



Economic Affairs Committee

Corrected oral evidence: UK energy supply and investment

Tuesday 22 March 2022

2.30 pm

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Members present: Lord Bridges of Headley (The Chair); Viscount Chandos; Lord Griffiths of Fforestfach; Baroness Kramer; Lord Livingston of Parkhead; Lord Monks; Baroness Noakes; Lord Rooker; Lord Skidelsky.

Evidence Session No. 9

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Questions 118 - 132

Witnesses

I: Michael Liebreich, Chairman and CEO of Liebreich Associates; Ian Simm, Founder and CEO, Impax Asset Management.

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Examination of witnesses

Michael Liebreich and Ian Simm.

Q118 **The Chair:** Good afternoon and welcome to this hearing of the Economic Affairs Committee. Could I ask you to briefly introduce yourselves for the committee?

Michael Liebreich: Thanks very much. I run something called Liebreich Associates. I have also created something called EcoPragma Capital. Liebreich Associates does analysis of energy, transportation, sustainable finance development and so on and EcoPragma Capital matches investors to investment opportunities around net zero.

I am possibly better known for having founded something that is now called Bloomberg New Energy Finance. It was New Energy Finance but I sold it to Bloomberg—Michael Bloomberg's company, not himself—which is about 250 people. It is not bragging to say it is the leading information service around clean energy, transportation, industry and so on. It is headquartered here in London, very proudly, but now part of the American company operating around the world. I still write for them but I am no longer in any way an executive.

The Chair: Excellent. Thank you very much and welcome, Michael. Nice to see you.

Ian Simm: Good afternoon. I am the founder and chief executive of Impax Asset Management. For the last 23 years we have been investing money from pension plans and savers around the world in the clean economy. We do that into public and private companies and today we have around £40 billion under management.

Q119 **The Chair:** Great. Very good to see you both. Thanks again for coming. Just to clarify my interest again, as we are talking about financial regulation, I am an adviser to Banco Santander. I will kick off with a scene-setting question and would be very grateful, given it is a broad question, if you could just give us headline points. I will start with you, Michael. The Government has said it wants to decarbonise the power system in the UK by 2035. Given that and given where we are, what would be your three—if we can just pick three—main actions to increase investment, and I stress increase investment, in energy sources to help us meet that target while ensuring energy is affordable and reliable?

Michael Liebreich: It is a fabulous question and a very difficult question. The first thing I would say is real clarification on electrifying heat. It sounds sort of wonky and thermodynamic and engineering, but we are facing all of these discussions about electrification versus hydrogen and how we are going to do it. I think a really clear signal and a really clear framework, not just that heat will go electric but also to think about how thermal storage can work in the power markets, because it is much easier to store heat than it is to store electricity. If we electrify heat it opens up a whole set of solutions around the very difficult last few per cent. I know we are going to talk about long duration storage and so on.

I think that would both create more markets, so investors like knowing there is lots of demand for what they are going to invest in and, also, it can help us to solve some of the systemic problems that we are going to have as we electrify as we go to these vast amounts of renewable electricity that we have access to.

I think, along the line of also long duration storage, and particularly in the light of what is going on and what we are now learning and the reordering of our priorities because of Ukraine, we need to have a plan and it needs to be supported by government for, I would almost say, very long duration storage. I know that in the preparation notes some think of anything over four hours as long duration. I am very relaxed about four hours and one day and two day.

I worry about not just the weeks when there is very little wind during winter but, actually, the six months when there is low output. You might be going into a few weeks of very low wind when you have empty stores of whatever it is that you are using, so I think that we need a resilience strategy as an insurance policy to allow us to move to very deep penetration of renewables and, of course, there is a role for nuclear and we can get on to that as well.

On the third thing that I would say, I have to be very careful because I am not the greatest expert on the minutiae of not just the electricity markets for the kilowatt hours but also all of the different ancillary markets that are run by the National Grid to keep things balanced and so on. What we clearly need to do is to move away from where the electricity price or large parts of the electricity in the wholesale markets that changes hands is priced according to the marginal megawatt hour or kilowatt hour, which will generally be set by the price of gas. We need to have a market that rewards long-term contracting. In some ways, a lot of people see the intervention of the contracts for difference as a subsidy. It is actually not. It is sort of a blunt-instrument way of creating a market for long-term purchasers of electricity, which give investors the security to make those investments.

What we really need is a wholesale electricity market that has very clear price formation for both energy and also capacity out many years into the future. Then the market will be able to allocate resources and fill gaps and invest against that. At the moment, we do not have that market structure and, therefore, I think that impedes investment.

Ian Simm: My three points, Chair: first, we need an ambitious but pragmatic approach to policy to establish a flexible but resilient system. Specifically we really need to see simple, stable policy on buildings' energy efficiency, particularly around building codes and grants, so that we can ensure resilience in the supply chain and skills base, rather than stop/go. We need national support for public goods, particularly around interconnection and potentially gas storage, which I think is very interesting in the current context. And I am really in favour of accelerating hydrogen trials. It is a real problem globally in solving the chicken and egg problem for hydrogen and I think we can do that, for

example, by mandating—subject to trials—up to 20% blending of hydrogen into the gas grid, which would send a very strong demand signal.

