



Economic Affairs Committee

Corrected oral evidence: UK energy supply and investment

Tuesday 1 March 2022

4.15 pm

[Watch the meeting](#)

Members present: Lord Bridges of Headley (The Chair); Viscount Chandos; Lord Fox; Lord Griffiths of Fforestfach; Baroness Kramer; Lord Monks; Lord Rooker; Lord Skidelsky; Lord Stern of Brentford.

Evidence Session No. 4

Heard in Public

Questions 42 - 52

Witnesses

I: Mike Tholen, Sustainability Director, Offshore Energies UK; Dr Nina Skorupska, Chief Executive, Renewable Energy Association.

USE OF THE TRANSCRIPT

1. This is a corrected transcript of evidence taken in public and webcast on www.parliamentlive.tv.
2. Any public use of, or reference to, the contents should make clear that neither Members nor witnesses have had the opportunity to correct the record. If in doubt as to the propriety of using the transcript, please contact the Clerk of the Committee.
3. Members and witnesses are asked to send corrections to the Clerk of the Committee within 14 days of receipt.

Examination of Witnesses

Mike Tholen and Dr Nina Skorupska.

Q42 **The Chair:** Would you like to introduce yourselves before we kick off?

Dr Nina Skorupska: I am the chief executive of the Association for Renewable Energy and Clean Technology—the REA. We have been around for 21 years, working principally across the deployment of onshore renewables and clean technology, on decarbonising power, heat and transport, and on circular bioresources.

Mike Tholen: Good afternoon. I am head of sustainability at what is now known as OEUK—Offshore Energies UK. We have a pedigree of 50-plus years. I have not been with it the whole time, but we focused first as an association on looking after the energy sector offshore, particularly oil and gas. In the last decade, we have been increasing more widely and in the last couple of years focusing on the raft of energy opportunities offshore.

Q43 **The Chair:** Before we go any further, just to let you know, Lord Fox and Baroness Kramer will have to slip away. If they do so, it is not something you said.

You were very good at waiting, so you heard the end of our last panel. Let me pick up where we left off, on the impact that the current crisis is having on the debate about energy security and supply. To what extent does it affect our approach to the trilemma? Lord Skidelsky has views about the use of that word. What impact would it have on our approach? Does it mean that we should be rapidly accelerating investment and means to encourage investment in renewables, or should there be a different, more balanced approach as regards oil and gas?

Dr Nina Skorupska: We should already be doubling down our efforts on renewables. As the REA, we have long argued with the Government that the energy transition is taking far too long. Of course, we can look back and say, “If only we’d done all these things, we could have ensured quite a considerable amount of insulation”, and I use that word particularly because of the thought that, if we had done more insulating of people’s homes, we would have insulated them from the energy bills, which are predominantly what will impact people and broader society.

Wholesale energy prices are an internationally traded commodity, and a question is coming about whether, when we price electricity and use wholesale markets, the market mechanism that we have in the UK is fit for purpose any more, since it is based on marginal cost of a fuel rather than focusing on the fact that renewable power sources such as offshore or onshore wind, solar and other technologies are way cheaper.

Mike Tholen: I would not like to say that I want to have my cake and eat it here, but the challenge for us, even leaving aside the desperate times ahead of us at the minute with what is going on in Ukraine, is that, as a country, we need to be able to manage that change as quickly as we

can, while, at the same time, having a performant, socially focused economy that can provide the jobs, the security and the care for society that we need all the way through. There is an inherent tension there, not least as we see it just now.

The focus has to be, in the first place, on reinvesting in the new energy opportunities on and offshore, at the best pace we can, so that we can deliver those. At the same time, we are blessed with a whole range of energy resources offshore, not least oil and gas. If we are to use those, we need to make sure that we use them reliably, cleanly and as effectively as possible in that transition.

The Chair: Would you want to see more investment in and development of oil and gas in the North Sea, for example?

Mike Tholen: I would like to see continued investment in oil and gas. Between now and 2050, about half our energy mix as a whole will be provided by oil and gas, and it seems a shame not to make the most of what we have in the UK. The figure of 50% is the Climate Change Committee's own figure for the demand of oil and gas over that period. