of promoting energy efficiency that will gain greater levels of public acceptability. It is not as simple as that.

Q26 **Mark Pawsey:** Would those frameworks enable us to continue to participate in the EU Emissions Trading Scheme?

Professor Skea: We have a carbon price floor at the moment that is combined with the Emissions Trading Scheme. I have to say that the committee has not thought its way through that. A priori, I cannot see any reason why it would not be compatible.

Q27 **Antoinette Sandbach:** I want to ask you about the role that targeted support for renewables has played in the UK in price reductions, and particularly FITs and CfDs. I wonder, Professor Skea, what you would say about that.

Professor Skea: We think it has been rather significant. If you look to the auction results on the offshore wind, the cost reduction that we have seen coming through the auction process is truly extraordinary. Testing this in the market through the auctions has been really important, and it has revealed the opportunities that are available.

Q28 **Antoinette Sandbach:** The criticism is that this has been very inefficient, and that it has cost the consumer money. Do you agree with that?

Professor Watson: As the other Jim on the panel said, in the early stages of CfDs, where you had administered prices, you could look in hindsight and say, "Those contracts were too expensive". Costs have fallen, partly because of international technical change, but partly because of that auction mechanism, as Professor Skea says. Yes, you can make that criticism now, but it was hard to think that through at the time. The fact that you have auctions not just in the UK, but in many countries around the world, delivering low prices gives me a very strong confidence in that type of mechanism as a way of driving innovation and cost reduction.

Emma Pinchbeck: I would naturally agree with my fellow panellists. We forget how extraordinary the development of renewables has been. We have not seen anything like this speed of industrial and infrastructure change in energy ever, maybe in telecoms, but it has been remarkable. To have gone from being the most expensive forms of generation to being the cheapest over the last decade is an extraordinary achievement of the UK Government, the carbon budgets and the auction systems, but also our natural resources.

Q29 **Antoinette Sandbach:** What role do you think FITs have played in the public having much greater acceptance of renewable technology? In other words, the small-scale deployment encourages acceptance and broadening out of wider-scale deployment.

Emma Pinchbeck: Again, this is often poorly understood. There is more than three-quarters public support for renewables across the piece, but particularly, as you say, for community-level generation. There are two current holes in policy that need to be rectified. First, on the economic side, if we ran a pot 1 auction, we think that the price of onshore wind would be under £50 per megawatt-hour. That is cheaper than gas; it is extraordinary that they are unable to compete.

On a small scale, there is no certainty at the moment for small and medium wind, and other small-scale decentralised technologies, beyond 2019. There is supposed to be a feed-in tariff consultation this year; well, there was supposed to be one last year, but it has been delayed. I would again urge the Committee to look at immediate policy decisions inside the current framework, as well as having this theoretical conversation about what is to come in future, as renewables become incumbent.

Q30 **Antoinette Sandbach:** Professor Watson, do you think the UK could have benefited from the same level of price reductions if the Government had not given that targeted support?

Professor Watson: For some technologies, to some extent, yes. They are different, in the sense that, if you look at the PV case, it is very internationally driven. You have a combination of countries that were ahead of us, such as Germany and some states in the US, and of course Chinese manufacturers.

Q31 **Antoinette Sandbach:** Were those countries, like Germany, encouraging and providing support to install solar PV?

Professor Watson: Indeed, and that was entirely the international evidence base I was referring to much earlier, in the introductory questions. If it was not for, in that case, Germany, probably a bit of Spain, some of the US, Japanese R&D from the 1970s onwards and Chinese manufacturing—this whole constellation of global policies that were not necessarily co-ordinated—the cheap solar we have today would not have been delivered.

Similarly, as Jim Skea said, there is the issue of onshore wind and the Danish leadership. Then we have led on offshore wind. Where the UK policy has helped is to build up local supply chains and local capacity. It is not that our own contribution to this was negligible in those areas where we were not historically the leader. It was important, but perhaps we had more impact on things like offshore wind because we are the biggest market in the world for that technology.

Emma Pinchbeck: If I could beg the Chair's patience for five seconds, that is the very important point that is missed in this review. When we

make policy decisions like targeted support for a particular technology, there are huge industrial benefits from doing that, which are not captured or considered in this review. The membership of RenewableUK is now 50% supply chain companies, 25 of which are in your constituencies. I have more information on that, if you would like it. We exported to over 60 countries last year. We have a world-leading industry now for offshore wind, and we have over 60% of new onshore wind developments coming from UK companies. That is a benefit to your constituencies as much as low energy bills are.

Professor Skea: I was going to amplify the point made by my colleagues about the degree to which the UK is a market leader in some technologies. For some technologies, like PV, we are a price-taker in global markets. We are making the market, effectively, in offshore wind. If you look at the International Renewable Energy Agency reports, the UK is the defining market for offshore costs. It was just to make the point that we really have created export opportunities for ourselves, as well.

Q32 **Antoinette Sandbach:** Very briefly, has support for some technologies disadvantaged others? Why is AD not doing as well as solar PV and wind?

Professor Watson: It depends on the level of support and what it can contribute, but also how far there is a potential for cost reductions. I was just thinking, while we were all speaking, that this is not just about renewable technologies. There is the question of CCS, as Jim Skea has mentioned, and even nuclear, where the question is still a rather similar one: to what extent the UK doing things and prioritising these technologies could make a difference to cost reductions.

In some areas—for example, CCS, where there is not a huge amount of international progress at the moment—if we are sitting there waiting for somebody else to solve the problem for us, we might be waiting rather a long time, despite all the plans around the world. There is a question, in terms of our priority-setting in the UK, as to what other technologies we might want to bring on board, again learning the lessons of the successes that we have had.

Emma Pinchbeck: There is an opportunity, particularly at the moment, to look at the next generation of technologies. We have all talked about CCS, but there are others, including, I should note, wave and tidal technology.

You asked how, if you are going to do targeted support, you choose which technologies to look after. You look for the ones where you believe there is going to be a significant cost reduction; where they can compete in the market; where there is global demand for those technologies; and, in addition, where we have excellent existing skills and natural resources to use. Wave and tidal is one of those. At the moment, it does not have a route to market in the UK, because it cannot compete against the price of offshore wind. Again, the review does not really go into much detail about

why it is necessary to choose technologies and provide revenue-based funding, not just R&D grants.

Q33 **Antoinette Sandbach:** What is your view of the equivalent firm power auction, and whether that covers the costs of intermittency? Will that help to minimise bills? Who wants to deal with that?

Professor Watson: It is an interesting proposal, but there are good reasons why we at the moment have separate mechanisms for addressing capacity and for addressing incentives for cost reduction and deployment of low-carbon technologies.

One of the risks with the equivalent firm power proposal is that you end up asking each individual plant to self-balance, and that is not a systems view. Overall, you want to balance the system. If you balance the system, all other things being equal, you will end up with a lower-cost system than if you ask every individual plant to balance and then add all those costs up. One of the risks of that is that it takes you into that place, and ends up pushing up costs, not bringing them down.

The second one is the extent of the change that would require, as I think Jim Skea mentioned earlier. EMR itself, the electricity market reform, took many years of development in order to get from the germ of the idea to implementation. At the moment, the last thing we need is more investor uncertainty if we are wanting to make progress towards our carbon targets.

Q34 **Antoinette Sandbach:** What are your views on the move to secure backup capacity at project level, rather than at system level?

Professor Watson: I would repeat what I just said. The review missed an opportunity to take a systems approach to the problem. Thinking about backup capacity, that whole language does not really reflect the potential opportunities to balance the system. They come on the demand side; they come from transmission interconnectors; they come from storage; and they come from generation. Some of the language is still, paradoxically perhaps, stuck in the last century, where generation was the thing you used to balance, and now we can balance by many things. It is a system-level issue. By putting it all on each individual generator, the risk is that you just push up costs overall.