Secondly, we need to ensure that relevant institutions are sufficiently well resourced and governed. I am particularly interested in local government, as an agent for change in climate change: local government lacks resources in this area; there does not appear to be a national mechanism for sharing best ideas between local authorities, which seems to be a real oversight; and I think the Department for Levelling Up, Housing and Communities could engage much more effectively on climate change. I also think there is a strong case for full independence and setting up a not-for-profit systems operator, so a fully independent systems operator and I do think there is a case for monitoring Ofgem's mandate, particularly around the trilemma.

Thirdly, I think we need to mobilise and engage both the public but also the financial sector. So I do think there is a strong case for an ongoing apolitical communications campaign to make sure the public are thinking about climate change in the context of their day-to-day decisions—purchasing decisions, lifestyle decisions. I do think there is also a case for BEIS, in particular, to engage investors much more systematically, particularly on the details of policy implementation, which worked very well with the electricity market reform seven or eight years ago.

Q120 The Chair: We are expecting the Government's energy strategy next week or even this week. Is it naive to think that there is a policy lever that can be pulled now to increase investment, either by consumers or businesses, that will address affordability and reliability in the very short-term? I am thinking about this winter and next winter. Michael, could you give your thoughts on that?

Michael Liebreich: Nothing is easy in energy because it is so pervasive in our society but, yes, there is a lot that could be done in the very short term. I am in the camp that says we should be looking at next Christmas: what could we do by next Christmas? The sort of things we can do is energy efficiency, and I do not mean just turning down the thermostat. I also mean making sure that boilers are set up correctly. We are in the extraordinary situation where, since 2006, it has been illegal to install a boiler that is not a condensing boiler, but the vast majority do not condense. They are set at the wrong flow temperature, probably wasting 5% or 10% of the nation's gas. Could we get that fixed by Christmas? Sure, but it is hard. There are 28 million homes that we would need to visit, some large proportion, and have expertise to set that up.

Another thing we could go back to is burning more coal, which I am a defence for. I would be in favour of in a sense suspending our aspirations on climate in the very short term but not in the long term. The long-term security and climate play very nicely together but in the short term there might be contradictions. I would be looking at things like every single regasification unit—when you bring in LNG it comes in as liquid and then has to be regasified and you have to put heat into it to do that. Those

units are expensive. There are some floating units. If they are in Asia this time next year, that is a failure in policy, in my view, because I would have thought we should be able to get them all in and try to get to the extent possible off that Russian gas, so there are those things.

I am finding it very difficult in the discussions where people say, "Oh, because of Ukraine we must accelerate hydrogen. Because of Ukraine we must accelerate nuclear" or even things I absolutely love. I love nuclear as well. I love hydrogen and nuclear. I love all these things, but if the response to Ukraine is accelerating things that take years to either build or for the supply chain to grow, I find that troubling and cynical versus these things that you can really do by next Christmas.

By the way, if it involves coal, what we could do is use coal by next Christmas but then replace it very quickly in the subsequent couple of years, so there are a lot of things that we can do looking through an urgent lens.

The Chair: A quick comment, Ian, before I pass over to Viscount Chandos.

Ian Simm: I do not think there is a single policy lever that one can pull to solve this problem overnight. I tried to sketch out some of the longer-term signals earlier. Investors are looking for simple, stable policy based on delivery of the 2035 objectives and I do think that could be put in place very quickly. That could start to unfreeze the taps on investment flows. That will help solve energy problems two or more years down the road but not by next Christmas.

Q121 **Viscount Chandos:** Pressures have been put on financial services businesses by all sorts of parties—regulators, investing institutions and NGOs—to create investment strategies to divest of fossil fuels. In the current circumstances, do you see that as helpful or hindering an orderly transition?

Ian Simm: I think there is increasing financial sector awareness of climate change and there is no board of a major financial institution around the world that is not talking about climate change at the moment to some degree, so the awareness is definitely there. The world is awash with capital and I do think there is plenty of capital for all sorts of energy solutions, climate change-friendly or not.

I do think that mandatory divestment has potential to hurt ordinary savers and pensioners because of the returns that are available to fossil fuel supply as we transition. Starving energy majors of capital is going to damage their ability to become brands that are trusted by consumers in the future, so I think it is a bad idea to mandate fossil fuel divestment. Personally, I think it is a flawed strategy because of the money that can be made for pensioners and for savers over the next 30 years as we transition.

Michael Liebreich: I think some of that pressure has been very damaging, if I am honest. I speak as somebody who is entirely convinced

of the need to switch to net zero as quickly as possible but also very aware that, if you say net zero 2050, that is three decades, and we are heavily dependent on fossil fuels currently and we are going to be for the coming decades. The people who suffer most from high energy prices are of course the vulnerable and the less well off.

There are lots of reasons why it happened but if you go back to 2014 there was \$1.9 trillion invested in energy in 2014—so upstream, midstream, downstream clean, fossil, everything. Of that, the clean energy was about \$700 billion and the fossil was about \$1.2 trillion. If you go forwards to 2020, the number was about \$1.4 trillion equally divided between clean and fossil. By “clean” I am talking about renewables, nuclear but also the grid, because we are going to have to electrify everything, so it is writ large the clean system of the future.

The big picture is that energy investment has gone down from \$1.9 trillion to \$1.4 trillion. We have lost \$0.5 trillion of annual investment in energy—this is before Ukraine—and we have gone into a price spike. This is the Economic Affairs Committee. That should be an obvious and expected outcome. That price spike is very socially damaging. It is not a just transition, if all you do is block and make things hard and ask financial institutions to divest before or without a commensurate surge of investment, which is what we are trying to enable—I think it is the topic here—in the clean solutions. We have turned the tap off on the fossil side of things before we have really turned the tap on of the clean in many ways.

The clean has gone from \$700 billion to \$700 billion. Now of course we see more solar panels and we see more windfarms and we see the electric cars, but the reason we see more and more of those is because the costs have been coming down. What we have not seen is the costs coming down and, at the same time, the sheer volume—the vast volume, the trillion-scale volume of investment—in those solutions. Therefore, we have an unjust, regressive transition and that is before we talk about the security implications, which we are all learning about now, tragically, through Ukraine.

Q122 Viscount Chandos: I think the net-zero campaigners would argue that, had they not been campaigning over the last decades, the fact that climate change was now at the top of the agenda at every financial institution would not have happened, so the question I would like to ask: is there a better way than the action of regulators and ShareAction or whoever, on maintaining the momentum but not being unconstructively prescriptive?

Ian Simm: I think that capital markets are very efficient with respect to the energy sector. With public companies obliged to disclose their risks and particularly the Taskforce on Climate-Related Financial Disclosures, or TCFD, having put in place a globally accepted framework for how to communicate climate change risks, then I think we have the frameworks in place for national regulators and national Governments to see what is going on, to shine a light on corporate activity. Then capital will flow to

where opportunity lies and away from where significant unacceptable risk lies. I am personally happy that regulators stay out of the divestment debate and let the market decide.

Michael Liebreich: I would agree entirely that the activists' attention has changed the debate. I would argue that it kind of started from the Paris Agreement and the fact that the 1.5 degrees was mentioned and enshrined as a goal there, because then everything else grinds through. You do the analysis and then the activists use that output and we have seen that. I say bless them for raising the tone of the debate and forcing education on the financial sector and so on. The problem is that you do not want the activists writing your energy policy or your economic policy because, if all that you do is raise the cost of capital for the stuff you do not want, you will end up where we are, which is with very high energy prices.

It is not up to the activists to say, "Well, we are going to figure out how to also push down the cost of capital for all the stuff we want" but the two have to be working hand in hand. Overly prescriptive responses to climate change that say, "You must not do this" and "You must not do that" are great at driving up the cost of capital on the one side, but it does not provide cheap, affordable, resilient, clean energy on the other side.

The Chair: I am going to bring in Baroness Kramer very briefly and then Lord Griffiths.

Q123 **Baroness Kramer:** Very briefly, I am just fascinated, Mr Liebreich, by your answer that in a sense what we have seen is investment in fossil fuels go down, as companies and investors become afraid of stranded assets, but no increase in the amount invested in green technologies, despite the drop in price, despite arrangements to make sure there are long-term pricing contracts or their equivalents in place. Why has the financial community not leaped on those opportunities? I would just love to understand.

Michael Liebreich: There is a range of barriers that you can come up with. There is a range of things that could have been done or could be done to make it easier to invest in some of those solutions but part of the argument is about our markets. For instance, in the UK, the way our power markets worked was structured largely around the spot markets. That does not work when you have a zero marginal cost resource that has to have a 15-year or 12-year or whatever financing arrangement, so there are just some market structures that make it very difficult. It is back to the answer to the first question: how do you get a lot more money flowing into electrification or the build out of clean energy? It has taken a very long time for regulatory frameworks to be built around that.

Those numbers I gave you were not UK numbers. Those were global numbers. We have actually done very well in this country. As you probably know, we have led the major economies in switching off coal and switching on particularly wind, but it has been slow going in many

countries of the world and it has been fought every step of the way by people who already own assets.

Ian Simm: Can I cite a couple of brief points to that question? First, the same amount of money has bought more megawatts at the end of the decade compared to the middle of the decade because of rising cost-effectiveness, so the same amount of money has bought more power generation. Second, the political environment in the time period that Michael has referred to was notably the one where the Trump Administration was particularly unsupportive of this agenda. Also, the European Union was trying to decide what its 2030 target should be and, as well as Brexit, that did create a period of hiatus and deferral of decisions by investors. But I think we are through much of that now.

Q124 **Lord Griffiths of Fforestfach:** Public debate over climate change and the future of the planet has changed the context in which this debate is going on. Both of you must talk a lot to the actual companies involved. To what extent is there a difference between words and actions? Do the actions really follow the words?

Ian Simm: A very interesting development in the last two years has been this idea of corporate net zero. From an economic perspective, it is not rational or efficient to translate a national net-zero target to a target for every entity to be net zero. That is hugely wasteful in theory, but what it has done is it has brought the issue of climate change into the boardroom of every company, of every institution in the developed world and beyond. That has really focused attention by boards on what they are doing around efficiency and whether their long-term strategy is consistent with this decarbonisation agenda. What we will see in terms of the efficiency of capital use I think is a question for the future.

Michael Liebreich: I think the efforts of the corporates that I talk to, which may be a biased sample, are sincere. It is not that they are saying one thing and then going off into their boardrooms and shutting the door and saying, "Thank goodness we got through the ESG report". They are genuinely trying, but I think they would say that they are not seeing the investment opportunities.

