HOUSE OF LORDS

Select Committee on Economic Affairs

Corrected oral evidence: The Economics of UK Energy Policy

Tuesday 8 November 2016

3.35 pm

Watch the meeting

Members present: Lord Hollick (The Chairman); Lord Burns; Lord Darling of Roulanish; Lord Forsyth of Drumlean; Lord Kerr of Kinlochard; Lord Layard; Lord Livermore; Lord Tugendhat; Lord Turnbull; Baroness Wheatcroft.

Evidence Session No. 6 Heard in Public Questions 87 - 102

Witnesses

I: Mr Martin Pibworth, Managing Director of Wholesale, Scottish and Southern Energy plc; Mr Francis Egan, Chief Executive, Cuadrilla Resources; Mr Tor Martin Anfinnsen, Senior Vice President, Marketing & Trading, Statoil.

II: Mr Richard Warren, Senior Energy & Environment Policy Adviser, Engineering Employers' Federation UK; Mr Jeremy Nicholson, Director, Energy Intensive Users Group; Mr Andrew Buckley, Director General, Major Energy Users' Council.

Examination of witnesses

Mr Martin Pibworth, Mr Francis Egan and Mr Tor Martin Anfinnsen.

Q87 **The Chairman:** Gentlemen, welcome to the Select Committee on Economic Affairs. As you know, we are looking into energy policy. I am sorry for the slightly delayed start but we had some internal matters to discuss.

It is nice to see Mr Egan here again. We last spoke during our fracking inquiry. I am not sure that a lot of fracking has taken place since then but we travel in hope.

One issue that we have been concerned about is the extent to which commercial investment could be made in the energy market. We are particularly concerned about the effect on the wholesale market, which Rupert Darwall raised with us, of subsidising zero-marginal cost renewables. He asserted that this is destroying investment. Until renewables pay the cost of the intermittency they are imposing on the system, we will continue to have that problem. We have a dysfunctional market, which is deterring investment and that cannot be good for competitive pricing and affordability and all the other good things that the policies are trying to achieve. Who would like to respond to that?

Martin Pibworth: That is a very complex question, so I will break it down, if I may. The UK has gone on a significant journey of investing in renewables to hit its decarbonisation and emissions targets. It is worth pausing slightly and looking at how successful that policy has been in encouraging renewable investment on to the system. If you had been kind enough to invite me before the Committee five years ago, I do not think I could have possibly believed then that the UK would have 8,000 megawatts of onshore capacity, 3,000 megawatts of offshore capacity and almost 10,000 megawatts of solar and other things. It has been a remarkable transition to a lower-carbon, lower-emitting system, and that is to the country's credit. It is incredibly complex to transition from a historic legacy generation mix of gas, nuclear and coal to one with broader renewables penetration. It is probably right to critique some elements of the policy that has led us here. However, from a holistic point of view, the country should be pretty pleased with its efforts in producing a better decarbonised mix in 2016.

From here, the key thing that we need to do as a country in order to secure our energy supply and address some of the affordability issues that you hinted at is to follow the government trajectory on a carbon price floor and capacity mechanism. SSE sees the capacity mechanism as the logical transitional step to encouraging new-build investment in gas that will help with those intermittency costs and issues.

The whole trilemma has always felt to me to be an incredibly complex problem to resolve. The Government are trying to resolve it against a backdrop of other things that happen in the world energy market that are

entirely relevant commodity price shocks, changes in nuclear availability and so on. It is not a coherent and stable policy against all those extraneous occurrences but it will lead us to a sensible mix of nuclear, gas and renewables into the 2020s.

The Chairman: Would anybody else like to add any comments to that?

Francis Egan: Not particularly, no.

Lord Turnbull: I have a supplementary question, which is: have we been more successful in creating capacity than we have in creating electricity generated? As of today, all the gigawatts of capacity from wind are generating 2.5 gigawatts.

Martin Pibworth: I am very grateful for that question. There is no doubt that the electricity market looks relatively tight at the moment. That is for a number of reasons. As you rightly point to, renewable energy output is pretty low today, with barely a third of total capacity coming from onshore wind. There are other issues in the market that are perhaps a little less predictable and probably slightly surprising. For instance, French nuclear output is down significantly because of issues over there; and there are probably a couple of thermal power stations that are reasonably late back from outage, which has created a tightness in the market. This day a year ago, as a nation we were producing probably double that renewable energy. As a result, the system was in very decent surplus. There is no doubt that we need a grid that is resilient enough to cope with the variability in wind output. But for us, the capacity mechanism and a carbon price floor provide the policy instruments that permit a sensible transition to that sort of energy economy going forward.

The Chairman: So do you have high hopes that the Government will deliver on Amber Rudd's ambition of having a competitive electricity market, with the Government out of the way as much as possible, by 2025?

Martin Pibworth: I have been in the energy industry for 18 years. I have sometimes been surprised by events and have learned never to make too rash a prediction too far in advance. Ultimately, the UK is an importer of gas and therefore attached to global markets, which lends a volatility that perhaps was not the case 15 years ago.

What is important there is that the Government have designed EMR and the pillars around it, and that makes good sense to SSE. I think the industry would probably agree with that. Part of that mechanism is to provide security of supply through the capacity mechanism and decarbonisation partly through the carbon price floor and CFD mechanisms. That seems to me to be working well. Inevitably, when you change a power market and go through transition, there will be certain times when things do not quite go as well as planned, and there will be situations that we did not foresee. To their credit, the Government have been reasonably pragmatic about the capacity mechanism. They have

introduced various changes over the past two years to address some of the concerns that have come through, including an earlier initiation of the capacity mechanism in 2017 and some other policy ideas such as emissions performance standards and triad payments for better generation. The Government have been pragmatic, so right now as an industry represtative I am confident in the policy, as long as there is stability from here, to deliver what we are looking for.

Lord Darling of Roulanish: You mentioned the capacity mechanism. Does that mean that you are happy with the capacity mechanism or would you like to see changes? Some people have been quite critical of the capacity mechanism and say that it discriminates against gas-fired power stations. Do you think it needs to be changed, and if it does, in what way?

Martin Pibworth: I will take that question back a step, if I may. The capacity mechanism was introduced to encourage new-build gas, as you suggest Lord Darling. It is probably fair to say that the outturn price for 2018, and indeed the capacity that was contracted, was a slight surprise to a lot of industry observers. Perhaps the 2019 capacity mechanism outturn was also slightly surprisingly low, as far as attracting new build. Having said that, the Government have listened to the industry. They have seen some of the things that have gone on in the capacity mechanism and have made, or are on the path to making, various positive changes.

Lord Darling of Roulanish: Such as?

Martin Pibworth: For example, we at SSE have argued that there is a need for a capacity mechanism much earlier than 2018. The Government's introduction of one in 2017 is a positive step for the security of supply. We have also argued that embedded generation is getting a double benefit from triad payments and the capacity mechanism. That skews the advantage, which means smaller embedded generation sets getting contracts at the cost of bigger, highly efficient new-build stations and CCGTs getting contracts. The Government are going through a consultation on that and are probably on the right path to making the correct amendments.

Personally, I would plead for stability on all the mechanisms that are in place, to give investors confidence that no major interventions are going to come. However, minor tweaks are inevitable in a market that is maturing and getting used to a new mechanism to remunerate it.

Q88 **Lord Forsyth of Drumlean:** The Chairman asked you about Amber Rudd when she was in charge of energy policy in 2015, when she said, "We want a consumer-led, competition-focused energy system that has energy security at the heart of it and delivers for families and businesses". You gave a bit of a politician's answer and said that you did not make predictions. Is it pie in the sky or not?

Martin Pibworth: To have an affordable, secure, decarbonised system?

Lord Forsyth of Drumlean: No, to have "a consumer-led, competition-focused energy system that has energy security at the heart of it and delivers for families and businesses".

Martin Pibworth: To try to answer that question as best as I can, without making rash predictions—

Lord Forsyth of Drumlean: I just want a yes or no, really.

Martin Pibworth: It is quite a complicated question so perhaps I can give you a maybe and then give the reasons why I am keen to caveat it. Assuming the current pillars of EMR stay in place, the market is on course to develop a system that is flexible and guarantees security of supply and a competitive, affordable price. The market is designed well around that. On consumer benefit, through the market pillars of EMR the consumer gets a cleaner, more reliable, more efficient network of power stations, which they should receive benefit from. I am caveating that slightly because it is really important that we have policy stability to allow the market time to deliver that.

Lord Forsyth of Drumlean: I am sure that is right, but what you are describing cannot be described as, "a consumer-led, competition-focused energy system".

Martin Pibworth: I hope that what I have described is certainly a competitive market system. A market system that is lower-emitting, cleaner, has more efficient and reliable plants and new CCGTs is probably in the consumer interest.

Lord Forsyth of Drumlean: Okay. How does the capacity market operate and how does it influence your decisions?

Martin Pibworth: It is yet to function in real time. At the moment we are still waiting for the first one to deliver in 2018. Can I just clarify the question? Are you asking how we assess our own bidding strategies for the capacity mechanism?

Lord Forsyth of Drumlean: I am really asking you about the market. For example, Mr Jimmy Aldridge from the IPPR told the Committee that it was, "not entirely clear whether it is about keeping old capacity online and ensuring that it has sufficient revenues to stay online or whether it is about incentivising new capacity to come forward". The IPPR has been calling for the market to be split into a market that provides a price for keeping capacity online and a separate market for bringing new capacity to the system.

Martin Pibworth: My view of the capacity mechanism is that it is there to help the transition from an energy mix of old coal, legacy gas and renewables to cleaner, more efficient gas, renewables and nuclear. That is a transitional process, so in 2018 it would not make much logical sense to turn the existing system on its head and introduce a whole new world. The way that the capacity mechanism was designed is that new build competes in the market against existing legacy stations, whether that be

existing coal or legacy gas stations, and new build, through carbon pricing and the pricing efficiency it gets through its own efficiency and reliability, should ultimately win that competition, and we will transition to a better, more modern generation system.

Lord Forsyth of Drumlean: So you are happy with the operation of the market as it is. Would you regard the criticism that has been made of the latest auction as unfair?