Q35 **Antoinette Sandbach:** Professor Skea, do you see any potential challenges for an auction scheme that has two goals: namely, low carbon and firm power?

Professor Skea: Yes. This is quite a radical proposition in the review, and it goes back to the point I made earlier: when you make these radical changes, it needs a lot of consultation, and a lot of looking out for unintended consequences. Several of us have mentioned that, sometimes, you do not get the most economically efficient result when things are set administratively, rather than being tested in the market. We suspect that there are elements of the equivalent firm capacity that

would be of that administrative nature: for example, deciding what proportion of wind capacity could bid into a capacity auction. How do you set that? I can see Emma's members queuing up in Victoria Street to advise the civil servants on that one.

The other issue I would raise about the question of self-balancing versus balancing at a system level is that it would almost be bound to increase the transaction costs as each individual participant in the market was going to it, and it is not just a case of looking for batteries to back you up. An important element of flexibility is, for example, interconnection to Norway or continental Europe, so does every renewable generator have to take part of a contract in that? The complexity and the transaction cost is something that we would like to see teased out a bit.

Emma Pinchbeck: This recommendation is largely targeted at my members. You mentioned earlier that incumbents never want to see reform. Unfortunately, I do not represent the incumbent industry; I represent the disruptor side of things, but we are still saying, "Focus on the framework you have now, improve it and then look ahead to the future", but it is important to say that we think the market will need reform in the 2020s.

It is hard to overestimate the speed of change, but these are the wrong solutions to that problem, and it is partly because the review does not quite get to grips with the system-wide change that we are talking about. This is no longer about large bits of kit on a centralised system. The challenge for energy policy for the next 10 years will be: "How do you integrate all the decentralised, low-carbon technology at demand side and supply side that will be coming online, and do that efficiently?" The firm power auction is an old-fashioned solution that prioritises an old-fashioned view of security of supply above everything else, in our view.

Q36 **Albert Owen:** To move on to the next series of questions, I agree with you, Emma, on the lack of support that has been given to tidal, wave and marine energy in particular. We have to bite the bullet, be pioneering and invest in direct support to get that kick-started, and then the prices can fall down. My question is to tease out of you whether the industries have had the lion's share of exemptions and reduced costs with support, and it has not really filtered through to the consumer. You talk about the excitement of the price coming down, but the consumer is not feeling that. If you look at average prices, they have not fallen proportionately to the cut in the auction price. We have not seen it, so should we have a fairer system where the consumer gets a bigger share of that immediately? That is for all of you, not just you, Emma.

Emma Pinchbeck: I am going to have a go at that question, but it is quite complicated. For clarity, the prices from last year's auction are for projects that will be built and come online in the 2020s, so there is a natural lag.

Q37 **Albert Owen:** No, I understand it, and I can understand why you are excited, because your members are getting the lion's share, but I am speaking more broadly now about the consumer. I hear people saying, "We are getting lower prices". We are not. Most of my constituents are paying more for their energy.

Emma Pinchbeck: I accept that, but, to repeat something I said earlier, the investment in cheap energy infrastructure today and the flexible system, we are all clear and the industry is clear, will lead to lower consumer bills by 2030. This is an investment in cheap bills for tomorrow. In terms of benefits to consumers and the public today, in building those projects, there are also economic returns to local communities.

It is notable that, of the £18 billion of investment that I talked about that will go into communities for those latest offshore wind projects, 90% will be outside the south-east of England, going into coastal towns and communities around the UK where there are not other forms of industry. The bills question will be resolved in time. That is what we all believe is the best thing for consumers in the long run, and in the short term you get the economic and industrial benefits of an investment in a new industry.

Nigel Turvey: Looking at it from a networks perspective, we are a regulated industry. We go through quite a rigorous process when we come to price controls, in terms of explaining the investment we need to make. That is highly challenged by stakeholders, customers, generators etc., who all help us to put that business plan together. It comes under scrutiny by Ofgem as well. The way that the regulatory process works is to ensure that where we underspend—and there is an incentive to underspend against the allowance that we are given—that benefit is shared between our shareholders and the customers, and is used to reset the price controls at the next price control period, so it gives a new benchmark to reset them. The process is there to feed the cost reductions that we manage to achieve through to end customers.

Q38 **Albert Owen:** What percentage, on average, of people's bills is transmission and distribution?

Nigel Turvey: It is about 20%.

Q39 **Albert Owen:** Do you think that is too high?

Nigel Turvey: It is, in that they are the costs we incur to ensure that we have a network there. The actual percentage is dependent upon all the other components as well, in terms of how they vary, but our objective is to minimise the costs of the network. The whole regulatory process incentivises us to look for the lowest-cost solutions. That is why we are exploring flexibility, to see whether we can find lower-cost solutions of employing demand-side response, or integrating electric vehicles in networks, to keep those costs down as low as possible.

Professor Skea: The committee periodically looks at costs, bills and experience, and we will be doing so again. From our discussions, which have not been in-depth, we do not totally understand why bills have not come down more quickly. We would like to look at that again. It probably needs forensic accounting. To try and understand it is an extremely complicated business to get through, but it is well worth doing.

Emma Pinchbeck: The Treasury's new cost control mechanism has made a good stab at talking about the need to do better accounting, and we welcome that. As renewable prices come down, what we have traditionally thought of as subsidies, with that language of industry getting the lion's share and consumers not benefiting, is a bit of a misnomer. If you think about onshore wind costs now being cheaper than the wholesale price, cheaper than gas and paying back over the lifetime of the projects, the CfD becomes a way to lock in low prices for consumers, which is the reason it should endure. That is the new world we are in, which is worth thinking about when we are having this debate.

Q40 **Drew Hendry:** Are the network companies making unnecessarily high profits?

Professor Watson: As Helm himself talks about, the process that Ofgem goes through to regulate revenues for distributed transmission companies is a difficult one. It is trying to set a price control for a long period of time when the industry is moving very, very quickly. At the moment, there is evidence that the companies are not spending all the money that they are allowed to spend. I am sure that Nigel will go into this in more detail than I can.

The question is what you do about that. He comes up with quite a radical proposal, as has been discussed, about setting up system operators, changing licence conditions etc. In some way, we need a mechanism whereby the regulatory system, however it works, can keep up better, and be more flexible and responsive to the rapid change we have, and that could take you both ways. It could take you to a place in some regions where you are spending much less than you expect. It might be, because of, say, electric vehicle rollout, that some regions will have to spend more money reinforcing local grids. It is a question of how you manage uncertainty. At the moment, the arrangements are not necessarily as good as they could be for doing that.

Q41 **Drew Hendry:** Before I come to Mr Turvey, maybe I could pick that up with Professor Skea as well.

Professor Skea: We have not looked at that at all as a committee. I am afraid that I cannot really provide you with anything there.

Q42 **Drew Hendry:** Have you any thoughts, Emma Pinchbeck?

Emma Pinchbeck: I will just reiterate that the biggest challenge for energy policy, as we see it, is no longer about the cost of kit on centralised architecture. It is about lots of different types of kit, often

literally, as in the case of electric vehicles, being driven by consumers, rather than the supply side, and more flexible smart technology. The grid is the thing to get right here, and the thing that will have the biggest impact on consumer bills going forward. As Nigel says, a lot of that work is already being undertaken. It is a case, as Jim said, of making sure that that work is in line with the technology development. Often, I am worried that the speed of Government is behind where industry is now on some of this stuff, but the thinking is there.