There is a subtext in some of what I am saying, which is: is it up to the financial sector or frankly those corporate executives to lead this agenda in a situation where the regulation at the level of transportation, heating, building codes, energy systems and so on has not created the frameworks where they can earn a good risk-adjusted cost of capital. I think that is where a lot of them find themselves. You could imagine, for instance, a steel company: "Yes, we can make steel with hydrogen or direct electrical reduction" or whatever, but if it just means you are going to be uncompetitive and have to shut your plant and lay off all your workers, that is not a solution.

Where we need to be looking at much harder is, in a sense, creating the demand for clean energy and where necessary, where we can, intervene and try to create more technologies, and more investment opportunities

on the supply side as well so that we are not just shutting off one thing but we are creating the investment opportunities and the investment then on the good stuff.

Q125 **Baroness Noakes:** In the short term and probably in the medium term, we are going to need gas, and the situation in Ukraine has brought home very much the need for security of supply. We certainly need dispatchable sources of energy at least until long duration storage can make a significant contribution to our security of supply. Against the background of financial institutions and companies themselves being driven towards net zero, are the investments that will be needed in gas, perhaps gas storage or LNG facilities, is the capital available for that and where does it come from?

Michael Liebreich: The answer is there are investors out there. Well, first of all, there is a reset going on about what you expect the future price of gas to be, because until half way through the pandemic we thought that we were in a world where there would be lots of relatively cheap gas. We had this kind of \$2 per million BTU gas in the US because of fracking and then because of LNG that sort of downward pressure on gas prices have been exported to Asia and to Europe. We thought that that was the new normal and so you could always rely on there being relatively cheap gas available.

That had implications, for instance, for heat pumps in the UK. The challenge was, "They are more expensive than a gas boiler so you need to have a support mechanism. If the Government wants people to do that the Government has to do X, Y and Z". Now there is a reset going on about gas prices: what is the actual long-term future gas price? Because today you would be very happy if you had a heat pump and not a gas boiler, looking at the way that energy prices are going—and the same on generating capacity and so on.

In answer to your question about "Will there be investors?", there will be investors in producing gas. If you look at one of the things that is happening, we have already heard the news today that Shell is looking at reopening its activities in Cambo. That is oil, but there will be companies doing the same around gas fields. We will want to be finding gas in reliable partner countries and so there is definitely going to be investment in that.

If you look at the generating capacity associated with gas, you need to extract it but you need to perhaps store it and then generate. We have plenty of generating capacity. It is not that in the future we are going to need to build lots of new gas plants. We will need to use them in a very flexible way and so on, but I am not that concerned about the availability of gas generating capacity. On storage, there will be plenty of investors, I can tell you, because suddenly we have all realised that gas storage, which has been out of favour, has been dismantled and has not been able to pay its way, suddenly quite clearly has become a valuable asset.

What do Governments have to do? I think there is a very substantial role for government in long-term resilience. We talk about that kind of two weeks without wind at the end of a period with poor wind, for instance. It is going to be very difficult to get a pure market response to that, in the same way that it is very difficult to get a pure market response to hospital ships that get used in conflict. There are things that the Government has to plan for and make sure there is provision for in advance and it is part of its role in government.

Baroness Noakes: So there is no capital available for it without government support?

Michael Liebreich: I would not say there is no capital. Next winter, I think anybody who has gas storage will probably fill it up and find themselves remunerated.

Baroness Noakes: We know we do not have enough storage.

Michael Liebreich: We do not have enough but if you want to have a really well-designed storage strategy, that would probably want to be at a European level, because if they mess it up we suffer and then if we mess it up—and so on. In co-operation across that gas market, I think there is a role for government in that.

Baroness Noakes: You mentioned earlier LNG facilities, which we do not have enough of if we are going to use LNG significantly to contribute to our gas supply. You mentioned mobile LNG. Is that a realistic possibility, that we corner the world market in mobile LNG facilities?

Michael Liebreich: I have not done the analysis of how much regasification capacity we might be able to Hoover into the European sphere. I wanted to make the point only that there are options. It is a European gas market so we do not necessarily need to do everything in the UK because we are connected to Europe in various different ways. Through LNG, we also compete with Asia so there are scenarios where Japan or South Korea can also reduce their own gas demand and, if there are the floating regasification units, potentially we could. Like I say, I have not done any analysis at all on what the volume of that could be relative to the volume of gas that we are currently buying from Russia; “we” as Europe.

Baroness Noakes: Even with government support, do you think the pressures that are being put on financial institutions, which we heard about a moment ago, would they be backing further investment in fossil fuel energy sources?

Ian Simm: I think even the most climate change-aware financial institution recognises there is going to be a transition and that natural gas plays a crucial role in that transition, as we all know. So if your initial question was “Is there enough investment interest in the natural gas sector?”, I think the answer very categorically is yes, and we are still at a

point where we have almost the cheapest cost of capital globally that we have had in 250 years. That is changing, sadly, but it is still very low.

The real question is: what is the return on investor capital for those investors available from the gas industry? As Michael has indicated, it is very complex, particularly given rapidly evolving technology and the Government needs to be selective in choosing points of intervention.

There is no shortage of capital for the transition. Last week I was in the US talking to investors . Texas pension funds, funds in Australia and Canada and the Middle East are lining up to invest in UK gas infrastructure if the economics are right.

Michael Liebreich: Can I raise one further point on this? That is that the risk in a sense—bringing together a few of the threads so far in this session—is that it becomes hard to invest in fossil for quoted players, players that have a public profile. There is a risk that what happens is investment in fossil energy goes to private and overseas players. At the extreme it could be, for instance, the national oil and gas companies of countries and their associated sovereign funds because, in a sense, they are in that game anyway and so the reputational damage for them to make an investment in fossil fuel somewhere in the world is relatively much lower.

Again, it comes down to: if the theory of change is just to stop Shell, BP, Total, Equinor—and I should be open that I am an adviser and am on the international advisory board for Equinor—from investing in fossil and the world will go clean, it will not. We will just drive that investment and it will marginally increase the returns, the cost of capital, to those operations and then all of those earning streams will go to people who are much worse regulated and less committed to the transition.

Q126 **Lord Livingston of Parkhead:** I will come to my question but I think we have already seen that—whether it is for good or bad—in coal there has been divestment by quoted companies into the unquoted sector.

Just a point of clarification from you on when you were talking about LNG: it felt like you were talking about Europe as a whole. I appreciate that mainland Europe sets a large chunk of the price and the UK has some of its own factors. Germany, I believe has no LNG capabilities

Michael Liebreich: I think there are two conversations going on. There is the subtext of Ukraine and “Can we get off Russian gas?” If we are going to do some—

Lord Livingston of Parkhead: Which again is a European-wide issue—

Michael Liebreich: Yes, it has to be done on a Europe basis because we do not buy that much Russian gas but the prices are set by those who are trying to reduce their dependence on it.

Then the other discussion is of course attracting the capital for what gas we do need within the system in the longer term. I suppose it is not that

we have to do everything in co-operation with our European partners, we just have to accept that we are in a European gas market where the—

Lord Livingston of Parkhead: You are not recommending the UK has to increase its LNG capability, particularly—

Michael Liebreich: No, I made the opposite point. To the extent that we need to be able to bring in gas from other sources than Russia, it really does not matter where in Europe because we have very extensive gas pipeline networks, so in that way we are blessed. That is already in place pretty much.

Q127 **The Chair:** Very good. Can I quickly pick up on one technical point flowing from Baroness Noakes's questions? As you will both know, financial institutions are following IEA scenarios and setting alignments for oil and gas, and my understanding is that those scenarios do not allow for further new oil and gas exploration and investment in LNG structures, I think I am right in saying. I may not have the term exactly right. Ian, do you think that needs to be refreshed? Does that need to be reset in light of where we are? How do we align the science—and we saw the IPCC report that came out showing the state we are in—with the geopolitics and the economic need we are in? How do we get that balance right in the here and now?

Ian Simm: I think there is a free market in information and the vast majority of asset owners and allocators do not follow the IEA scenario slavishly. They just use that as one input. Of course, these are scenarios so I do not think the IEA means to say that the most likely outcome is "No more investment in fossil fuel, exploration and production". To be honest, at the risk of perhaps overstating the point, it is a bit of a red herring as to where the capital is going to come from.

The Chair: Good. Is there anything else you want to add?

Michael Liebreich: This is one of the areas, as I put it earlier, where you do not want to let the activists write your energy policy. What has happened there is that, for outcomes in terms of climate damage, you really want to be at 1.5 degrees rather than at 2 degrees. That was the IPCC's 2018 1.5 degrees special report. What the IEA has done has said, "If you want to get to 1.5 degrees this is where you need to be by 2030. You essentially have to halve emissions". That means, if you look at the decline curves of existing oil, gas and coal resources, you do not open up any new ones.

That has been interpreted, particularly by the activist community, as saying, "The IEA says we must not open up any new ones". The IEA has not said that because what it has not done—in fact, nobody has done—is said, "What is the actual cost benefit of 1.6 degrees versus 1.5 degrees?" One and half degrees is worse for the planet but there is nothing that says what, if you take all social policy as a whole, are all the things that you could do with money if you were not putting it all into 1.5 degrees—that actually has not been established. It is not the IEA's job to do it and

the IPCC has not done it. It has just said, "Here is the damage if you go to 1.5 degrees versus 2 degrees".

The other thing is that, of course, we can have stranded assets, so in a sense the IEA is saying, "This is what you do if you do not want stranded assets", but we have stranded assets across economies. That happens. If you say, "One of the boundary conditions or one of the conditions for this transition is there must never be a stranded asset. Every oilfield, gas field, coalmine, train for transporting coal must reach its natural end of its life and then be retired rather than be five years old and scrapped", well, then you do not build any more.

It could well be that what we need to do, particularly in the light of the fact that we have suddenly woken up to this absurd overreliance on Russian gas, are some things in the short term and then we regroup and there are some stranded assets. I just do not think on a societal level that that is the worst thing in the world. It is not great if that is your asset if you are an investor of course.

Q128 **Lord Skidelsky:** I was just thinking that Arthur Scargill used this argument about stranded assets in opposing the Thatcher policy of closing down uneconomic pits.

Obviously, the macroeconomic aspect of climate change policy is very important. As you know, the green mandate has been added to the Bank of England's inflation target and central banks are conducting climate stress tests on financial institutions.

We heard from one of our witnesses that it is not the role of the Bank of England to distinguish a particular component of energy policy. The Bank of England has a particularly demanding job to address inflation. If the Bank were to move to distinguishing bad investments from good investments, it would be stepping beyond anything we could reasonably ask it to do. In fact, do you think that capital requirements should be increased to reflect their lending to businesses involved in fossil fuels? What is your view of that statement concerning the proper limits of Bank of England intervention in climate change policy?