Martin Pibworth: I think I said earlier that there is a case for being slightly critical about some elements of the capacity mechanism over the two previous iterations. The Government have taken relatively pragmatic steps to address some of our concerns and to make a more balanced mechanism, which should create the conditions that allow the investment they are ultimately looking for.

Lord Forsyth of Drumlean: Professor Helm told us that the latest auction, "shows the utter confusion in government between those who think that markets are useful because they do not know the answer, so let us see what the right answer is from the market, and those who believe they know the right answer but want to use a market mechanism to try to produce that result".

Martin Pibworth: I would argue that the capacity mechanism for 2020 and the rules for that look very different from the capacity mechanism we have for 2019. I am not sure I agree with Professor Helm's comments—he has put that perhaps a little more baldly than I would—but for the 2020 mechanism the remedies and the slight tweaks to the system the Government have made mean that we are positive for a successful result.

Lord Forsyth of Drumlean: On the capacity margin itself, the National Grid's winter outlook, which was published last month, expected the electricity margin this winter to be "tight but manageable" at 6.6%. Professor Helm described the capacity margin as, "currently serious … not where an advanced economy should be … This is an extraordinary position to drive yourself to where people can think about investing in this country and wonder whether the capacity is going to be there to provide this basic necessity of electricity".

Martin Pibworth: The market is tight right now, as I think I alluded to earlier. I think there are particular reasons for the market being tight. Obviously, it is up to the grid and the Government to manage security of supply. I found the Grid's winter outlook statement reassuring: 6% is a manageable margin. What is happening on the market right now is a combination of low renewable outputs and the situation in France and, as I said, delayed returns from various thermal stations. It could be argued that the capacity mechanism should have started this year because if we were in a capacity mechanism market now and the Government had procured their target capacity, the grid would dispatch that capacity in a normal merit order and it would cover all requirements. Right now things are perhaps a little tighter than most commentators would have

expected, for very understandable reasons, and the capacity mechanism should give us the assurance that those conditions will ease.

Lord Forsyth of Drumlean: Professor Helm has warned about this in the past, has he not?

Martin Pibworth: Yes.

Lord Forsyth of Drumlean: So he was right.

Martin Pibworth: I do not know the precise nature of his warning so I would not like to say whether he was right or wrong. SSE was calling for an early introduction of the capacity mechanism many years ago and we think it is sensible that the Government changed their initial stance from a 2018 introduction to a 2017 introduction, to overcome some of the issues that Professor Helm may have identified.

Q89 **Lord Tugendhat:** Matthew Bell of the Committee on Climate Change told us that he thought that the cheapest way to achieve emission targets would be to have roughly the same proportion of electricity generated from gas in 2030 as we have now. Do you agree with that proposition? Perhaps Mr Egan would like to have a go.

Francis Egan: If coal is being displaced, I am sure that that can be the case. I do not see why not. I have not done the calculations, but I imagine that if we reduce the amount of coal-generating capacity and keep gas at a constant level, something else will have to fill the gap—presumably in his theory that is renewables—ergo CO_2 emissions will come down. Whether or not that meets the 2030 climate change target, I do not know, but we will certainly need gas to generate electricity in 2030.

Lord Tugendhat: Would you agree, Mr Anfinnsen?

Tor Martin Anfinnsen: Yes. That is very much in line with our own analysis of this issue.

Martin Pibworth: The key thing to understand is that the Government have said, rightly, that coal will be closed in the UK by 2025. That is actually reality. Our own coal stations are well over 45 years old now. They are nearing the end of their life. They take significant amounts of capital to make sure that the assets are safe and can operate reliably and with integrity. Realistically, there will be a transition away from coal to new gas and inevitably our mix in the 2020s will be gas, nuclear and renewables. Like my colleagues, I do not know the calculations but it seems a sensible premise.

Lord Tugendhat: Do you think there is a problem with investing in new gas-fired power generation? If so, should the Government do anything to encourage it?

Martin Pibworth: Without sounding repetitious—and forgive me if I do—the capacity mechanism gives potential CCGT developers the mechanism

to price in and try to get contracts which will trigger new build. From SSE's perspective, we will bid on a new gas plant in December 2016 for 2020. Whether we are successful in that will be down to a competitive process and whether our price is attractive compared with alternative sources of capacity. Frankly, none of us knows. If we did win a contract, clearly we would get on with building that station and delivering according to that requirement.

There are a number of new-build CCGTs that have prequalified for the 2020 delivery. They will go through similar discussions and considerations to those we are having at SSE about what price they should bid in at. Ultimately, the most competitive plant will win, and I have no idea whether that will be us or others. But I believe that the capacity mechanism policy will ultimately attract new build. Of course, for 2018 the Government did contract for a new-build station. As far as I am aware, Trafford is still a possibility. Obviously, it is not for me to comment on that either way but a new-build station was contracted in the 2018 capacity mechanism.

Lord Tugendhat: You have recently brought a plant out of mothballs, have you not?

Martin Pibworth: Yes, that is our existing Keadby 1 power station. That was done for a combination of reasons: first, to give our portfolio flexibility; secondly, to respond to an increasing market signal that it required that capacity back online. It also allowed us to move some of our engineering resource from Ferrybridge, which we closed, to Keadby to keep that engineering resource within the company. That engineering resource is very precious and very scarce so on many fronts it made sense for us to do that. That is generating today.

Lord Turnbull: There seems to be agreement between you that gas is going to play a major part after 2030. Is the question not rather different—whether there will be a sufficient response from the potential builders of it, given the way the market is currently structured? Is it the case that the incentives for building new gas power stations are not quite in place yet and something needs to change in the structure of the system?

Francis Egan: I am not an expert on the electricity market, which might help with the question, but clearly nobody is building them. If the incentives were there, they would be building them, so something is not working.

Lord Turnbull: What do you think is stopping them?

Francis Egan: I guess they are not making a return on the investment. Presumably, if people were able to make a return on the investment, they would invest in them.

Lord Turnbull: What is stopping them making a return on the investment? Obviously something is wrong. Is it because of this question

of renewables and the fact that they always have priority dispatch—whatever the technical term is—that no one wants to build a power station, not knowing how much and how frequently it is going to be used? In effect, you are being asked to build a power station knowing you will have to operate it inefficiently.

Francis Egan: I am assuming it can only be revenue. Gas prices are low. They are not expensive to build, so it is not costs.

Martin Pibworth: May I attempt an answer? It is a very important question. Up to this point, a huge amount of capacity came on after 2008, obviously, including a power station that we have an interest in at Marchwood. A surplus of capacity came online, which led to quite low market returns and that has created a stasis in investment. The capacity mechanism is designed to get around some of those investor concerns about how you get a new-build CCGT, which is a very capital-intensive investment, properly remunerated. Ultimately, the capacity mechanism will provide a base amount of revenue to a new-build developer. A new-build developer has to make certain assumptions about other market revenues it can earn by operating in the market, which will depend on assumptions about its load factor, the carbon price floor, and the relative cost of gas compared with alternative technologies—principally coal, probably, in 2020, because it will still be on the system. There is a whole range of variables. As a company that will be bidding in a new gas plant in 2020, we will make conclusions about some of those things. For us, the key drivers to get a new-build station away are: first, are we competitive enough to get a contract; and, secondly, do we believe in the stability of the policy enough that it will trigger the build? On the capacity mechanism, we are confident that the policy is stable. We are slightly concerned about the carbon price floor and the stability of that so we would be looking for the Chancellor to extend some of the commitments he has made about that because that is an important component of pricing new build into the system.

Q90 **Lord Turnbull:** I will come on to the carbon price floor. While there is coal, having a carbon price floor gives a relative benefit to gas vis-à-vis coal, but when there is no coal, all the competitors of gas are getting the benefit from this and only gas, in a sense, is paying this. The mechanism has been criticised on two grounds: one is that it is making more difficult the development of gas that we actually need; the other is the sheer unilateralism of it—no one else has a floor of anything like that amount. Hence the rumour that in a few days' time the Chancellor might dispense with this and simply go back to the same floor as in the rest of Europe. Do you have a view on that?

Martin Pibworth: It will probably not surprise you that I have a very strong view on it. For me, the carbon price floor probably does a little bit more than you have just outlined. First, clearly it provides a competitive edge to existing gas versus coal. Your summary of that was absolutely correct. It triggers the phasing out of coal over time and it allows that to be displaced by new-build gas. Essentially, the carbon price floor gives new-build gas a slight edge because of the increased efficiency of new-

build gas. Gas plants are being built at 56% to 60% efficiency. There is gas on the system right now at 48% efficiency so that delta in efficiency the carbon price floor gives money to new-build gas and makes it a more attractive proposition for developers.

Other elements to the carbon price floor are also important. For example, as I outlined right at the start, as a country we have invested a lot of money in onshore wind. In maybe 10 or 12 years' time, that onshore wind comes to the end of its ROC period and people such as us who own these assets will have a decision to make about whether we are going to replant or redevelop these sites. Clearly, against a carbon price floor backdrop, it is more logical for us to look at the development economics of that in time to do that than if it did not exist, so that would be another positive.

Lord Turnbull: But the effect of that would be that you are maintaining the competitiveness of refurbishing your wind fleet and it is not good news for gas.

Martin Pibworth: Yes, it would help with the refurbishment of our wind fleet, which is probably good for our national targets. I still maintain, as I said at the start of my answer, that it would also be very good for gas because gas gets the competitive edge, first, against coal and then, once coal has disappeared from the system in the mid-2020s, it gives a competitive edge to high-efficiency new-build gas versus lower-efficiency legacy gas plants.

Lord Turnbull: At the expense of being less competitive against wind. You are saying that new-build gas is more competitive than old gas—that is obvious—but when there is no coal to compete against, the effect of the carbon price floor is to make gas less competitive against renewables, particularly wind.