Q43 **Drew Hendry:** I have saved you for last, Nigel Turvey, but can I throw another question into the mix? In answering that, would you agree that the existing system of price controls for network companies, the RIIO, needs to be replaced, because it has failed to keep prices low for people?

Nigel Turvey: No, I would not. The RIIO framework gives us stability in terms of setting out a business plan and getting that implemented. It has ensured we innovate and look to reduce costs, because that is of benefit to our shareholders and customers in the long term. The framework is working. It has allowed us to connect large amounts of distributed generation, which were not forecast at the time that it was set.

We are also looking at moving forward into a distribution system operator and the transformation to that. Again, that was expected to come probably after this price control, whereas the transition that we are undertaking is coming during this price control, yet the investment we need to make to achieve that will be achieved under the current framework. The framework is showing that it is flexible to change. It is strongly incentivising companies to innovate and find lower-cost solutions to things. Those benefits will be passed back to customers.

Q44 **Drew Hendry:** There has been a lot of talk about prices versus bills for the consumers. In the Highlands and Islands and other rural areas, there is an inequity in the amount of money people pay on their bills due to transmission and distribution charges. They pay more than others, despite being close to the sources of generation. Are there any measures within the report that you feel will challenge this or deal with it?

Professor Watson: Not that I can recall, but I may have missed something. Clearly, there is a balance there. One of the principles that you are trying to follow by having this differential pricing is to reflect costs, but at the same time, if you have big disparities between different consumers in different areas, that is seen as an inequity, quite rightly, especially if they are on lower incomes. That is one of the challenges of policy there. Again, you are meeting different objectives. There is a system objective to reflect costs and therefore get people to invest where it is best to invest—in generation or network reinforcement—but, at the same time, we want to treat customers fairly. I cannot recall the review getting into that in detail.

Emma Pinchbeck: I cannot recall anything interesting in the review, per se, but the issue you describe is one that we are very alive to in the

sector. There is a lot of work going on to look at charging: currently not just the second price control through RIIO, but also whole system approaches, such as the Smart Futures work being undertaken by BEIS and Ofgem. The Charging Futures Forum is looking at this. The Future Power System Architecture project is touching upon it, because it is about how the system is structured and where everything sits.

Renewables pick up considerable cost for imbalancing and balancing already, and that chunk is expected to grow for our generators, which is one reason why the idea that we should pay for the whole cost of balancing in a single auction is probably not the way to go. This needs to be a system-wide approach. There is a lot of good thinking happening on this, which we can give the Committee more information on.

Professor Skea: As the Scottish champion on the Committee on Climate Change, I am well aware of the issue that you are raising. Like my colleagues, I did not detect anything in the report that directly reflected on that. However, the direction of travel in the report is towards cost-reflectivity, and if you had cost-reflectivity there would be an issue that that could imply higher costs for people who are in the remoter parts of the system. Even if you have renewable energy, you would need the battery back-up, like with the NINES project or whatever, to carry it. If that is a concern, it is something that would need to be prodded a bit in the report to look out at the implications.

Nigel Turvey: In his report, he seems to favour a move towards nodal pricing, which goes down to very small geographic areas. That causes real problems, in terms of disproportionate impacts on certain customer groups. It also causes issues with volatility of prices, which makes it very hard for people to invest, in terms of making decisions as to what they do about some of those prices. I would exercise real caution over going right down to nodal price-type systems.

Chair: I am mindful of the time, but I am sure that I will be assisted by Peter Kyle.

Q45 **Peter Kyle:** You certainly will, and Professor Watson is going to help me along with alacrity. Very quickly, to what extent are Professor Helm's proposals for a regional system operator different from the transition that is already underway from distribution network operations to distribution system operations?

Professor Watson: There are some similarities, in the sense that both are trying to separate the asset ownership by distribution companies from decisions about how that system should operate, mirroring what is already starting to happen at transmission. That is right, because in a way it reflects the fact that you are moving towards more complex systems at local level, and you probably need some analogy to what is happening at transmission level, thinking about how to run those systems. As Nigel said, many of the companies at DNO level—distribution level—are already starting to think about what that might mean for them.

Q46 **Peter Kyle:** You are fairly happy with this proposal, then. You would not suggest another alternative, or another way of achieving the aims.

Professor Watson: The general direction of travel is the right one, because it means that you are thinking about how to run that system most cost-effectively, and you are not just relying on your incumbent distribution company to do that for you, with all the conflicts of interest that might go with that. The other advantage, which Helm alludes to, is that, because of licensing and convention about what is monopoly and what is competitive, you really want an entity at the distribution level that can think about all the solutions together, whether they be network reinforcement, demand-side response or storage. There are these divides, for good historical reasons, which, at the moment, are being challenged.

Q47 **Peter Kyle:** Professor Skea, if I could change the subject, Professor Helm advocates a more technology-neutral approach to energy R&D. Do you think that this will affect the UK's ability to pursue least-cost solutions?

Professor Skea: Deciding R&D portfolios is perhaps more of an art than a science. For early-stage R&D, being technology-neutral and covering a wide range is extremely important. As you move on to applied R&D—demonstration, early market—a greater degree of selectivity is inevitable if you are going to make the best use of taxpayers' money in supporting R&D.

One area that the committee would disagree with a bit is the characterisation that you can have R&D support that produces something out of a laboratory, which is then handed over, that will be pulled through by a pure carbon tax. We think that R&D strategy needs to be much more complex than that, and the simple carbon tax plus early-stage R&D will not do the trick. You need the middle-stage support to get you through that valley of death.

Peter Kyle: I appreciate both your quick answers.

Q48 **Vernon Coaker:** To start with Emma, will the review's recommendations help lower-carbon industries, hinder them or are there bits of them that are good and bits that are bad? What would you like to happen, from the people you represent?

Emma Pinchbeck: My favourite bit in the review is where Professor Helm says that renewables are the new conventionals.

Vernon Coaker: Was he being complimentary?

Emma Pinchbeck: I think, though, that some of the mechanisms he suggests may not help renewables get away. In particular, we talked about the auction earlier. Revenue support for technologies that have been tested or trialled in the UK but need to get to the market is key. We are bad at that in the UK across a number of industries, but we have seen the power of the CfD, in the UK and the energy sector, for moving a

technology we think we might be good at to something that is world class. That is now sadly absent in energy policy for new technologies coming forward.

Q49 **Vernon Coaker:** What is the level of exports at the moment? Do you know?

Emma Pinchbeck: Last year, we ran a report called *Export Nation*, which I can send to you. Off the top of my head, I think we exported to over 60 countries, and over 300 UK businesses were exporting.

Q50 **Vernon Coaker:** Do you know what the value of that was?

Emma Pinchbeck: I cannot remember that particular statistic, but I can send it to you. We have it.

Vernon Coaker: It would be helpful to have that.

Emma Pinchbeck: A big chunk of our organisation's work now is with DIT and going on trade missions. Anecdotally, we have huge interest from China and India in our wind sector, from Colorado in the US. I have met with Taiwan and South Korea on our potential for wave and tidal technologies. Going right back to the beginning of this debate, this is not just about levelised cost of energy; it is a huge industrial opportunity.

Q51 **Vernon Coaker:** The question then becomes one for the committee as well. Looking in this report, Professor Helm says that the cost to the consumer of an electricity bill is some 20%, and he also says that the legacy costs, by 2030, would be an estimated £100 billion. Is the argument therefore that that level of support by consumers and by Government is a price that has been worth paying to get us to the position where we are now? Is that the argument, or do you dispute the figures that he is using?

Professor Skea: No, I do not dispute the figures, because I think that Professor Helm was quoting from a Committee on Climate Change report.

Vernon Coaker: You cannot disagree with your own figures.