Ian Simm: I think I would agree with the statement from the previous witness. I do, however, think there is a role for the Bank of England in making sure that financial regulation ensures that there is proper disclosure of risk around climate change, the methodologies for which are only now being explored and where there is no consensus yet. The Taskforce on Climate-Related Financial Disclosures that I referred to earlier, or TCFD, which was initiated by Mark Carney, the former Governor of the Bank of England, and others back in 2017 is a very helpful framework for central banks around the world to discuss with financial regulators in order to ensure that information is coming out of the private sector in a systematic and comprehensive fashion. This is going to take a little bit of time to bed down so it is quite important that financial regulators, but also supervisory banks above them, do monitor what is going on to make sure that we do not end up with complexity and heterogeneity in disclosures. We need convergence in standards.

Michael Liebreich: I also agree with the previous statement and also with my colleague Ian's statement.

You talked about the Bank of England's role in countering inflation and then you see it through the lens of risk. I agree with that entirely. Where there is systemic risk I think it is entirely appropriate and I am entirely in line that what we need being disclosure and more and more understanding of risks.

I very much worry about the stress test approach. It sounds elegant and obvious. The problem is that you get these scenarios. The question then is: what scenario do you use? Then it becomes: is the scenario a snapshot? Do we use a scenario for 2050, 2030, 2025, 2100? As soon as you go into scenarios there is a temptation to use the most extreme scenarios, some of which are really—I am going to say it—absurd.

If you look at the IPCC scenarios, there is an extreme scenario that gets used for a lot of the communications because we start to have this philosophy of the precautionary principle: how bad could it be? A scenario was constructed 20 years ago that shows it could be really bad, but that is based on the coal sector growing by a factor of 10 through to the end of the century. The fact is that the coal sector is not growing. It peaked around 2013. We might have a bad year this year for all sorts of reasons we talked about, but we are not in that extreme scenario. Those extreme scenarios do get reflected in some of those stress tests.

If we are going to stress test we need to stress test using a scenario that is believable as opposed to not believable, and that is a very contentious statement: what is believable? The IPCC does not put probabilities on its scenarios and a lot of people want to use the more extreme ones because of course it drives their business models, their communications, gets lots of attention and so on. I think that we need to be much more sophisticated overall in our understanding of risk and move to adaptive pathways of approaches, of option value in finance terms of saying, "Yes, if you take the worst it could be in 2100, we would not wait until 2099 before taking action. We would get some information earlier and we could, therefore, course-correct in some ways".

In some cases that is used. I was on the board of Transport for London and we had an adaptive pathways approach to when we would need to build another tideway barrier, but the stress tests are very blunt instruments. I also do not think it is up to the Bank of England to make up for weaknesses in our energy policy. I personally think that blending hydrogen is not a good idea. I think it is a very poor idea but it is not up to the Bank of England to decide that. That should be part of the debate around energy policy and the cost benefits that you would be trying to achieve. Then it should be up to BEIS and up to the Government to put it in place, if that is what we want—or perhaps it is long-term storage. It should not be the Bank of England saying, "We are going to make it easier to invest. We are going to drive capital into long-term storage because we think long-term storage is the thing". Somebody else might

say, "No, it is digitisation". Why is the Bank of England the one that will decide what the clean technologies should be?

In 2011 I wrote a piece accusing the financial system of being institutionally fossilist. There were lots of things to do with fiduciary responsibility, with the way capital requirements were phrased, with liquidity requirements and Basel II at the time, and so on. Clean energy solutions that made sense economically were not being financed because of the financial sector and the way it was regulated. That was 10 years ago, and that is not the case now. We are as close as we can hope to a level playing field, and I think it is very dangerous to start to tilt the playing field towards preferred technologies.

Lord Skidelsky: Let me put the contrary argument to you. Inflation policy was outsourced to the central bank, and that was a crucial component of economic policy. Why should not energy policy be outsourced to the central bank in the same way? It is a way of telling the central bank, "You make the strategic decisions, because the Government do not want to make them". It is exactly the same principle.

Michael Liebreich: I am not sure it is, because inflation policy is managing our money, one single resource for the benefit of everybody, without favouring a particular sector. Largely you might say that is not the way it works, because housing might want this, and shipbuilding something different, and so on. But there is only one lever, whereas in energy policy there are so many different elements.

The Chair: I am going to jump in. I am so sorry. We are beginning to run very tight on time. Forgive me.

Q129 **Baroness Kramer:** Because of time I will contract three questions into one. It is really just a question about the green taxonomy. I am trying to get a bit more clarity on how or whether this can accelerate investment in green technology. Could you give us your view on whether or not it is appropriate to include nuclear and transition gas within that taxonomy? Also, are there investor consequences to having different taxonomies, the UK, the EU, the US and whatever else? You have talked about there being an EU energy market; in particular can you comment on a difference in taxonomy between the UK and the EU?

Ian Simm: I am happy to go first. I co-designed one of the world's first green taxonomies back in 1999, which became the foundation for the FTSE Russell's Green Revenues series, which itself was a forerunner to the EU taxonomy. So I have been working with green taxonomies for more than 20 years. Up until 2016 the private sector was using green taxonomies as a label to indicate greenness. Retailer investors in particular were interested in that; and there was choice. Some green taxonomies had nuclear in there, others did not and had natural gas. The FTSE Russell taxonomy had neither. There was no right or wrong. Green is not black and white.