Martin Pibworth: I would argue that it would make gas more efficient against lower-efficiency gas. CCGTs are being contracted; embedded generation, diesel generation, et cetera, are all being constructed or exist on the market at the moment. There is another element to this. To pick up the point about the UK maybe moving back in step—I think was the insinuation—with European partners, I am not sure about that. From my meetings and considerations in my daily life, I think there is a strong view in Europe that they should have a higher carbon price to support some of the things I have just described. Obviously, there was some discussion in France about whether they should introduce some kind of carbon price floor or carbon support mechanism. In a world in the 2020s where the UK is in a deeper, more liquid interconnected market, the risk of the UK not having such an instrument and another country having one clearly affects the flow of electrons around the system and indigenous security of supply.

Lastly, probably the most important issue for me is that the market needs stability. As an investor in existing and indeed new assets, we need a stable mechanism that does not get changed or dramatically

tinkered with every 12 months. It feels to me, to SSE and maybe to the industry, although I cannot speak for it in its entirety, that the debate on this has been pretty constant for the past two or three years, and that lends itself to people like me inserting effective risk provisions into our investment cases, because we need stability and that certainty.

Lord Turnbull: You can get stability in two ways. One is for the Chancellor to say we are getting rid of it and the other is for the Chancellor to say that we are absolutely going to keep it. The worst thing is to say nothing. What is your preferred outcome of this debate?

Martin Pibworth: In an ideal world, I would like the Chancellor to go back to the messages of two years ago, when the Chancellor at the time said that we would have a carbon price floor until the end of the 2020s on a trajectory. It is perfectly reasonable to discuss and debate the nature of that trajectory but we are looking for the Government to follow through on some of the comments they made previously about the carbon price floor. Last year, they were talking about the carbon price floor through to 2021 and then a review at that point. That is probably the minimum we are hoping the Chancellor will say in his Autumn Statement.

Q91 **Lord Burns:** Mr Pibworth has been more optimistic about capacity and how the market is working compared to what we have heard in these sessions in recent weeks. Mr Egan and Mr Anfinnsen, do you have any general comments on whether the way in which the market works in the UK works for you and will deliver the Government's objectives?

Francis Egan: If I may, I will broaden it out a little beyond the electricity market. We have heard quite a lot about that, and it is obviously a very important part of this. However, at the end of the day, it is about a third of the energy market in the UK; the other two thirds being transport and heating.

For us, it is partially working. We have well-documented interests in exploring for shale gas. Irrespective of how we generate our electricity there will be a requirement for gas in the UK; all the forecasters accept that. For us, it has been remarkably difficult to get to the point at which we can drill some exploration wells. To put that in context, we started our application process in mid-2013—Lord Hollick has heard this before—and submitted an application in 2014. It was heard in 2015, and we got an appeal in 2016 that we might drill a well in 2017. We are still subject to planning conditions—touch wood. That is four years to get to the point where we can drill a well. In the US, they are drilling 30,000 a year. In the time it takes us to drill one, they will have drilled 120,000. That might give you a pointer as to why gas prices are $2 a unit in the US and $5 a unit in the UK. There is no natural reason why that has to be the case.

I think the Government have good intentions and we are grateful for their support. Our investors are patient, but frankly, taking four years to drill a well is beyond most people's patience.

Lord Burns: And more broadly?

Francis Egan: I was interested in that debate and the comment by Lord Forsyth, who quoted Amber Rudd when she specifically talked about security of supply. What you are hearing is other factors coming into it: security against a requirement or desire to decarbonise. They are not the same thing. You can get a secure supply without it being low carbon, and it is quite easy to get a low-carbon supply without it being secure—we can see that already. Getting the two together is quite difficult. Ultimately, and this is my personal view, somebody has to say that something is more important than something else. They can never all be equal. Somebody has to make that call. If you want low carbon to be the most important, you will probably have to put up with some security of supply issues and higher prices.

Tor Martin Anfinnsen: I will try to add to that. What I say will echo what has been said by my two colleagues. We need a stable framework with a long-term perspective. We see that, for example, in carbon prices in Norway. The regime has been stable for a long time and we have changed behaviour as a consequence. The carbon price in Norway is roughly £50 per tonne, and it is ratcheting up every year. Today, our gas and oil sector has the lowest carbon footprint. We have carbon sequestration and storage to the tune of 2 million tonnes per year, and it would not have been that way without the carbon tax, frankly. It is stable and long term and we know what to expect. We can still be competitive.

When it comes to the current outlook from our perspective in the UK, we very much support the aim of the Government to decarbonise for practical purposes and for the economy, and we support the 80% reduction. But that will mean the decarbonisation also of the gas that goes into the UK. How do you achieve that goal? Probably the only way is by CCS. There must be a stable policy to support that in some shape or form.

We are not quite sure whether the conditions for getting gas into this country in the long term are there any more. They have been in the past. The UK was always ahead of Europe in facilitating an open and transparent market but now we are not sure, with the future in mind, whether we can invest and still bank on there being demand for our gas. As a producer with a 10, 15 or 20-year horizon, we are looking for some security of demand, not only in the UK but in Europe. It is a common feature.

Lord Burns: How confident are you about the prospects of carbon capture and storage?

Tor Martin Anfinnsen: We are doing it today to the tune of 2 million tonnes per year. We know that pre-combustion sequestration is much easier than post-combustion. We were very much involved in Shell's Peterhead project and others. It will not be easy but we are very optimistic that in the long run it will be possible to do it. Right now, though, we are spending a lot of time and effort on the transportation

and storage part of CCS, which is also very important. But in the long term we have to face up to the fact that in a decarbonised world, that is the only way gas will survive in the mix. That is a strong incentive.

Lord Burns: But what more should the Government be doing to hasten this process? You suggest that you are looking for incentives and official support. What other things would you like to see happen?

Tor Martin Anfinnsen: The carbon floor is one approach. That incentivises us, and again I make reference to what we have done in Norway as a direct consequence of the CO_2 tax. More targeted support could achieve much the same. I do not know whether it was called a subsidy at the time, but the basis on which Shell promoted its project in Peterhead brought on board several serious players in the industry.

Martin Pibworth: May I comment? Peterhead is an SSE station, so we were involved in that potential project as an investor. What made us and Shell confident that we could deliver something was the stable construct of the CFD mechanism. Material amounts of money were spent on developing that project. I cannot speak for Shell but from an SSE perspective we were disappointed that that project did not go ahead. But it gives you an idea of the structure that may be required for these high-capital-intensive projects. From an industry perspective, in trying to manage the transition to a lower-carbon electricity market, the need for stability and policy is really important.

Lord Burns: Finally, we have had a lot of debate and discussion here about what the costs of renewables are, when it is that they are likely to be competitive without subsidy and the whole issue of taking into account the cost of backup generation to deal with the intermittency issues. I would like to hear from each of you how you see the prospects.

Martin Pibworth: If I may, I will take us back slightly. There has been remarkable progress by the industry in reducing the cost particularly of onshore renewables but equally of offshore renewables. Prices have clearly come down. That is testimony to a very stable policy that has existed in the UK that has allowed the UK and asset owners and developers to have a mature supply chain and put pressure on the costs side. The assumptions we would make today about contingency, project management costs, capital overrun, et cetera, would be considerably lower than when we were building onshore wind farms back in 2010. That helps us build projects at a cheaper price. We are spending a lot of time in SSE trying to find a way of delivering renewable capacity in a subsidy-free world. Key to that will be a stable and robust carbon price. That is important to say, but equally we think that in the longer term it will be possible to do this without any direct subsidy, or at least with some kind of CFD arrangement which attracts the investments. We are making good progress as an industry. It is really important that as a nation we do not kill that progress off.

Q92 **Lord Darling of Roulanish:** My question is about carbon capture and storage. I remember visiting the Peterhead project 13 years ago and

launching a competition to do something which I think developed into another failed project in the Firth of Forth. Realistically, are we ever going to see CCS? People keep saying that they know about the carbon, they know about the capture and they know about the storage, but they cannot seem to link the three of them. Is this always going to be at least 10 years away?

Martin Pibworth: I will answer that from my experience as the person in SSE responsible for Peterhead power station. I was very close not to the project you described—which I think was a BP collaboration—but to the Shell collaboration at Peterhead. After many years of engineering studies and people much brighter than me making decisions about how all this fits together, we believed that we had a practical, workable solution at scale. We believed that we had something that could be delivered.

Lord Darling of Roulanish: What killed it?

Martin Pibworth: The Government decided not to go through with their competition on the CFD process so we did not get a chance to bid that through the process.

Lord Darling of Roulanish: Where else in the world are they actually doing it?

Martin Pibworth: I am not aware of anybody doing it at that scale elsewhere in the world. From memory, I think there is a power station in Canada where they are doing it with coal but I do not think it is a gas solution. Tor Martin may know.

Tor Martin Anfinnsen: This was the key project last year. There were others, but they were much further down the merit order, if you will. I agree very much with what Martin says. There are very realistic hopes of making this happen. Our company was focusing on the transportation and storage part of it; Shell was pretty confident about the carbon capture part of it. We are doing this in addition to the Sleipner field in Norway. We are doing it in the far north already in connection with LNG. We are also doing it in Algeria, in In Amenas. So it happens today, and it happens close to the well, typically.

Lord Forsyth of Drumlean: Just on that Sleipner field, the information we have been given is that you have stored 14 million tonnes of CO_2 to date. Is that correct?

Tor Martin Anfinnsen: I cannot vouch for the total number but in Norway we store roughly 2 million tonnes per year.

Lord Forsyth of Drumlean: Right. So what has the cost of that been?

Tor Martin Anfinnsen: This was built into the original concept of the field. As such, it was much less costly than if it had been bolted on to an existing facility. I do not have the numbers, but I am sure we can provide them.

Lord Forsyth of Drumlean: Not even a rough indication?

Tor Martin Anfinnsen: No, I am afraid not.

Lord Forsyth of Drumlean: To what extent was it dependent on there being a specific tax on the CO_2?

Tor Martin Anfinnsen: Very dependent.

Lord Forsyth of Drumlean: The tax on the CO_2 was, what, $50?

Tor Martin Anfinnsen: It is now. It has ratcheted up from a lower level initially but it will continue to ratchet up from where it is.

Lord Forsyth of Drumlean: Right. So presumably, therefore, it must have been less than $700 million.

Tor Martin Anfinnsen: Again, I cannot vouch for the number. But I can definitely check that and have that fed back to you.

The Chairman: If you could let us have that response.

Lord Layard: Could you comment on the outlook for solar? You have talked about everything else but what about solar?

Martin Pibworth: SSE has no significant solar interests so I am no expert on it. I suspect you will be as informed as I am. When I talked about it in my introductory remarks, I was not necessarily talking about industrial solar but about the rise of solar panels on domestic homes and the significant output that can give on a sunny day. I do not know the trajectory of solar beyond the fact that penetration is probably slowing down as a result of reducing subsidy for that technology.

Q93 **Lord Layard:** Perhaps we could explore the impact of low gas and oil prices in the world at the moment on your businesses and how you are thinking about how that might work out in the future.

Francis Egan: Perversely, it is rather good for our business at the moment, being an exploration company with the high-class problem of no revenue. We are finding that the cost of services has declined dramatically. It is costing us a lot less—or will, I hope, cost us a lot less once we get started on drilling and testing the wells—than it might have done a few years ago. Another perhaps perverse—perhaps not, depending on where you sit—impact of Brexit has been that we are funded in dollars so we get more pounds for our dollar than we did three or four weeks ago. Again, that has helped us. Obviously, as we move into the production phase, the opposite will come into play, where we will be hopeful for somewhat higher prices. I will not even try to forecast what the gas price will be because I will be wrong. At least of late, US prices have been picking up and UK prices have been picking up as well. We might hit the perfect point in the market if we are lucky.

Tor Martin Anfinnsen: From our side, we produce roughly 2 million barrels of oil equivalent per day. We still have a growth trajectory. Near-

term projects are still going on as planned. You might know that we are now developing the £4 billion Mariner project off the UK, which I understand to be the biggest in the UK over the past decade. Of course, this has hit our industry very hard but there is a lot of good coming out of that. One good thing is that the industry in total is slimming down, which was necessary. Addressing the costs as vigorously as we are—not only our company but the industry in general—is also reducing the break-even price of new production, which should benefit end consumers in the longer term. Just to give you one example, we have an oilfield up in the very far north called Johan Castberg. The first time I heard about it, the break-even price was around $100 per barrel. Then when it was over the first hurdle, it was just over $80 per barrel. Now it is at $45. That was absolutely inconceivable at the time but it has proven possible, and it has proven possible across the industry, be that in shale or in conventional oil and gas.

Martin Pibworth: I would characterise prices over the past 12 months as extremely volatile rather than low. Six months ago we were looking at a prevailing gas price of 30p and an oil price of $30. Today it is roughly $45 to $50 for a barrel of crude and the winter gas price for the balance of this winter is probably near 50p. There is a certain amount of volatility in that. It has not necessarily hit our investment strategy. Our investment strategy is based around being balanced and trying to mitigate across the whole chain. Interestingly, in a world of commodity price volatility, it is really key to bear in mind that, as an importer, the UK is exposed to global events in a way that it probably was not 10 to 15 years ago. For me, that stresses the importance of having mechanisms that provide base remuneration to assets outside of the volatility of commodity prices. That is significant.

Q94 **Lord Livermore:** When do you expect exploratory drilling for shale gas to take place? Do you think that government policy is now clear enough to encourage the development of the industry?

Francis Egan: I think we will be the first to drill wells. We now have approval to drill four wells in Lancashire. We are going through the planning conditions with the county council and expect to have discharged those by the end of the year. We expect to start site construction at the beginning of next year, to drill the wells in the second quarter of next year and to be testing them by the end of next year. These will be the first exploration wells drilled into UK shale, although certainly not the first into shale or in the UK but the first horizontal wells drilled into UK shale and tested, and so they will be very closely watched. We are obviously very technically excited about it, but I have been long enough in the oil industry to know that the proof of the pudding is in the eating. We will have to drill them and test them.

Lord Livermore: What about the Government's policy?

Francis Egan: The Government's policy has been very supportive. The issue we found, which I alluded to earlier, is translating that through the

Town and Country Planning Act—a fantastic experience that I would not recommend to anybody.

Tor Martin Anfinnsen: Our company is also involved in shale, but only in the US. We looked at the UK some time back as part of a global survey, together with Chesapeake in the US, but we decided against going into the UK.

Lord Livermore: What are the reasons?

Tor Martin Anfinnsen: We believed that we were operating on a more prolific basis in the US than what the UK could offer. I think it was primarily due to the above-ground risk and not so much about government policy. This country is fairly densely populated. There have been obstacles to our activities in the Marcellus field in the US and we thought that those might be even tougher to overcome here.

Lord Livermore: Can you see a situation where you would reconsider that decision in the UK?

Tor Martin Anfinnsen: You can never say never, but I do not expect that. For us, it is much more cost efficient, based on our calculations, to develop offshore fields and our offshore Norway assets and bring that gas into the UK by pipeline.

Francis Egan: I am hoping to convince you otherwise.

Lord Turnbull: What is the surface area that you have to take in order to drill a well?

Francis Egan: A well is very modest. You could drill a well in this area.

Lord Turnbull: But what about the whole site?

Francis Egan: Our site in Lancashire, where we are drilling four wells, is two hectares which is about the size of two football pitches.

Lord Turnbull: Is that two hectares for each well?

Francis Egan: No, the whole site is two hectares. We are going to put four wells on it but you could put 40 wells on it. The surface area is probably the most modest of any energy development.

Lord Turnbull: But the issue here is not the land take. It is more about access, is it not?

Francis Egan: The issues tend to be typical planning issues around traffic and noise. The land take for shale is order of magnitude lower than wind, solar or nuclear per unit of energy produced because it is all happening 8,000 feet underneath ground. The land surface impact is quite small.

Baroness Wheatcroft: How do you square the production of shale gas with emissions targets?

Francis Egan: The climate change committee and the Government squared it. As to how I square it, we are going to need gas and that is going to have to fit into emissions targets or else we are going to have to shut off the heating in the country, and that is not going to happen. We have to demonstrate that we can produce gas at lower emissions than we can import it.

You have to remember that emissions for us are revenue. We are burning dollars or pounds. People say that we have to be heavily regulated. We do not have to be heavily regulated—it is our product; it would be like Tesco throwing away its food. The best practice is that you get down to less than 1% emissions, and there is no reason why we in the UK cannot do that.

Baroness Wheatcroft: Do you think the Government are providing a regime in which you are confident enough to invest in shale? Obviously you do.

Francis Egan: Shale is quite an interesting investment proposition. It is quite different from Hinkley Point and is probably more akin to a power station, in that it is an incremental investment. Each shale production site, or pad as we call them, is a self-contained investment. It a cookie-cutter approach. It is not like the North Sea where you would be putting in several hundred millions of pounds or, as we have just heard, $4 billion. That is a big gamble; if the oil price tumbles the day after that comes on, everyone would be very sad. For large companies—we are not a large company—it is useful to have shale in your portfolio exactly for that reason, because you can balance the $4 billion investment with 10 $100 million investments.

So, yes, people are comfortable investing in four wells. The next test will be whether they are comfortable to invest in a production site with 10, 15 or 20 wells. We do not get any government money. As a company, we are backed by private equity and in due course we will probably have to go the equity markets or debt markets to scale up. I think there is still an appetite to invest in oil and particularly gas in the UK, but we will be testing that.

Q95 **Baroness Wheatcroft:** There is one area we have not talked about. Perhaps all three of you can tell me your projections for what you anticipate will happen to energy use in this country.

Francis Egan: That is a bit like the question about energy price, but I will have a guess. Most people say that gas use will come down, not least because we are looking to increase renewables in the electricity sector. That will probably be the case. Equally, the population is going up. I do not know whether energy usage per head is going down that much—others might be in a better position to say. I expect that there will be a marginal decrease in gas usage but I cannot see it falling off a cliff any time soon.

Martin Pibworth: I do not have too much to add to that—it is a very difficult question to answer—but there is no doubt that usage per head has dropped significantly over the past five to 10 years. Off the top of my head, I would say that it has dropped by around 15% or 20%. There is clearly still a drive to energy efficiency in the UK, and I think some of the government schemes have been relatively successful in delivering more efficient housing stock, for example.

Part of my responsibility is overseeing an energy solutions business that goes into big industrial sites and helps them control their energy usage and optimise it. We are seeing much more demand in the big user space for those products and systems, so I suspect that that sort of design product will penetrate further and deeper into the market, which will reduce usage.

I guess that the great unknown for me is electric vehicles and how quickly they will come on to the market. This is not a particularly informed view, but my hunch is that they will be taken up much quicker than people are assuming, not least because of various things that we have seen in Norway and France where the right targeted subsidy has created the demand for that type of vehicle.

The picture is incredibly complex. I am saying that a lot, for which I apologise, but it feels to me that the energy efficiency drive will continue, which will probably reduce unit-per-head energy in the medium term.

Baroness Wheatcroft: Thank you. Mr Anfinnsen, would you like to add anything?

Mr Anfinnsen: I very much agree with what Martin says.

Q96 **Lord Darling of Roulanish:** On the question of drilling for shale gas, I think you said that you expected the exploratory drilling, if it goes ahead, to be completed by the end of next year—2017.

Francis Egan: The initial wells, yes.

Lord Darling of Roulanish: How long to you expect it will take to evaluate those findings before you reach a decision on whether or not you want to do it on a commercial basis? What is the timespan between the end of your preliminary drilling and a decision to go ahead?

Francis Egan: That is a good question. Typically, shale wells decline over an 18-month period from an initial floor rate before they stabilise at the lower rate, which can carry on for 20 years or more. A 12 to 18-month window would not be uncommon. That said, these being the very first wells drilled and tested in UK shale, I am sure we will see some surprises along the way that will either accelerate or decelerate that. That is the ballpark.

Lord Darling of Roulanish: If you look at the likely price of shale gas versus imported gas, we had evidence suggesting that there might be some doubt over whether the shale gas can ever be cheaper than the

imported gas, given that imported gas prices are so low at the moment.