Professor Skea: We have never said that decarbonisation of the economy comes for free. There is a cost for it, and we have persistently estimated it at about 1% of GDP overall. That is not out of line with it. Given the ambition of the targets we have set, plus the enhanced ambition that comes from the Paris agreement, money needs to be spent to do it. It is really, really important, as the review has said, to make sure that it is done at the least cost to the consumer, and that we do not waste money unnecessarily.

Q52 **Vernon Coaker:** Do you think that his package needs to be put into practice as a whole, or would you pick bits from it?

Professor Skea: It is philosophically coherent, if I could put it that way, but that is not the same as saying that you need to take all the elements at one time. We have not really discussed this as a committee. My

personal view is that you could pick and choose a bit from the different elements.

Q53 **Vernon Coaker:** Which bits would you choose?

Professor Skea: I am interested in the networks thing, which I have to say is the part that I know least about. Maybe that is why I am most interested. The recommendations that most affect us would be those on carbon pricing and the equivalent firm capacity auctions.

Q54 **Vernon Coaker:** Do you agree with a universal carbon price?

Professor Skea: "Universal" we might want to put brackets around, but we are extremely supportive of a carbon price.

Q55 **Vernon Coaker:** What about splitting legacy costs and taking them out of actual costs?

Professor Skea: That really does not affect carbon reduction policy going forward, so we have not discussed the treatment of legacy costs. We do not see any harm in treating them in the way that the Helm review proposes.

Emma Pinchbeck: We are not clear on how that works, if we are talking about the legacy bank. I would be very pleased to hear more information on that from Professor Helm in the following session. It may be more accounting, rather than actual impact on consumer bills. We should hold in mind actual impact on consumer bills in this. Circling back round to the first question, we need to keep bills low but we also need to decarbonise the grid by 2030; 50g to 100g of CO_2 is the target.

We also need to build an industrial base and a trading base for the UK following our exit from the European Union, and to ensure economic productivity in the future, so we need to keep costs low for manufacturing consumers as well as for domestic consumers. On top of that, we need to recognise technological innovation. This is complicated and I do not think that accepting interesting theoretical ideas wholesale will get us to all those things.

Q56 **Vernon Coaker:** To each of you, would you take Helm's proposals as a whole package? Which bits would you take, and which bits would you leave out?

***Professor Watson*:** I would not take the whole package. I think you can pick and choose.

Vernon Coaker: Which would you pick?

***Professor Watson*:** Three things, probably. The carbon price is necessary but not sufficient, especially to give you innovation; you need other things. Secondly, we have not discussed what you said about energy efficiency. Hidden somewhere in the report is a reference to using standards and regulation to drive energy efficiency; I absolutely agree. Thirdly, the networks ideas are intriguing and need more thought but

there are some interesting things in there about how to operate this more complex world that we are in. Those require a bit more attention but they deserve to be taken seriously.

***Emma Pinchbeck*:** I agree: carbon price but not on its own. The idea is more interesting than the solution. The thing that we should hang on to here is that he started a debate about the next round of energy policy that we need to start looking at in the 2020s.

Q57 **Vernon Coaker:** Nigel, he says a lot about transmission and moving energy around.

***Nigel Turvey*:** From a networks viewpoint, in terms of the direction of using more flexible networks and flexibility from customers, we absolutely agree. We do not agree with the structural change that he believes is necessary to achieve that. We believe that we are already down that path and that we can achieve it under existing structures.

Q58 **Vernon Coaker:** What does he mean by "structural changes"?

***Nigel Turvey*:** He is talking about the complete separation of the DSO from the network owner and changing its ownership structure. We believe that that would be a distraction, which would delay the transition that we need to make.

Q59 **Vernon Coaker:** Why?

***Nigel Turvey*:** Because it would take a huge amount of management and resource time to implement. Legislation would be needed to achieve it as well. All of these would cause delays to a transition that we are already undertaking.

Chair: Thank you, all four of you, for coming to give evidence today. Hopefully you will stick around to listen to what Professor Helm has to say next. Thank you.

Examination of Witness

Witness: Professor Dieter Helm CBE.

Q60 **Chair:** Thank you, Professor Helm, for coming to give evidence to our Select Committee this morning. Thank you as well for listening to the earlier session, some of which we will be drawing on during this session. One of the most interesting points from the session we have already held this morning was Professor Watson's point that yours is more of a theoretical model that is philosophically consistent, rather than looking at the empirical evidence. How do you respond to that, Professor Helm?

***Professor Helm*:** I completely reject it. I am asked to give an overall framework and it is incredibly important that things fit together.

Consistency is a practical requirement of any framework policy. Indeed, inconsistency of policy is one of the reasons why consumers are paying too much for their bills and decarbonisation is not as rapid as it should be.

I make the point very clearly at the beginning that there are no new facts. If people really think they should design energy policy on the basis of changing it every time a new fact arises, they have the wrong idea about what an energy policy is. It is not for Government to decide, day by day, what the particular policy should be; it is to provide a framework in which the private sector, the innovative people—people in renewables and people doing storage and backup—and the demand side can have some stability and in which the proper advantages to the system can be properly reflected.

By the way, it is littered with numbers and charts to illustrate the points. Vested interests find it very easy to suggest, "That is yesterday's stuff. Did you not realise that something has changed today, so we have moved on?" Not really.

Q61 **Chair:** We will explore some of those points during the course of the evidence session. We asked the previous witnesses to tell us which bits of your report they would want to implement and which bits they were less keen on. From the work you have done, which would be the most important recommendations in your review?

***Professor Helm*:** Given that my starting proposition is that the cost of energy is too high, that we can improve on any energy policy and that there is a series of pretty clear reasons why the cost of energy is too high, someone is the beneficiary of that higher cost of energy. There are lots and lots of vested interests across the sector, so I am not surprised that each particular vested interest does not like the particular bit of the report that will attack the economic rents that it gets.

In a sense, you would expect quite an almost violent reaction to what I say; after all, I criticise the suppliers and I recalculate the margins. I criticise the returns to the transmission and distribution companies. I criticise some of the costs that have been awarded on the renewables side. If you work through those, of course change is expensive to lots of people and they want to pick the bits that give them higher economic rents, but not the bits that attack the benefits that they have. If you say, "We will just tinker with this bit in the energy market", you are not going to do much to get the cost of energy down.

Q62 **Chair:** Are you saying that you cannot, as the previous witnesses say, cherry-pick: it is either all of Dieter Helm's review or none of it?

***Professor Helm*:** If you look at the framework I have put in place, I say, for example, the first best solution and one of the key parts of the decarbonisation policy is to have a carbon price. I am very careful to say that, if you do not want to do that for political reasons, because you do

not want to confront the different sectors of the economy with the true costs of their carbon pollution, you can do an equivalent firm power auction, effectively a second stage within it, so that you can take the carbon budgets, set them against the bids that you get and do the document. I do adjust for that, but there are certain things that are really hard to move away from.

There is a fundamental conflict of interest between being the system operator and running the transmission system. There is a fundamental conflict of interest between being a DNO and being a regional system operator, given we want to bring the demand side, the renewables and other players into the game. It is a radical decarbonisation; people say the policies are radical. What is going on around us is extraordinarily radical. I make it very clear that, in terms of the pillars of the existing energy structures—the wholesale price being the guts of the market, not zero marginal cost; the absence of storage or no storage, to be replaced by storage; and a passive demand side, to be replaced by an active one—these changes turn the industry on its head. It is going through radical change. I am trying to encourage that to take place; to design a system for that world, not the last century, as one of the previous people suggested; and, within that, to bring forward these new, innovative things into the frame, in which the renewables are the conventional framework. They have to be, in a world of decarbonisation.

Q63 **Chair:** You think there is a lot going on in the market at the moment that works well, but that the framework needs to be updated for the changing realities, or because it is inconsistent and those inconsistencies result in rent-seeking.