Then the EU came along and crowded out the private sector, if I am honest, by effectively saying there was a definitive green taxonomy. It

did not legally oblige the private sector to step away, but that is what has happened.

Green taxonomies have in effect become a public sector tool. That is quite dangerous, in my view, for a couple of reasons. The first is complexity and the additional problem of boundary issues around definitions. For example, whether diesel or petrol is greener is a very subjective point. The complexity means that these taxonomies are not very nimble, but there is also the additional problem of mission creep, and I am fearful that with the Government setting green taxonomies there will then be a temptation to orient other government policies around the green taxonomy—for example, procurement - and government could also end up shifting the cost of capital to the disfavour of those essential sectors that need to help us with the transition.

To your specific question about whether nuclear or gas should be in a green taxonomy, I think if it were in the private sector that would be a question for green taxonomy suppliers and customers to decide. Given where we are - subject to limitations being put around the use of the green taxonomy, so there is no mission creep - I think it is sensible that nuclear is included in a green taxonomy, if it is going to come from government, because it is an essential part of the transition. The EU seems to be deciding that natural gas, within certain conditions, needs to be in there as well, for reasons of the transition. Is there a problem with the difference between a potential UK green taxonomy and the EU green taxonomy? I think there is. It is potentially enormously confusing for users of the taxonomy if there is a difference. That comes back to my original point—the Government should not be defining a green taxonomy.

The Chair: Very good. Michael, do you have anything to add? If not, I am going to move on, because we have three more questions and 10 minutes.

Michael Liebreich: I am against green taxonomies, I think they stifle innovation. They will drive capital towards a subset of solutions. If we have to have one, nuclear clearly has to be in it. It is the largest single producer of low-carbon electricity globally. We all need to stay away from getting into these very arcane discussions about which level of gas used which way or what way, and so on. That is just going to funnel money towards consultants and lawyers, and not towards actual solutions to the climate transition. The solutions we need go across so many different sectors in so many different ways. The idea you can make a list of things that are always good, and therefore by definition a list of things that are always bad, is absolutely impossible. Finally, on Europe, I would let them do their thing, and we should do ours. Otherwise, we are in Franco-German political discussions about the role of nuclear. These things are decided by politicians, not based on science. I do not think it is our role to then match exactly what they say or try to persuade them they are wrong.

Q130 **Lord Livingston of Parkhead:** I will also try to do three questions in

one. Long-duration storage was mentioned earlier. You said it is defined as over four hours, which seems a somewhat strange definition in today's world. What do you think we should mean by long-duration storage? What is the nature of it and what can the Government do to encourage its delivery?

Ian Simm: I do not have a precise answer on the boundary of where long duration starts and short duration stops, I am afraid.

Lord Livingston of Parkhead: There is probably a medium somewhere in between, but no one ever talks about that.

Ian Simm: Exactly. I think it is important that everyone recognises that the technology for long-duration storage is still in development. There is no clarity as to what the most cost-effective technical solution is, and the cost of the storage solutions is outside the ability of the market to pay, currently. However, there is a very strong case for having a power system with long-duration storage in it. Therefore, we need to find a way as a nation to encourage that. Building on lessons from the development of renewable energy technology, there is a case for targeted support, potentially using the financial models and contract models set up for the interconnector sectors, for example with cap-and-collar-type payments, price auctions and multiple rounds of support, in the same way we have seen for renewables. The UK is very well placed to experiment with this, given the flexibility that the grid has, and the Government should accelerate the development of policy to get this to take off.

Michael Liebreich: My guideline would probably be 48 hours, because I think everything under 48 hours will be pretty simple—demand response, all those batteries that will be in vehicles, and also thermal storage, the ability to have a big tank of hot water, and so on. My suspicion is that 48 hours becomes relatively straightforward. The second point I will make is that I think we have to be very careful to jump to long-term storage, because the problem is long-term resilience, not necessarily long-term storage. When it comes to renewables, we want them to be used, never curtailed. One hundred per cent of every kilowatt hour has to be used. Why? We do not require that of a coal-fired power station, a gas-fired power station, or a hydro power station. Our cars are used 5% of the time. Why do we only expect renewables to be used 100%? Therefore, we immediately frame it as, "We are not going to build too much. We are going to build the exact right amount, and we are going to have storage".

By the way, long-term storage is allowed to go unused year after year. That can have a low-capacity utilisation, but we do not expect that of our wind, solar, and so on. If we define the problem as, "How many days, how many weeks or months, do we need to be able to be resilient?" then energy efficiency and interconnections play into that. I will trade my book. I am a small, tiny investor in a project to bring in dispatchable electricity from north Africa. There are batteries in north Africa, and electricity will be brought in via Xlinks, subsea cables and interconnections overall, which could be cheaper than storage. Overcapacity is politically very difficult. The *Daily Mail* loves to say,

"These wind farms were paid not to produce" but that may well be what is required. It may be cheaper to overbuild than to store.

Lord Livingston of Parkhead: You do not think that overbuild can help create storage? Excess wind farms use their spare time to put into hydrogen, for example.