Francis Egan: Yes. It depends on where it is imported from, clearly. I am sure you have had evidence—it is pretty widely accepted—that by 2030 we will be importing virtually all our gas. That is not all going to come from one place. Norway—sitting next door to us with developed infrastructure—is a relatively low-cost supplier of gas. We are probably competing in shale gas with imported LNG. So if you look at US gas prices, at about $3 a unit, add $1 or so to liquefy, another $1 or so to transport and another $1 or so to translate it back into a gas, you are talking about $6 landed in the UK, which is what we have to compete with. We are comfortable we can compete at that level.

Lord Darling of Roulanish: Mr Bell of the climate change committee has said to us that shale gas is okay only if it displaces an equal amount of imported gas. What do you say to that?

Francis Egan: It is like the Archimedes principle of shale gas. It is an interesting accounting balance because you end up with the perverse situation where it is actually better for the climate to develop your own gas but on your books it is worse, because you do not count the emissions of the production of the imported gas. The climate is not British, so if you take a sensible view of the world, if it produces lower emissions to develop it here than to import it from the US, you should be developing it here. For example, for Scotland to be importing shale gas from the US and to have a moratorium on exploring for it, never mind producing it—in a country that has led Europe in oil and gas development for 25 years—is beyond belief.

Lord Darling of Roulanish: Indeed. Can I come back to the CCS point? I am puzzled why, if it is so ready to go, no one is actually doing it—on a big scale, I mean. Is it cost?

Francis Egan: Personally, I think so. The economics of it are not proven. You saw last week that some of the very large oil companies—BP, Statoil, Total—are putting serious money into it again. Personally, I am quite optimistic about the technology. The technology is there but people have not been able to make it economical.

Lord Darling of Roulanish: Commercial.

Francis Egan: Exactly.

Martin Pibworth: The thing I learned from the Peterhead experience was that you have to spend significant amounts of money going through your engineering and design phases to make sure that you have a credible technological solution. Before anybody commits to spending that sort of investment money up front, they would want to be pretty sure that there is a firm way of remunerating that once everything is established. At the moment, that mechanism just does not exist in the UK. I cannot really speak internationally because I am unaware, but certainly that is the experience in the UK.

Lord Darling of Roulanish: I have a final question for Mr Egan—back to the shale gas. As I understand it, there are four sites in the UK that are being looked at at the moment. There is your one—

Francis Egan: Yes, IGas is looking at a site. I do not know whether the other two are. I know INEOS is looking at a number of sites. There are no production sites in the UK, if that is what you mean.

Lord Darling of Roulanish: No, I know that. I just want to get a feel for how far ahead the industry is as opposed to your own firm. I understand the problem in Scotland, which you have to understand is tied up in Scottish politics.

Francis Egan: Yes, of course. I do not think that any of us has an application in to drill a horizontal well. There is an application in Yorkshire to fracture a vertical well, which is subject to an appeal, and there is an application in Nottinghamshire to drill a vertical well—not even frack it. Roughly speaking, we are about a year and a half to two years ahead of everybody else.

The Chairman: Gentlemen, thank you very much for your helpful answers. That brings this part of the session to an end. Thank you.

Examination of witnesses

Mr Richard Warren, Mr Jeremy Nicholson and Mr Andrew Buckley.

The Chairman: Welcome to this part of the session and thank you for joining us this afternoon. Lord Kerr would like to ask the first question.

Q97 **Lord Kerr of Kinlochard:** Thank you. I need to declare an interest as a director of a power company. Somewhat paradoxically, I would like to ask about the price of electricity to industrial users. The numbers published in September by the Department for Business, Energy and Industrial Strategy suggest that prices in the UK are the fourth highest in the IEA and that the tax component of the price is higher than anywhere else but Italy.

Do you agree with these numbers and, if so, how serious is this for determining industrial investment decisions? Can you give us any examples of decisions that went what one might think, in the national interest, was the wrong way as a result of the price of electricity?

Jeremy Nicholson: Thank you. I will answer on behalf of energy-intensive industries and perhaps my colleagues can comment on manufacturing and business users more broadly.

The published figures that you refer to do accord with our members' understanding about relative prices here and elsewhere. After all, a lot of manufacturing companies in energy-intensive sectors have parts of the

same company operating elsewhere in Europe, and indeed internationally, and are therefore in a good place to understand these pricing differences.

It is certainly true that for the largest industrial users, electricity prices are among the most expensive in Europe and European prices are, of course, quite high by international standards. Part of that—a very large component in fact—is due to add-on costs. Most of them are to do with the climate programme; a mixture of direct taxation, although, interestingly, that is the lowest component; and carbon costs, which I am sure we will discuss. It is not just the EU emissions trading scheme and the extent to which that inflates wholesale prices, and therefore supply prices, but, more particularly, the UK-only carbon price floor, which is much more problematic for our members. Then there is the cost of the renewables programme, the small-scale feed-in tariff, the renewables obligation and the contracts for difference.

To put some numbers on that, typically for an annual bill the wholesale price might be around £50 per megawatt hour on average—it will be slightly higher this winter. We might be looking at something like £13 per megawatt hour for carbon pricing—several times the level elsewhere in Europe—and around £20 per hour for the combined cost of the renewables elements. Some of those elements are subject to partial compensation for a number, but not all, energy-intensive sectors. An even smaller number of energy-intensive users benefit from the relief of some of the cost of the carbon price floor but, due to reasons to do with the EU state aid guidelines, which are somewhat confused on this subject, there is a different eligibility for carbon price relief than there is for renewable relief. Of course for my colleagues in other parts of manufacturing, they face nothing but increased costs.

Andrew Buckley: To add to that, most of our members are not energy-intensive users and, therefore, the relief that the energy-intensive users get has to be borne by others. This came up earlier this afternoon, but when we talk about whether there can be a competitive market, our members basically face two fundamental elements within their bill. One is the competitive energy charge and the other is all the additional costs that go to delivering, but there are also all the levies and what have you.

If I was talking to you five years ago, we would probably be saying that the average energy element was about two-thirds of the bill. Today, that has reduced to between one-third and a half. If our projections are anything to go by, the actual competitive element within the bill will reduce to about 25% over the next few years. In terms of looking at industrial energy prices—and indeed commercial energy prices, because we have data centres, which are large electricity users and are equally transportable from one country to another—you can see the burden of these additional costs, which is the focus of our attention at the moment.

Lord Kerr of Kinlochard: Thank you, I understand. Did you say, Mr Nicholson, that the carbon component of a price at around £50 or £60 was £13?

Jeremy Nicholson: Yes, the carbon price floor has been pegged at £18 per tonne of CO_2. This produces an effect on the wholesale price of electricity of around £10 per megawatt hour, which may not sound a lot but, in conjunction with the other add-on costs, it is considerable—and it is not faced in the electricity costs of any other manufacturing user in the EU.

Lord Kerr of Kinlochard: You are talking about UK-imposed costs, not the costs of EU emissions trading?

Jeremy Nicholson: This is a self-imposed injury.

Lord Kerr of Kinlochard: Could you give us examples of energy-intensive industries that have really suffered as a result? I offer aluminium smelting—there is not a lot of that done in Britain now.

Jeremy Nicholson: Indeed, there is none in England and Wales following the closure of the Lynemouth smelter in Northumberland and the Wylfa smelter in Anglesey. A small amount of smelting is still carrying on, I understand, in Lochaber in Scotland. One wonders how long that will carry on operating here.

Aluminium production is among the most energy-intensive processes, but we have seen similar loss of capacity in a number of energy-intensive industries, even industries such as the paper industry—which may not have attracted the same attention as the steel closure—where we understand that there has been something like a 25% closure of capacity in the last 18 to 24 months. The UK is now one of the biggest importers of paper products in the world. Energy price competitiveness, particularly electricity price, is one of the biggest factors in those closure decisions. It is fair to say that it is rare for energy prices to be the only factor in a closure decision or decision to divert investment to another part of the business or another part of the world in which the business is operating, but it has increasingly become the dominant factor, particularly for energy-intensive industries that are also worried about their own carbon costs in the long run.

My colleague Richard can say more, specifically about the steel industry, which has of course been in the news recently.

Richard Warren: Just to place energy prices in the context of the wider steel crisis that has happened over the last 12 to 18 months, the reasons underlying the steel crisis have been well discussed: global overcapacity in steel production and cheaper imports from places such as China. That has affected steel companies across Europe, but one has to ask the question: why has the steel sector in the UK suffered particularly badly? One reason that comes up consistently from steel companies is energy prices and, specifically, electricity prices.

There are lots of different estimates and figures on what exactly the costs of energy are within different steel sites and different methods of production. The World Steel Association puts it at somewhere between 20% and 40% of costs. To put that into a slightly clearer context, at a

blast furnace site, the costs of just electricity are 11% of costs. We have calculated that at an electric arc furnace for recycling steel it is closer to 20%.

Lord Kerr of Kinlochard: Evidence to the climate change committee put the figure at closer to 1%, saying that if you took into account sterling and the fall in the price of steel, and a range of other factors, the cost of electricity amounted to only a 1% disadvantage to location in the UK.

Richard Warren: One can fiddle around with percentages for an extremely long time. With all due respect to the climate change committee, these figures have been produced this year by steel companies; they are looking specifically at electricity costs, particularly at electric arc furnaces. I remember an interview with the chairman of the Committee on Climate Change in which he stipulated that the key costs for energy at steel sites was natural gas when, in fact, it is the exact opposite—it is electricity. I would perhaps question all the figures that come out of the climate change committee on this.

To jump to a couple of specific examples of where energy costs have impacted investment decisions within the steel industry. I am happy to provide more specifics in a slightly less public forum, but one company that has plants in the UK, France and elsewhere in Europe approached the French Government in relation to investment decisions—investment they wished to make in plants in France—with concerns about electricity prices. Within four months, specific measures had been put in place to make electricity prices more attractive there. Let us compare that with the situation in the UK, where discussions have been ongoing since at least 2010 about the impact of climate change policy on electricity prices and certainly for the past 12 months on more specific measures for the steel sector to reduce electricity prices. It will have taken us five years to put in place what we will finally have next April in terms of climate change costs. Since the referendum on 23 June and the change of government, all progress against further measures on electricity prices has completely stalled.