***Professor Helm*:** There have been two really big steps forward: first, to auction the renewables through FITs etc., which has produced these dramatic, really stunning falls in prices, particularly for offshore wind; and secondly the auctions of capacity, which have produced stunningly low prices compared with what the administrative suggestions would have been. All I am doing in that particular part of the report is bringing forward those things that are already going in the direction of change, but there are other things happening. As the wholesale price is chipped away by zero-marginal-cost renewables—and it will be, over time—this will become an industry that looks much more like the economics of broadband than the old energy world in which the wholesale price drove stuff.

The capacity market is the guts of it, and I am trying to put around that a sustainable framework that recognises the great success of renewables and brings them together but makes it always consistent with achieving the carbon budgets and the framework. This goes with the grain of where we are going. We should just try to be a little more on the front foot and, taking a comment from the previous speakers, we should try to get out of being in the 20th century. That is all over.

Q64 **Chair:** The clean growth strategy was published by the Government

recently. How good do you think those policy proposals are and how do they interact with what you are recommending in your review?

***Professor Helm*:** Both the clean growth strategy and the industrial strategy are post my review, so I had neither of them available to me to do the review. The clean growth strategy sets out, in very considerable detail, how to do lots of the particular forms of support, how to do the R&D etc. That is way beyond the scope and the terms of reference of what I am doing. They can be perfectly compatible, so there is nothing in the clean growth strategy that suggests that it would not be a good idea to have a carbon price. I say that a carbon price is not the only solution; I take the same line as Jim Skea and the Committee on Climate Change, which is that it is a very important component. That sits really rather comfortably there, and the clean growth strategy does not say anything that conflicts with my equivalent firm power auction.

Q65 **Chair:** Do you not find it perhaps surprising that the Government's clean growth strategy does not have some of those things in that you think are so important for the energy market going forward?

***Professor Helm*:** They did not have my review to read. I hope my review added a bit and that it would have been worth reading in the construction of this. As I make clear in the preface, no civil servant or Minister—or, indeed, anybody else—saw the report before it was published, which I thought was incredibly important. Hopefully, as they take the clean growth strategy and the industrial strategy forward, they will read my report and try to integrate some of the things that come out of it, in trying to achieve the other objectives that they wish to pursue.

Q66 **Drew Hendry:** Good morning, Professor Helm. You have said that the complexity of current energy policy "is a major source of inefficiency and has created excessive costs". What empirical evidence is there for that statement?

***Professor Helm*:** It is empirically impossible to work out the costs of current policy, because each policy intervention interacts with every other policy intervention. Any cost-benefit analysis of a particular intervention has to do the plethora of interactions with all the other bits as well. If you want an empirical piece of proof, you need to have all that analysis done and then analyse the empirics of the counterfactual, of what would have happened if you did not have all that complexity. Maybe there are people who think that the complexity is cheaper as a result, but I make the observation that no civil servant, no company director, nobody involved in this sector can even list the interventions, let alone work out what the component interactions between them are. There is no possibility of empirically calculating those costs, but it is a pretty good a priori proposition that the costs of complexity are greater than they need to be for the outcomes.

Q67 **Drew Hendry:** People in their houses and homes want to see real-life examples of change here. What real evidence is there that your proposals

would make things better in that respect?

***Professor Helm*:** If I am correct—of course, I may not be—the first thing that they will see is that their bill will be lower than it otherwise would have been. I put it to you that, while there is great support for many of the things we are doing in the energy sector, there has been great concern, over the last five years, about the electricity bills that people are paying. It is no accident that it was, in the last two or three elections, one of the most important issues and one which, apparently, as opinion polls suggest, exercises voters to a great degree. I suggest that bills should not be as high as they currently are.

The past is the past and you cannot change it, but I would like to have decarbonised more quickly than we did. Getting out of coal was the cheapest route to start with, by a long way. It is great that we are going to get out of coal by 2025, but it is very cheap compared with the other alternatives. It does not mean that you should not do the other alternatives as well, but it simply says that we could have lower bills. That is what consumers will get immediately, and that helps to build democratic support for decarbonisation. I make this point because, whereas people who are engaged in the area understand why we have to decarbonise, there is still a question more generally. If you make people pay more than they need to in order to achieve the targets, you are going to come up with resistance, as well as real hardship in some cases.

Q68 **Drew Hendry:** I posed to the previous panel a real-life example of the current setup of network and distribution costs leading to more expense for people in the Highlands and Islands and other rural areas. They responded that they could see nothing in your report that went any way to challenging that cost for them in their real lives; in fact, they said that some of your suggestions could make things worse for them, particularly the modal suggestion. How do you respond to that?

***Professor Helm*:** First of all, let us start with the network costs in total. I go through the transmission costs and the distribution costs, and I point out that Ofgem made two significant errors, trying to forecast a decade ahead what the costs of these businesses might be. I suggest that it is a hopeless task, and that Ofgem got it wrong. That is retrospective, but it thought construction costs from the Olympics onwards were going to go up when they went down, and they got demand badly wrong too.

I make three suggestions as to how Ofgem might address this: first, just let those excess returns remain until the periodic review; secondly, persuade the companies to not take the full entitlement of their price increases; or, thirdly, intervene now. I suggest that Ofgem should consider which of those options it should take and move forward. I suggest that it should not repeat the periodic review going forward, because forecasting 10 years in advance what future costs will be in a world of massive technical change will have a big effect.

The second bit is the RSO. Networks build networks. In a number of cases, including for some of the people you refer to as at the periphery, it is not obviously the case that you want to invest in the distribution network; you might, instead, want to invest in demand-side management, in energy efficiency or in local generation. By separating out the RSO from the DNOs, we can invite bids to see if that is a cheaper option, rather than have the incumbent with the obvious conflict of interest.

The third point is about whether people at the periphery should be subsidised, even if their costs are higher. I raise the question of the USO. I say that, in the future world, most of the costs are going to be fixed—capacity and system costs. There is no competition in fixed and capacity costs and, therefore, it is for Government to decide how it wants to allocate those costs. The USO is one principle; another is that they should reflect exact costs. I do not say that they should necessarily reflect the costs. I make it clear that Government will have an increasing choice as to who pays the system costs, with nothing to do with competition for those system costs itself. All those features bear down on the position—both the challenges and the opportunities for the people you refer to.

Q69 **Drew Hendry:** I have a very quick follow-up, with a simple answer, please, on this: in recommending intervention by Ofgem, would you suggest that that happens now in order to take away that inequity?

***Professor Helm*:** It needs to make a decision as to whether to intervene to get voluntary reductions, to have a new interim review or to take the judgment—

Drew Hendry: Should it?

***Professor Helm*:** I did not have enough detail and time to research that in phenomenal detail, so I leave the choice open but I recommend the choice is made.

Q70 **Mark Pawsey:** Professor Helm, you have just repeated that you think energy bills should be lower. One of the reasons we attribute to that is that Government got its understanding of where prices on oil and gas were completely wrong. Why did you treat energy price assumptions as forecasts, and what is the difference?

***Professor Helm*:** If you look at the various bodies in this territory, they will all say that they do projections or scenarios, but they have a base-case line. It is absolutely correct that very few people give a point projection; they usually give some range around it. Nevertheless, to make the decisions Government made, it had to make a judgment about what those future costs were going to be. That, effectively, is a forecast.

In the case of Ed Miliband, Chris Huhne and Ed Davey, they explicitly referred to their assumptions about rising fossil fuel prices. Indeed, DECC, to my understanding, relied upon the forecast that the wholesale price would go to £92.50 per megawatt-hour by the early 2020s in

making its choices about some of the projects that it selected to support at around those levels.