Michael Liebreich: Overbuild will spur innovation. It may look like storage. It may look like bringing in industries. It may look like demand response. We may make aluminium load follow, or electrolysis, or desalination in southern Europe. There is all sorts of innovation that happens. I am not as scared of overbuilding as some others are. When you come down to the demand for long-term storage, it is going to be something like hydrogen in depleted gas fields, salt mines, perhaps compressed air or liquified air. There are technologies that we can use. Of course, we need a bio strategy, because some of it could be gas or bio. The very long-term stuff that is about national security should be taken out of the normal energy markets and paid for and planned for separately.

Q131 **Lord Monks:** We know that wind power in particular has become spectacularly cheap in recent years and it has very impressive performance. Is there any point in offering further government support for its encouragement, and the same with solar panels?

Ian Simm: I think we are in a period of enormous disruption in the market, and uncertainty around what the configuration of the system should look like. In that context, financing what is called merchant plant, where there is no contract, is extraordinarily difficult. There is a situation in Spain where merchant plant is very difficult to finance for the same reason. There is a real need for the Government to signal that there is support for renewable energy through some kind of mechanism. It does not necessarily need to be heavily subsidised - I think auctions for CFDs are an efficient way of getting costs down. The Government need to stay the course, but they need to keep a very close eye on the public purse as they do so.

Lord Monks: Are there any other interventions you think could be introduced, in addition to contract for difference, to support the rollout of renewables? Are there any specific programmes you would like to see?

Ian Simm: Just very briefly, in the interest of time, there is a bit of a problem in incentives for co-location of storage and generation. My understanding is that the network operators are still seeing storage as a generation asset and are too quick to curtail the supply. Potentially the contracts around CFDs need to be examined to see whether there is a disincentive to bolt on storage to an existing project. Yes, there is some work to be done to encourage the creation of what Dieter Helm calls equivalent firm power, which at the site level is a very powerful way of smoothing out the lumps in the system.

Michael Liebreich: I am very against a requirement that renewable projects also have to sell firm power. I think that would be very inefficient. I would put the onus at the absolute other end of the value chain and say it should be up to the energy retailer to secure the energy supplies that they are selling. Whether they are selling to households or to industry, it should be up to them and there should be very substantial penalties for getting it wrong and stress tests. Let them then mix and match and ensure that they are procuring what they sell. I think that would help to drive liquidity into the forward curve for the very long term; the three-year, five-year, 10-year, 15-year forward curve for clean energy.

I look at the CFD and it is just a swap contract. The Government are essentially buying long and then selling short to the market, so it is taking that term risk. That can be done. Surely it cannot be beyond our wit to design a system where a market can do that, and private players—private balance sheets—could take over that role. That has to be the direction of travel, where we push liquidity into that forward curve so that the Government are not the one taking all the risk and then deciding all the volumes with all the political ramifications of getting it wrong and so on.

Q132 **Lord Rooker:** I will keep it to one question. If carbon capture and storage allows us to burn some fossil fuels for much longer than what we planned—I am not talking about five years, but about a couple of decades or more, and that is an advantage if they are emission free—should the Government create an incentive for creating the carbon capture and storage mechanism that we have not done so far?

Ian Simm: I think we have been trying as a nation to incentivise carbon capture and storage for more than a decade and like, almost all other nations, we have only half succeeded. I remain very sceptical about whether adding carbon capture and storage to a fossil fuel generation plant at scale will ever be cost-effective. The complexities of getting the project finance sorted out has proven to be intractable for almost all projects around the world. It is not clear that that situation is going to change.

I think Governments should remain close to the market that is trying to develop these technologies and be willing to support the trial of individual projects but also to plan for a scenario where carbon capture and storage associated with fossil fuel generation does not become widely adopted.

Michael Liebreich: There are two roles carbon capture and storage might play. One is where you have process emissions, particularly cement; if we want to keep making cement, unless you go to a different chemistry, you have the CO₂. You could regulate and say you are only allowed to make cement if you capture the CO₂ and do something with it or you can pay the companies to do that. But there is definitely the role of government to do one of the two.

On the other, I agree entirely with Ian. Retrofitting the end of tailpipe to

capture the CO₂ from generation is a non-starter because we are going into a world where the gas that we are going to need is intermittent. It is there as back-up. You are not going to build all the CCS just to occasionally capture a spurt of CO₂ when you need that gas. The second role is blue hydrogen, which we have in some projects, because what we will do then is make the hydrogen, use it in our industrial hubs up and down the country—particularly in the north—and also in storage to provide that long-term resilience that we have talked about. That is where CCS will work as part of cement and blue hydrogen.

For both of those, absolutely there is going to be a role of government, either through regulation or through incentives of some sort not just to jumpstart but to ensure on an ongoing basis that those things happen. CCS is both the capital cost but also the parasitic load. It is not just building it, you will build it and people will not use it. You have to build them and pay them or regulate them to use it.

Lord Rooker: So there is an energy security aspect to it as well.

Michael Liebreich: I believe that that is the role of hydrogen. I am not interested in hydrogen buses, hydrogen cars, hydrogen scooters, hydrogen boilers. I am not interested in blending because it does not time shift. Hydrogen is very expensive and complex and we need to do clean hydrogen to replace current dirty hydrogen, because it can provide resilience and do things that nothing else can do; perhaps aviation, perhaps shipping.

The Chair: Thank you both very much. My apologies for cutting you off but that has been an incredibly useful session. We covered an immense waterfront of issues so thank you both. We are going to suspend the sitting now as we bring the others in for a virtual panel.