Q98 **Lord Forsyth of Drumlean:** Have you made any assessment of the impact? Looking at the reasons given for adding to the cost of electricity to avoid non-green emissions, and taking as an example the steel industry in particular, have you made any assessment of the amount of carbon we are importing as a result of the substitution of Chinese steel relative to the effect on the planet overall if the steel were manufactured in the UK? Have you done that exercise for other industries? We seem to be in an absurd position. I visited the docks in Liverpool the other day to see wood imported from North America, turned into chips and put on special trains to be taken across the country to be burned, because apparently it is better for the planet than burning coal. It is difficult as a layman to understand how this makes sense looking at the totality. Have you done any work on that?

Richard Warren: To provide exact figures on the level of carbon leakage in the steel sector is very tricky. One needs specific carbon emission

factors from steel plants in China and to substitute them for the production in the UK that it would be displacing. To take one example, perhaps the biggest increase in Chinese imports has been in rebar—reinforcing bar for concrete. In the UK, it is produced exclusively in electric arc furnaces from recycled steel. When we get to the point where the grid is decarbonised, that will be extremely low-carbon steel. If we compare that to the rebar produced in China and brought in, we see that it is almost exclusively produced by blast furnaces and will be of far higher carbon content. To come up with figures for the entire steel sector and the amount of carbon that we are importing is extremely tricky, but industry has consistently asked government to look at it. One project that we are working on at the minute with BEIS officials is the 2050 decarbonisation road map. We want in future years to see a sector-by-sector breakdown of import emissions or consumption emissions as a whole, rather than just of the emissions we produce in this country.

Lord Forsyth of Drumlean: Is not the danger that by the time this work is done there will no indigenous industry to benefit from your work?

Richard Warren: That could be a danger. We are certainly not proposing that government halts any progress on actions that could help the industry while it awaits developments on consumption emissions.

Jeremy Nicholson: You are absolutely right to make that point. It is a bit like a patient going to the doctor and saying, "Doctor, doctor, I'm ill", and the doctor saying, "Don't be silly. You're not dead yet", and waiting for the point at which they are dead, when the person is proved right that they had something wrong with them. That is what it feels like in industry. Some of us in the Energy Intensive Users Group and elsewhere have argued with government for a long time about this. We are not saying that we should not be on a long-term decarbonisation trajectory or that we should throw out the Climate Change Act, but that in forming policy we need to be sure that we are reducing emissions and not redistributing them. One problem is with power generation, for example, which is currently covered by the EU Emissions Trading Scheme—no one knows what will happen as a result of Brexit negotiations on that, but for the moment it is covered by it. That means that unilateral measures here, the cost of which are borne by UK consumers in industry and elsewhere, mean every tonne of CO_2 that is saved in UK power generation is a tonne of CO_2 that can be produced by our competitors elsewhere in Europe. The net result of this is not to reduce emissions. You will have heard, not just from the earlier evidence from SSE but doubtless from others, that the UK has successfully decarbonised power generation as a result of the unilateral carbon price floor. I am sorry, but while it may have reduced the emissions on our books, it has allowed further increases or smaller reductions elsewhere in Europe, and it has increased the cost to UK consumers into the bargain. I do not think that it is intellectually honest for the Government to pursue such policies and claim that it is a decarbonisation effort; it is a redistribution of costs and of emissions. In fairness, Defra and DECC have done some work themselves—we lack the resources to do it comprehensively. I am not

suggesting that it is practical to have consumption-based targets, but there needs to be an impact assessment for new and current policies to make sure that this is properly taken into account.

Lord Forsyth of Drumlean: But you say that that data is not currently available.

Jeremy Nicholson: It is patchy.

Richard Warren: It is available from Defra at a high level, but if you want to understand the impact on individual industrial sectors, that data is not available.

Jeremy Nicholson: Some of us of a more cynical disposition might say that it has suited government or parts of government in the past that this data has not been made available.

Q99 **Lord Tugendhat:** How does the carbon price floor interact with the EU Emissions Trading Scheme?

Jeremy Nicholson: It undermines it. Its primary function is to undermine it, in effect, by taking some of the strain off the EU Emissions Trading Scheme.

Lord Tugendhat: So the floor undermines the scheme and not the other way about.

Jeremy Nicholson: Yes, or rather the interaction between the two is unfortunate, to put it mildly. If you are serious about having cost-effective carbon reduction within the power-generating sector and potentially other industries, too, there is some merit in going down the trading route. One can argue about whether that should in future be done under an EU cap or some other arrangements. What does not make sense is to pursue two directly opposing policies simultaneously, which has been the root of the problem. It is a problem, too, with unilateral renewables policies, which have the same effect. If you want a more robust carbon price signal but without causing the same damage to consumers, you would reduce renewables subsidies and unilateral carbon taxation and allow the emissions trading scheme to work properly. Whether that would necessarily produce a result that was acceptable to all our members, I do not know, but it stands a better chance of doing so. This needs to be borne in mind every time this or future Governments consider unilateral measures. How does this tie in, or not, with our international obligations? The two have to be compatible.

Lord Tugendhat: Will this particular international obligation continue after our withdrawal from the EU?

Jeremy Nicholson: I do not think that anyone is in a position to answer that, assuming that the UK goes ahead with Brexit at some stage. Nobody knows whether the power-generating sector or energy-intensive industries will be subject to some of the same single market rules as at present or whether some special arrangement might be made. There

could be good logic for doing so on collective actions and emissions, regardless of what might happen elsewhere in the economy. That said, there could be significant dangers to UK industry, not so much to the power industry, which can pass these costs on to consumers, but to industrial users, business users, my colleagues in the steel industry and elsewhere and, of course, every other domestic consumer in being subject to regulations and policies over which we might not have direct control, even though they will profoundly impact on our market. I put it no stronger than that. In the Energy Intensive Users Group, we do not take an ideological position pro or anti membership of the single market, providing we have non-discriminatory, tariff-free trade in energy. There may be a lot of sense in co-operation on least-cost emissions solutions. It is good to be open-minded about this but the worst situation would be to be bound by the same rules as we have at the moment, or possibly tighter rules, with a lack of influence over them.

Lord Tugendhat: Looking at the problem from the other side of the equation, would you support the abolition of the carbon price floor?

Jeremy Nicholson: Yes. In fact some of us called for its abolition on the day that it was announced and have carried on doing so ever since. Realistically, there is a limit to what the Chancellor can say on this subject, even if he was minded to do so in a few weeks' time. One understands that energy companies and others have built in certain expectations about carbon pricing to the short term at least. However, the initially announced trajectory for the carbon price floor was absurd, and was regarded as such by investors and everybody else from the moment that the Treasury first thought of the idea. Thirty pounds a tonne unilaterally by 2020 and £70 a tonne by 2030 is absurd—it was never realistic. No one has invested in anything on the expectation of those prices being realisable or politically tolerable. Hence, very shortly after the price floor was introduced, it was capped at £18 a tonne. We still think that that is too high as far as consumers are concerned.

If one accepts that at least in the UK, if not internationally, this has helped drive some coal off the system and tip the balance towards gas—in the long run that may be a good thing—then fine. But this is going to be practically irrelevant after 2025, when coal will no longer be on the UK system. At that point, the carbon price floor only adds cost to power generation. Frankly, I did not believe a word that SSE has said on this subject. I think that they were looking after the interests of their renewables portfolio and not gas-fired power generation. There is no way that taxing gas-fired power generation more than other forms of generation makes it easier to invest in, whatever the environmental logic for doing so.

Lord Tugendhat: That is a very robust and clear answer. Given that, it would be helpful if your two colleagues would tell us whether they agree with what you said.

Andrew Buckley: I welcome that, but would perhaps put a slightly different spin on it. Over all these years, the energy markets have

worked on customers' perceptions of the market. It may be, as Jeremy said, that there are very specific costs attached to this. This is a unique tax that industrial and commercial customers in this country face.

The bigger picture is that it is seen by those who invest in our country as an extra charge that we, and we alone, have; and that regardless of market conditions we have already set a profile forward that this tax will continue to be paid. We certainly support the EIUG's view that this is a tax. It has had no benefit in encouraging investment. Renewables investments have gone ahead for the reasons that they have and we see no purpose in it beyond simply raising revenue through taxation.

Lord Tugendhat: Do you agree, Mr Warren?

Richard Warren: I entirely agree. There are measures in place to reduce the impact of the carbon price floor on the steel sector and other sectors. State aid rules limit how much that offsets the price. You are probably paying around 30% to 40% at the minute, so we are shielded from most but not all of the cost.

To touch on the points around certainty of investment, all investment in renewables, at least for the foreseeable future, will be based on contracts for difference. It is entirely irrelevant to those people with contracts whether they get their money from an inflated wholesale price reliant on the carbon price floor or from top-up subsidies. The only impact of the two policies combined, the carbon price floor and a contract for difference, beyond possibly bringing coal out of the system—although that could be done more cheaply—is to completely unnecessarily increase the cost of decarbonising our grid.

Jeremy Nicholson: Very quickly, the issue of EU state aid laws is critical here. No other part of the EU has a carbon price floor, so there is no interest from any other member state or the Commission in helping the UK get out of the mess that it has created for itself on this subject. The state aid laws are very clear at the moment. Only an extraordinarily narrow number of energy-intensive sectors, not all of them electricity intensive, are allowed to compensate for this self-imposed injury. It happens to be, thank God, that the steel industry and one or two others are receiving this relief. But even in the ceramic sector, which is a less electricity intensive sector, there are specific examples. I can give the Committee more evidence on this in confidence, but I know of four companies where investment has gone elsewhere in Europe because of the price competitiveness issue, of which the carbon price floor is a big part. That is despite the fact that these are four companies running high-temperature, electricity-intensive arc processes that are about as electricity intensive and trade exposed as you could possibly demonstrate. Yet under these somewhat absurd EU rulings you are not allowed to provide compensation for our UK-only carbon price floor. As long as this remains in place, those industries are in danger.

The more broad business concerns we have heard show that there is no solution for Andrew's members in business generally or in the public sector unless and until that tax is removed.