It is also true that, although it is not a formal forecast or the only forecast, the reason that the Committee on Climate Change got to the levels in the first, second and third carbon budgets was because it assumed that early action would be cheaper because gas prices would rise by 30% by 2030. It is a nice game to say, "I did not really mean it was a forecast; it was just to look at the evidence". If you do the kind of intervention that Government had been doing—and that is why I prefer auctions—you have to make assumptions. You can look at the decision and work back to the assumption or forecast that would have validated the decision made.

Q71 **Mark Pawsey:** Why do you think they got it so wrong?

***Professor Helm*:** Policy, the politics of energy and the lobbying of energy get people to wish for answers that conform with the decisions they would like to take.

Q72 **Mark Pawsey:** You are suggesting that the outcome is identified and then the assumptions are created to justify the outcome.

***Professor Helm*:** I talk about not just evidence-based policy but policy-based evidence. There are many examples of political policies in which, effectively, a prior view is taken, and then one thinks about what evidence would support that outcome, rather than the other way round.

Q73 **Mark Pawsey:** Has that happened extensively in energy policy, in your view?

***Professor Helm*:** In the pre-auction period, it is very hard for it not to happen.

Q74 **Mark Pawsey:** What would happen if Government refused to predict and anticipate future costs? How would investment decisions be judged if we did not have some assessment of what those costs might be in the future?

***Professor Helm*:** You decide what you, as politicians and Government, want, and then you auction them. The interesting thing is that Government did have a view, it seems to me implicitly, about what sort of capacity it thought might be necessary to meet security of supply. It is fair to say that many people, including myself, were stunned at how low the bids were in the capacity auction. They were much lower than anyone anticipated. Do you say, "No, we will just forget what the auction said; that is what the market said. We know and our forecasts tell us that the right answer is the following one, so we will not pick the cheaper ones that come out of the auction. Do you know what? We will pick this really expensive one because our forecasts tell us that that is the right thing to do"? That is exactly the example.

That is the reason for getting Government to intervene to decide what Government wants, and then leaving a private market to get on with bidding for the contracts that are available and bringing forward all these technologies, where civil servants and Government, with the best will in the world, have only the haziest grip of what is going on. This is a technological revolution. It is not the moment for Government to say, "We want four of these stations, two of those and, by the way, six of these" and off we go. I make the point in the review that what has happened in the world we have constructed is that the client is the Government, not the customer. That is not a good position to be in. The Government have been determining, until we got to the auctions, every single investment in the electricity sector. If you look at the outcome of those choices, they are not exactly ones that look to have been particularly low-cost.

Q75 **Peter Kyle:** Could you explain how the move to regional system operators would achieve greater benefits than the Government's current policy of moving towards distribution system operators?

***Professor Helm*:** There are two ways in which you could do decentralised energy systems. One is to say that the network controls it and the network decides what it wants to do. That is building around the DNOs. The other is to say that there are generation, supply, energy efficiency and network solutions locally, and we want to ensure a neutral exploration of which options are best. If you are a RAB-regulated distribution company, you want to build networks, and you want a price cap that will deliver you the capital maintenance and the network investments. Of course, you might be interested in different components coming into your system—indeed, you have to be because it is going on all around you—but it seems to me it is vastly better to put that to an independent system operator to auction. My guess is that we will see much faster renewables, much greater energy efficiency and a lot fewer wire solutions to our problems.

Q76 **Peter Kyle:** You said "my guess is". What evidence is there that your approach would outweigh the impact of Government stopping its current policy, changing course and then implementing yours?

***Professor Helm*:** You ask "what evidence?" This is a fundamental question that also came up in the last session. If you know the answers to the question you have asked, you do not need any markets or any private sector; you can just do it. In fact, markets are a waste of time, money and transaction costs. The reason you use markets is because you do not know. What you do know is the outcome, quite often, of substantive lobbying of vested interests. You did not know that small OCGTs would be much more competitive than CCGTs in the capacity auctions. Did you say, "What evidence do you have that you should run capacity auctions?"

Q77 **Peter Kyle:** We do not know what the outcome of current Government policy will be in the market. You are saying swap one unknown for

another.

***Professor Helm*:** No, you are putting one player in the position of deciding what it wants to do, and the other players—the energy service companies, the small-scale, local renewables and so on—then have to essentially persuade the incumbent to do it under a regulated price cap. That is very unlikely to produce the speed and results for local distribution systems and local customers. That is why it is quite interesting who is in favour and who is not of my RSO proposal. It is understandable and, if I was working for a DNO, I would be against it.

Q78 **Peter Kyle:** Without evidence, what gives you confidence that, in the absence of Government setting the innovation priorities, market incentives will be sufficient to deliver the commercial decarbonisation solutions that are on time and will meet targets?

***Professor Helm*:** I never suggested that they are. I have a section about the extreme importance of the third pillar of energy policy, which is about R&D and innovation policy. I do not go into it in fantastic detail. I had a very short period to produce this and I focused on the cost of energy, but I make serious recommendations about the extent and importance of that role, and the industrial strategy picks that up. It is absolutely not true that I suggest the framework I put in place will solve the innovation or the R&D problems; those are additional, and we definitely should spend money on those things. How we do it and how we go about it in detail is way beyond the scope of my report, but I reject outright the suggestion that I think my suggestions for reforming the market will produce optimum innovation or optimum R&D. You need policies for that stuff as well, and that is a fundamental mistake in some of the interpretations of my report. That is not what I say.

Q79 **Antoinette Sandbach:** You spoke about the "stunningly low prices" that have come about in offshore wind, I think it was. Effectively, that was because of support from Government, for example, in contracts for difference. Could the UK have benefited from the same price reductions if the Government had not provided targeted support for the various technologies?

***Professor Helm*:** The practical question here is how much money should—

Q80 **Antoinette Sandbach:** Can I interrupt you and ask you to answer the question that I asked you? You spoke about the success of market areas where the Government have targeted support, so I am asking you: could the Government have benefited from those price falls if they had not provided targeted support to those technologies?

***Professor Helm*:** My answer is that, if the objective of Government is to achieve the carbon budgets—if you look at my terms of reference, they are to achieve the objectives under the Climate Change Act—yes, it could have achieved those objectives in the frame it has at lower costs than it currently has done. None of that suggests that you do not get benefits

from spending money on solar, electric cars, nuclear or offshore wind. The question then becomes: is the amount that you spent, relative to what you spent on other things, the most efficient spending of that money? This is a fixed pot.

Q81 **Antoinette Sandbach:** The other witnesses said to us that you did not take into account, for example, the associated supply chain benefits that come from the spending on FITs and on contracts for difference. Is that criticism accurate?

***Professor Helm*:** There were two different criticisms. One is to say that there are wider benefits to the economy of these programmes beyond the benefits explicitly to the electricity sector or electricity prices. That is outside my terms of reference and I have no doubt there are some. How much is another matter. Is it the case that spending X billion on offshore wind has been the best policy in the sense of producing the lowest possible prices we could have had today? That is open to debate; it is not to say we should not have spent some money on wind, but the question is how much. It is also an interesting question as to whether the prices of wind and the costs of wind have fallen, and to what extent, because of the British customers' spend as opposed to the spend in lots of other countries simultaneously.

Q82 **Antoinette Sandbach:** We heard evidence from Professor Watson that international examples had not been taken into account and, in fact, that in a number of international examples there had been high levels of similar interventionist Government support for low-carbon technologies, which also helped drive down the price.