The Chairman: It would be helpful if you could provide that information about the ceramics industry to the Committee.

Q100 **Lord Turnbull:** We as a Committee are in a certain amount of difficulty. We are hearing extremely contradictory evidence. Lord Turner, a Member of this House and the previous chairman of the climate change committee, when talking about industry said that: "a large slice of it might be called general electro-mechanical: engineering-based, making cars, factories that deal with food processing and so on. They are heavy users of electricity, but you still find that the total importance of electricity in their cost base is not large enough to make a difference to the location of manufacturing industry". Presumably you would repudiate that.

Jeremy Nicholson: That is self-evidently nonsense and Lord Turner has form on this. He had form while campaigning to get himself that job as chair of the climate change committee. He carried on behaving that way as chair and he has carried on behaving that way since. I am not entirely surprised by his remarks. I prefer to base our remarks on evidence from our members and others, whose investment decisions speak volumes.

Why, when there are closures of heavy manufacturing plants in Europe, are they concentrated in the UK? I cannot say that the entire reason is down to the disparity in energy prices, but do not tell me that it is a trivial issue. We have got the evidence and have shared it with you, and we will give you more. Virtually all the increase in costs is attributable to climate policy. I am the first to admit that climate policy does not need to be that expensive. If we could get those costs down, that would be the best way of shutting up critics like me who like to moan about climate policy from time to time and the best way of preserving our competitiveness.

Lord Turnbull: Let us put the bias of Lord Turner to one side. We all have in front of us a chart from BEIS called "industrial energy prices in the IEA", with a measurement in pence per kilowatt hour. The average is something like 4.7p and ours is 9.7p. The department seems to minimise that, but what is interesting is that each column has the tax component added to it. For the UK, the tax component is absolutely miniscule. This chart tells us that the price is higher but that none of it is to do with the tax component.

Richard Warren: The figures published both by BEIS and Eurostat give us a headline idea of where our electricity price sits compared to that of other countries. They are not entirely consistent in how they treat tax or in what they call tax. The miniscule proportion attributed to tax in those figures is down to the climate change levy, which is perhaps £5 per megawatt hour of those £95 per megawatt hour. What it does not call tax are things such as the levies on renewables obligations, small-scale feed-

in tariffs or contracts for difference, soon to be the capacity market. They call those levies and so they sit in the energy component element. If you look at how electricity prices in other countries are treated, sometimes those things will be called a tax.

It is important to point out that those headline figures do not take into account the various measures that different Governments put in place to reduce those costs. In a lot of the comparison figures, Germany seems as though it has a very high electricity price, but you have to take into account the various exemptions. They get almost 100% exemptions on renewables cost, and between 80% and 85% exemption or discount on transmission and network costs. Germany actually has one of the lowest industrial electricity prices in Europe. I have spent probably far too much time trying to make like-for-like comparisons. It gets incredibly complex, and perhaps you can really only drill down to get a realistic picture when you are doing it almost on a sector-by-sector basis.

Lord Turnbull: When you get into the compensation, what I have learned today is that although the department will say, "Well, of course we don't have a competition scheme", there is a competition scheme but it seems to deal with Mr Nicholson's clients but not those of Mr Buckley. He is very limited. The other feature of this compensation scheme seems to be that it is bolting the stable door. These industries have gone by the time it is introduced. So they can now go round saying, "We have this compensation and we have brought the price down", but the aluminium sector is long since gone. Is that a reasonable interpretation?

Jeremy Nicholson: It is. Richard is quite right. The Eurostat figures and the IEA figures are not wrong but they require some interpretation in terms of the tax and non-tax elements. With the exception of the climate change levy, which is a downstream tax, the other tax elements are embedded within our wholesale prices here. The carbon price floor and the other costs do not count as tax, even though in practical terms the renewables obligation, feed-in tariffs, CFDs and so on have that characteristic. Like-for-like comparisons are not straightforward and I sympathise with the Government in trying to find official international data that make that transparent. We have done some analysis on that ourselves, which we can share.

Lord Turnbull: The Government are not trying to make this transparent. The Government are trying to diminish, or trying to rebut an accusation—

Jeremy Nicholson: I am being charitable. Parts of government are actually trying to address this problem but you raise a question that is at the heart of this. Why are we spending so much time trying to find sticking-plaster solutions for the most energy-intensive users—and maybe some of those measures are required, certainly in the short term—when the underlying problem is the lack of a fully competitive, market-led energy policy and cost-effective carbon-reduction measures to go with it? Surely if the concentration was on that, any element that needed to be dealt with by compensation or exemption or whatever

would be minimised and the complaint from British industry would be lower in volume.

Lord Turnbull: Surely they would say that if you expand these compensation schemes and you have a fixed emission reduction target, someone else has to pick up those emissions and those levies if they are going to hit the overall target.

Jeremy Nicholson: This is exactly like the argument we had about emissions trading earlier on. What the Government did, belatedly, was to realise that for energy-intensive industries that were trade-exposed—and unless and until the rest of the world imposes similar costs on industry, in which case the competitiveness issue goes away—we are going to need some compensatory arrangements or exemptions. Instead of reassessing the long-term climate change target, or perhaps the trajectory on which we approach it, the Government maintained it, which, as you say, necessarily means higher costs for everyone else. That is a political decision. It is not for the Energy Intensive Users Group or others to say what proportion of those costs should be shouldered through general taxation or through exemptions that actually raise costs for other consumers or perhaps in a moderation of the trajectory we take towards our long-term target. Those are all options available to government.

Lord Turnbull: Can you provide us, either collectively or individually, with figures that are actually well thought-out and usable? At the moment someone is saying, in the Marie Antoinette way, "The solution is that they just have to use less energy"—which is Lord Deben's solution—and you are saying that there is a very serious problem. We do not have the proper quantitative evidence on which to come to a conclusion. Is there anything you can do to help us?

Richard Warren: From the point of view of the steel sector, there is an idea, particularly prevalent in the EU Commission, that if you sufficiently reduce the cost of energy—whether that is through government measures to reduce the cost of climate change policy or whether you are taking measures overall to reduce wholesale costs—and you give people these exemptions, they will stop making any improvements on energy efficiency. That is complete rubbish. If you run an electric arc furnace and your electricity costs are 20%, the fact that your Government have stepped in to make your electricity prices competitive with the rest of the EU is not an excuse to stop trying to improve your energy efficiency; it is a means of remaining competitive within the European Union. I want to make that point. Saying that we must still make steel or any other energy-intensive companies pay some of these policy costs, or they will lose any incentive to reduce their emissions, is completely wrong. Giving people competitive energy prices will not have any impact on their emissions. In fact, allowing people to be competitive and fostering a positive environment for investment in these industries in the UK is the only means of them reducing their emissions.

Jeremy Nicholson: It is worth pointing out that for certain industrial processes energy is essentially a feedstock—literally a feedstock in the

case of certain chemical processes—and electricity has a similar function when it comes to smelting for aluminium and electric arc furnace operations in the steel sector and elsewhere, such that even with theoretical 100%, or close to it, efficiency in laboratory conditions, you will still need a certain minimum amount of energy to convert a product from one type of material to another. That sets a maximum balance on producing a tonne of steel or aluminium or any other product. Thinking about those qualifying for relief, electricity costs tend to be 20% or more of the gross value added. It is a significant business driver that has board-level attention. These companies are not in the business of squandering their shareholders' money or wasting it on energy because they have not thought of a better way of doing it. They would not still be in business if they used energy carelessly. Where I do think there is greater scope for more efficient energy use and, indeed, demand response, is in the wider area—business users more generally. Andrew may have some thoughts about that.

Andrew Buckley: Yes, I do. To come back to your point, when the figures are quoting 9.7p a unit as the price, bear in mind that in the wholesale market of £45 per megawatt hour, that is 4.5p a unit. The energy element is what it is: less than half of the total, according to the figures I was quoting you earlier. Attacking that element and looking at that is absolutely essential. From a customer's point of view, they can fix their energy price forward by buying forward on the forward markets. What they cannot do is understand and project how much of these additional costs they are going to have to pay from year to year. So when we look at investment—from the customer's as well as the supplier's point of view—will customers invest in energy-efficiency measures if their perception is that the market is very complicated, short-term and uncertain? Bringing some light, simplicity and certainty to this market will bring us the investments which are going to make energy efficiency happen and help us to that market in the future where we want to go, which is the low-carbon market. We have complexity here as well.

Baroness Wheatcroft: Given your understandable calls for a competitive energy policy, do any of you have views on Hinkley Point?

Jeremy Nicholson: I can give you a range of views on Hinkley Point. There has been a lot of concern from energy-intensive users about whether this project gives value for money to energy consumers, even though a number of our members are going to be largely but not entirely exempted from some of the CFD costs—or at least that is the intention. It is an important project for the supply chain, the steel sector and others that are involved in construction, but that should not necessarily be the reason a project goes ahead. However, there are security of supply concerns and concerns about the practicality of our decarbonisation commitments if nuclear is not part of this. Therefore, the broad view from energy-intensive industries is that it would have been ideal if we were not starting from here, as is often the case, but we are, and the only buildable project at the moment is Hinkley, using the EPR design—which may be the last pair of EPRs built in the UK, we will see; maybe other

designs will come in at rather more affordable rates in future. I certainly hope so. There are reservations about that and it is right to put them on record, but I do not feel that I can criticise the Government's decision to go ahead in the circumstances in which they find themselves.

Baroness Wheatcroft: Not even with the price commitment?

Jeremy Nicholson: My personal view is that it was an astonishingly high price, although I recognise that this is for secure energy and therefore so-called levelised cost comparisons with offshore wind and so on are not straightforward because those do not include the back-up and integration costs referred to in the earlier session, which are considerable. Indeed, that cost internalises decommissioning and long-term waste management, which traditionally have not been internalised in the past. I have no doubt it is a comprehensive price. There is the possibility it could turn out slightly lower for consumers but why it needs 35 years' worth of indexation, I am not quite sure, considering that presumably the project is financed up front. There are all sorts of aspects of the details of which are questionable.