***Professor Helm*:** It is absolutely true. For example, if you spend €200 billion in Germany on solar panels in a nice dark country, you will get a reduction in cost, because you will generate demand for solar panel production in China, and China will produce them and you will put them in place. Did people in Germany, which is failing to achieve its 2020 target by a long margin, think that they were providing a benefit to the rest of the world, which they undoubtedly have, by reducing costs, or were they doing it to drive their own costs down? Those are interesting questions.

Q83 **Antoinette Sandbach:** Professor Helm, do you accept that we have expertise in the offshore wind sector, that we are exporting that expertise, and that, effectively, that is an industry that has been created largely because of the Government's support for the sector?

***Professor Helm*:** You are undoubtedly right that the industry would not have got to where it is without Government support. You are undoubtedly right that there are lots of spin-off benefits from that. On the trade figures—the import of turbines etc.—we heard about exports but not about imports, so I do not report the numbers for that, and it is beyond my terms of reference, but that is relevant. All I am doing is saying that it is an interesting question as to whether the amount that was spent in

that area was the best allocation of moneys to hit the climate change targets, which is what I had to address in my terms of reference.

Q84 **Antoinette Sandbach:** The Government are trying to achieve three targets. Their policy objectives are around the energy trilemma, so their focus is slightly different from the focus that you have had in your report.

***Professor Helm*:** No. I am very clear in the report in the chapter on objectives that there are two objectives: the Climate Change Act objectives—

Antoinette Sandbach: I am not disputing your objectives.

***Professor Helm*:** No, but I dismiss the idea that it is a trilemma. If you have to achieve the objective of the carbon targets, the best you can do is the lowest-cost-bills way of achieving that. It is not a trade-off. Many people who are against renewables think that the argument is: if it turns out that bills are too high, we can do less on the carbon front. I reject that.

Q85 **Antoinette Sandbach:** Do you accept, for example, that there is massive opposition to onshore wind in the UK, which has driven, in part, the policy that looked for offshore wind, which was much more acceptable to the British public? Do you accept that there are legitimate public concerns that come into this debate?

***Professor Helm*:** Of course, there are lots of different considerations, and you report the politics of this. Of course, that is part of the frame. That is for you to decide.

Q86 **Antoinette Sandbach:** Can I ask about subsidy-free contracts for difference in the review? Why did you not consider subsidy-free contracts for difference?

***Professor Helm*:** Because the contract for difference is written against the wholesale price. My argument is that, as more and more zero-marginal-cost stuff comes into the system, the wholesale price becomes less and less the relevant benchmark for it. The objection to the CfD is not that there should not be a contract; it is that the contract form should, essentially, be a capacity contract form rather than an energy contract form. Remember that, in this report, I say that all the existing stuff should be fulfilled, so I am thinking out into the next decade, as did several of the other commentators in the last session. Over that period, you have to do this, and it is just a question of the most appropriate way of doing it, while still hitting the climate change targets, which is really important.

Q87 **Antoinette Sandbach:** We have heard evidence to suggest that requiring individual generators to self-balance is less cost efficient than requiring the system to self-balance. That reference to the 20th century outlook was to your report and to the way that you have approached it, rather than looking at demand-side management and new technologies.

***Professor Helm*:** There are two or three bits to this. The first bit is that the system is not some overarching, centralised system in the future; it is a system in which there is a lot of decentralisation. It would be a fair criticism to say that I have not, in the report—I did not have the time available—sorted out the tension between the national system operator and the regional system operator. The regional system operator is doing the auction.

Q88 **Antoinette Sandbach:** Can I just interrupt you there? You said you have not sorted out the tension between the national operator—presumably, National Grid—and the regional system operator.

***Professor Helm*:** No, not in detail.

Antoinette Sandbach: What do you anticipate are the problems there?

***Professor Helm*:** It depends how the technology goes, and I do not know. This is designed for a framework to allow this technology to go forward. Some things may come forward that make it possible to do very decentralised balancing of systems.

Antoinette Sandbach: But at the moment—

***Professor Helm*:** I accept your point entirely. At the moment, that is not where we are. My second point is that, for every side of a balancing contract, you can start with the intermittent generator, but there are all those opportunities for the people who supply those balancing opportunities: batteries, storage and electric cars coming into the system, the demand side etc. I suggest encouraging that market to develop and for those people to come forward. That seems to me to be opening the door to a lot of technical change.

Q89 **Antoinette Sandbach:** You want to pick winners and you want to pick technologies.

***Professor Helm*:** No, I want to provide a framework within which, if they come forward, there is a market for them, to take them forward.

Q90 **Antoinette Sandbach:** I wanted to ask you about the equivalent firm power auction. Is that to ensure "intermittency costs" are borne by those who cause them or is to minimise energy costs for consumers? What is your aim with that?

***Professor Helm*:** It must be the latter: it is to bring these things together. It is true that there is a derating component of this, but there is already an existing system. The equivalent firm power auction proposal is not that radical. At the moment, National Grid derates the renewables—the intermittents—but takes them outside the auction because they are already covered by the FITs. There is already a derating because that is how National Grid works out what the system requires as total capacity to make supply equal demand.

Q91 **Antoinette Sandbach:** We have had 13 GW of solar energy, for

example, that has come on to the system. That is low-carbon and intermittent. That is the equivalent of building some very large power stations and it has happened very quickly and very effectively.

***Professor Helm*:** Do you not think that that is a success? I do.

Antoinette Sandbach: Yes, I do.

***Professor Helm*:** Good—we agree.

Antoinette Sandbach: Marvellous. On that note, we shall end.

***Professor Helm*:** We most certainly could. This is back to the point at the beginning: trying to present the equivalent firm power auction as somehow anti-renewables seems to me to be completely wrong. It is exactly the other way round: it is trying to normalise a world 10 years in the future, maybe, in which renewables are the conventionals and the system works around that. It is trying to create the maximum incentives within that framework to give all these innovations and things, which I do not know will work or how exactly they will come forward, the best opportunity to come into the frame and offer what they have to customers. That is a framework that is enduring. It is not pro-anything. It provides a framework for the decarbonised world, which is overwhelmingly renewable; it brings in the storage framework; and it provides a great opportunity for the electrification of vehicles and the batteries to be brought into the framework. That is why it is very 21st-century.

Q92 **Antoinette Sandbach:** I would argue, Professor Helm, that the FITs and the CfDs encourage both offshore and solar generation.

***Professor Helm*:** I totally respect your view.

Antoinette Sandbach: New technologies are coming forward but they may well need Government support to get to that level where they are universally adoptable in the way, for example, that solar panels are on people's roofs.

***Professor Helm*:** I hope that you are very good at picking those and making sure you award the contracts to the right players. Forgive my scepticism.

Q93 **Chair:** This is what I do not totally understand, Professor Helm. You say that renewables are the new conventionals, but would that have happened without, as Antoinette said, that early-stage support? Will the conventionals of 20 or 30 years' time happen if there is not some seed funding or some support for them to grow? If we take, for example, carbon capture and storage, the Government, in the clean growth strategy, announced some money for research and development into that technology. Are you saying that that sort of support should not be forthcoming because it should just be a market and, if carbon capture and storage or anything else is the future, it should just bid against all the other technologies? You have the conventionals, and then you have

the things that might be the conventionals in the future.

***Professor Helm*:** I will repeat what I said earlier: there is a very powerful and strong rationale for a substantive innovation and R&D policy. The difference might be as to whether that should be done through, essentially, buying electricity—direct intervention in the electricity market—or explicit innovation and R&D support. We are not on a different plane.

Q94 **Chair:** Other people in the sector would say that it is not sufficient just to invest in the basic research. Do you agree that investing in the deployment is also part of investing in research and development?

***Professor Helm*:** Let me give you an example. You mentioned CCS. If you look at the way things are going globally, parts per million are well past 400 and they continue upwards. Global warming is global. In that frame, CCS may or may not have a role to play. We have found tens of billions for offshore wind, and we can argue whether that is a good or a bad thing, but we have not been able to find £1 billion to do a demonstration plant on CCS. The North Sea has shallow water, empty and well-understood oil and gas fields, and pipelines with coal and gas power stations nearby. It is back to the relativities.

I can be perfectly content with a world in which we support the deployment of offshore wind, we support onshore and we support current-generation and next-generation solar, but there are choices. The customers are paying 20% of their bills so far. It is for you, as politicians, to decide whether they should pay 30%, 40% or 50%, but the evidence seems to suggest that there is some degree of tension about the amount that they are paying.

Within that 20%, it is a perfectly reasonable thing to ask: what is the best way to spend that money between competing and many useful contributions to decarbonisation? If you asked me—this is not in the review and is beyond the scope of the review—I would have taken £1 billion of the tens of billions that went to offshore wind and used it to do a CCS demonstration plant, not because I know whether it is going to be a winner but because, globally, that is a contribution. Going back to Germany, for the EU it would have been better to do a mass deployment of solar in Spain rather than Germany, because the conditions are better to take that forward. We have to remember that, in my review, I am taking a unilateral Climate Change Act framework, and my question in my terms of reference is: what is the cheapest way of achieving that? I tried to answer that.

Q95 **Chair:** I am aware that many Members need to go in the next 10 minutes because of Treasury questions, so we are now going to really try to rattle through the questions and answers.

Q96 **Albert Owen:** Yes, I will rattle through this. You have criticised the energy market for being complicated but, with respect, some of your answers have been complicated today and have not been very

straightforward, so I am going to pin you down on the previous question. You have said that you do not think there should be targeted support for some of these technologies—R&D, yes, but not targeted support. Are you saying that the costs would not have come down and that the consumer would have had to pay more because they would not have been spread across the cost of electricity?

***Professor Helm*:** There have been definite benefits to cost reductions from the spend.

Q97 **Albert Owen:** Why would you want to do away with it?

***Professor Helm*:** No, the question is: how much of that spend? By the way, the existing framework which I say should carry on will carry on to almost 2030. By that time, we will have got to wherever we want to get to. There are other considerations that ought to have been taken into account in decarbonisation. Exiting coal early would have been a lot cheaper. We and especially Germany, which built 13 GW of new coal, allowed that pollution, which would have been relatively cheap to get out of the market, to persist.

Q98 **Albert Owen:** You are not advocating the old arguments about a decade ago that, if we are going to have greener energy, we are going to have to pay more for it. You are not advocating that.

***Professor Helm*:** No. The past is the past. We build on what we have to go forward.

Q99 **Albert Owen:** To save coming back to this, I know we are going to get some other questions on the system operators, and on transmission and distribution, but are you suggesting alternative models? For instance, do you think competition is a way forward? For instance, a private monopoly is running these areas. Should we have a not-for-profit model, or should we put it into the public sector? Big utilities in Wales are run by a not-for-profit organisation, Welsh Water, and it works. It delivers benefit to the community and to the environment. Do you think that is a way forward?

***Professor Helm*:** The national system operator and the regional system operator do not own any assets at all; they simply do the auctions and run and balance their systems. That is all they do.

Albert Owen: Yes, but I am talking about the network operators.

***Professor Helm*:** I do not propose nationalising them or anything else, with respect. I simply say that, when they come forward with what they want to do within the framework, this should be open to challenge from other renewables, from storage and from the demand side, and this should be bid. That is why the distribution, supply and generation licences should be conflated. The idea that there is a thing called distribution in 10 years' time would seem to be one of those, if I dare say it, 20th century ideas.

Albert Owen: There would be competition.

***Professor Helm*:** Yes, definitely.

Q100 **Vernon Coaker:** It has been very interesting. Building on what the Chair was asking, what do you think is the best choice for the UK in the future? Should we wait for the cost of low-carbon technologies to fall so that it reduces costs; should we take the lead in developing new technologies; or is that a false choice that is presented?

***Professor Helm*:** It is a bit of a false choice but we should take a lead in developing some of these new technologies. In terms of what is going on in solar, opening up the light spectrum, solar film and new materials—we have taken the lead in offshore wind because we have the right location for that—blade size, gearing and logistics, we should get on with it on the front foot. This is a huge opportunity, with big markets in the future. We should get on with it. I do not want to suggest in any way that there have not been enormous successes. There have been great successes but we are where we are. I am not trying to justify or criticise why we got to where we got to. My review is entirely about how to take this forward from what is, in many respects, quite a good platform to work from. I am trying to say how to build on that, how to make it more successful and how to achieve this enormously demanding decarbonisation target, because it is going to start to bite quite hard going forward.

Q101 **Vernon Coaker:** That takes us to the interesting questions. Where do you think this is going to go with the Government? Are you worried about them cherry-picking? Is there something that you think is an absolute must from your report? Will it fall apart or stand together on one decision that the Government make, such as the carbon price?

***Professor Helm*:** It is for the Government to decide. I was asked to do an independent review. They were not party to the review, and it is for them and for Parliament to consider what they want to do. These are merely my proposals.

Q102 **Vernon Coaker:** I am sorry to interrupt, but you have done a really thorough report and made some really interesting proposals to Government. Are you saying to Government, "You have to take it as a whole" or are you saying to Government, "You can do the carbon price and that will help or make an enormous difference"? Does it stand or fall together?

***Professor Helm*:** Most of what is in here will be in place in 2025 to 2030, almost regardless of what decisions are made now, because the fundamentals of zero marginal cost, active demand and the huge technological advances on the renewables side will change the frame dramatically. In terms of picking and choosing, whether to intervene on the price caps is a discrete thing.

Q103 **Vernon Coaker:** Is the carbon price the key?

***Professor Helm*:** We have carbon prices; we just have lots. Harmonising them will improve efficiency considerably.

Vernon Coaker: Yours was a universal carbon price.

***Professor Helm*:** Yes, and we have ones at £14 and at £18. We have an implicit carbon price in the road-fuel duty. We have loads of carbon prices.

Q104 **Vernon Coaker:** Yes, but yours is a universal carbon price, so is that the key point of your recommendations to Government?

***Professor Helm*:** No, it is one. I say that, if you do not do that, costs will be higher and you will have to doctor the auctions. That is all I say.

Q105 **Vernon Coaker:** Have you had any indication from the Government at all about that?

***Professor Helm*:** I delivered this report and put it on their desks. They have produced the industrial strategy and the clean growth strategy. I would be really horrified if they picked it up and said, "Yes, we are going to do this now". What I really want to happen and what I would be really pleased about is that they go away and think about it. People will criticise it, come up with other suggestions and say why things have gone wrong etc. I will, hopefully, participate in that debate going forward. In January, it is pretty early for the Government to have come to definitive conclusions, and I am really rather pleased that they have not. I wait to see whether they will.

Q106 **Vernon Coaker:** My view—and this is why your report is interesting—is that we need to get on with it.

***Professor Helm*:** That is my view too, because the costs that people are paying are too high, and we ought to do something about the bills. We have not discussed at all my proposals as to what we should do with retail bills and my recalculations of the margins, which show that the margins being charged are, in economic terms, considerably greater than those reported at the CMA. You are doing that now—your Committee is scrutinising this—but we have not discussed any of those components. I did not just say it is about legacy costs or about the structure of the market interventions; I also said it is about market power, which is a third component of my argument. I make serious suggestions about how that market power might be addressed.

Chair: Thank you very much. I thought these issues were complicated when you taught me microeconomics in 1997, and I still think they are today, Professor Helm, but thank you very much for your time and the evidence. We look forward to the Government's response to your report.

***Professor Helm*:** Thank you very much for your questions.