Baroness Wheatcroft: Would either of you like to add to that?

Richard Warren: Only to reiterate those thoughts. Both UK Steel and EEF have been supportive of the need for contracts for new nuclear. We cannot personally comment on the price. Obviously, we have not been party to the discussions that have ended up with the £92 or £93 per megawatt hour. We firmly believe that nuclear has a strong role to play in the future energy security of this country but we hope that, where possible, when future projects come online, they are subject to some element of competition rather than a decision between two parties, and that we do start to see some significant price reductions.

Andrew Buckley: It underlines the enigma of what a competitive energy market can and cannot be. You are basically committing to a price for 7% of our requirements 10 years away, as an escalated price. Because of security of supply measures, government must take a strategic role in this. You have to accept that that is the case. Just as we are seeing the competitive wholesale element getting smaller and smaller, in practice my question would be: is there a long-term competitive market?

Lord Forsyth of Drumlean: I just want to make sure I understood what Mr Warren said. Did you say that in Brussels they thought that if you lowered costs, that would result in people using more energy less efficiently?

Richard Warren: The state aid guidelines drawn up by the European Commission do not allow Governments to award 100% exemption or compensation in relation to policy costs. The general reason given is that if you exempt companies from the entirety of the costs, that will reduce their incentive to invest in energy efficiency. Allowing steel companies to continue to pay between 15% and 30% of various different policies means that they will continue to invest in energy efficiency, as opposed

to a situation where they are let off the hook completely and therefore they forget about investing in it.

Lord Forsyth of Drumlean: So it is a version of, "If your children do not have to pay the bills, they leave the lights on".

Richard Warren: It is like that. It is an assumption that children are running steel companies.

Lord Forsyth of Drumlean: An earlier witness—I think it might have been Dieter Helm—suggested that energy-efficiency operations actually result in people using more energy, particularly in the domestic sphere. This is Alice in Wonderland stuff, is it not?

Richard Warren: There is definitely a thing called the rebound effect when people have reduced their energy costs, so if in a household you were spending £500 a year on electricity and you had somehow managed to reduce it to £400, you would think, "Oh, I have an extra £100. Electricity costs me a bit less now. I might leave that light on". There is definitely a rebound effect.

Lord Forsyth of Drumlean: If that is correct, why is the Commission not therefore right that there should be some cost?

Richard Warren: The Commission does not always entirely follow the evidence at hand. Trying to calculate the exact rebound effect, particularly within industry, which clearly has a closer eye on energy, is complex to say the least.

Lord Burns: Am I right that you are suggesting that as a result of our energy policy, some of the reductions in emissions we have had in this country have been because we have exported them to other countries? If that is the case, do you have even the broadest idea of what that amounts to in relation to the reduction that has taken place?

Jeremy Nicholson: I do not have figures for the economy as a whole. We can send you some information about what has happened in certain energy-intensive sectors, where the consumption of those products has not gone down and in certain cases has gone up, but the production has gone down and therefore the emissions reduction shows up on our balance sheet and must necessarily not appear on someone else's, unless there is a lower-carbon form of producing it elsewhere, which in most cases there will not be.

Lord Burns: In addition, I understand you are saying that this policy has not helped the amount of renewables, because that has been subject to a different regime.

Jeremy Nicholson: The carbon price floor has had virtually no impact on renewables deployment except perhaps for some renewables that do not attract subsidies through other means. But, frankly, if you have small-scale renewables deployable with support from the feed-in tariff, if you have larger-scale renewables that historically have attracted support

through the renewables obligation or will in future through contracts for difference, why on earth would that not be the prime driver? You have heard it from those who have submitted evidence to this Committee: those subsidy measures provide the prime means of finance. I suppose you could say that for renewables which for other reasons have had subsidies withdrawn, such as onshore wind, the carbon price gives them a slight competitive advantage but that is not really sufficient to explain why investment in renewables has gone ahead on the massive scale that it has. There has been a lot of complaint from the renewables lobby about the reduction in rates of subsidy for renewables but, my God, the total cost to consumers is still going up—not just to the level agreed with the Treasury by DECC at the time of the levy control framework but beyond it. Currently, it is something like £7 billion a year on consumers' bills—set to rise to perhaps £11 billion or more.

Lord Burns: But you are saying that it may have played some role in speeding up the move away from coal.

Jeremy Nicholson: I do not think that that is in doubt, at least on the average rate of consumption. It may or may not have contributed to faster plant closures but certainly it is fair to recognise that there has been a lower coal output as a result.

Lord Burns: To be clear, your belief is that the primary effect of this has basically been to export our emissions and to export our jobs and our manufacturing activity—

Jeremy Nicholson: Yes, of course.

Lord Burns: —in search of something that has not really been terribly effective in other ways as far as reducing our emissions is concerned.

Jeremy Nicholson: Sadly, that is correct and was anticipated by some of us who criticised the policy on those grounds when it was brought in.

Lord Burns: What other benefits has it brought the Government—more revenue?

Jeremy Nicholson: Yes. There are former Chancellors here who could speak with greater authority on this subject. It is not a huge amount of revenue by government standards, although a useful one. It was obviously thought to be a rising and very significant revenue stream when the policy was first introduced, but even capped at £18 a tonne, which is significant as far as consumers are concerned, it is not the most enormous sum of money for government, particularly as coal and other fossil fuels start to drop off the system. Presumably that revenue must start to dry up at some point.

Lord Burns: So this is a number of own goals for relatively little benefit, as far as you are concerned.

Jeremy Nicholson: Correct.

Q101 **Lord Layard:** I want to ask about demand-side response mechanisms. It has been suggested to us that if you pay firms on occasion to reduce their demand, this somehow makes the industry concerned less competitive. As an economist, I find it peculiar to suppose that something can become less competitive because you offer it some money, which it can refuse. Can you comment on that?

Andrew Buckley: Yes. I agree with you. The MEUC has been pressing for a demand-side reduction or response for some years. Customers can do more than simply pay the bills, and by bringing together the energy management of an organisation with the procurement side of things—in other words, by judging the best time to consume and to not, and to take advantage of any commercial schemes that are available—leads us towards the smarter energy future. It is no longer a case of companies buying their energy and then using it. They are actually taking control of their energy by using demand-side response as a mechanism for making the most cost-effective use of the energy at the times when it is right to do so.

We are all in favour of demand-side response but it is no answer to investing in new generation. We saw that yesterday with the national grid calling a "problem day"—we have had two already this year. The idea that by reducing their demand customers can keep the lights on is a different question altogether.

Jeremy Nicholson: There has always been strong support from energy-intensive industries for voluntary commercially rewarded demand-side management, provided that it is not coercive or forced. Sometimes we see inflammatory headlines in the media about a return to a three-day week or something like that. That is not what we are talking about. Were we into that territory, it would of course be extremely economically damaging. But firms that have flexibility in their electricity use, and potentially their gas use, can take advantage of off-peak power and reduce their exposure to peak prices, thereby reducing their amount of peak generating capacity, which is expensive to provide. Demand response does not, of course, have the same carbon footprint as conventional generation, which sits on spinning reserves waiting to come in. There are lots of advantages there, and as Andrew has mentioned, there is considerable potential to extend it in aggregated form into other parts of the economy.

Q102 **Lord Kerr of Kinlochard:** I would like to know how much money you guys are making from this. Are your members making tens of millions of pounds or hundreds of millions of pounds for not making things? This seems to me to be one of the oddest bits of policy that we have. In order to make sure that my kettle works at its normal speed, great factories close and plants are turned off. I hear you sounding very enthusiastic about this, which encourages my suspicion that you must be making a lot of money out of it.

Jeremy Nicholson: I imagine that the national grid and perhaps some of the aggregators could provide some data on the total revenue available

for demand-side response. Sadly I do not have it for individual companies. I will say that it is very dependent on the process and company involved as to whether you can do it on a large scale.

Lord Kerr of Kinlochard: Can you give us a figure?

Jeremy Nicholson: No company would see demand-side response as shutting their factories down. It would be industries that have batch processes or flexibility, such as with electric arc steel production, for which they can ramp production up and down and avoid peak charging times during the day and reduce their transmission charges as well as the average charge for their bill.

In addition, some provide very fast frequency response services. But they are in competition with power generation elsewhere and potentially with battery services, too. It is not a license to print money. If the generation supply side, or indeed storage, can do this more cheaply, there is a market out there.

Lord Kerr of Kinlochard: I do not think that you have answered my question.

Jeremy Nicholson: I cannot answer the question about revenue, but I will be pleased to find out what I can and pass it on.

Lord Kerr of Kinlochard: What about you, Mr Buckley?

Andrew Buckley: It is not a significant number relative to the total. I would add that a number of our members are doing this in order to safeguard their own security of supply. There is a driver here: users are getting concerned about whether the public supply system can maintain adequate supply. I can give you an example of one of our metal-bashing companies, which, having survived the recession, is looking at whether it should invest in a new furnace or invest in standby generation so that, if the lights go out, it can maintain its activity. It is, as Jeremy said, not a question of stopping doing things but simply of moving away from the public supply to your own resources to carry you through those periods. If that can be done on a commercial basis by that company benefitting from some schemes then they are more likely to do it. That is an important aspect of this. Security of supply for medium-sized companies has now become an issue because the planning margin between generation capacity and demand has come so close.

The Chairman: Before we go and vote, I want to ask one question. You talked about imported emissions. Mr Nicholson, you made the point about evidence-based issues. Have you calculated the level of input across various industrial sectors as a result of capacity being reduced here? You talked about papermaking, for instance. Clearly imports have increased, not just imported emissions but in terms of real money. Have you made any calculation of that?

Jeremy Nicholson: Some, and we can provide some supplementary evidence on that, given that time is constrained. There are clear

examples in the steel and aluminium industries, as we have discussed, as well as in brickmaking, tar manufacturing, paper manufacturing and so on.

The Chairman: It would be helpful if you could shed some light on the cost.

Jeremy Nicholson: I think I am right in saying that in all those sectors, production has gone down and consumption has stayed relatively stable or indeed increased.

The Chairman: Like you, we do like evidence. Thank you very much. We now have to go and vote.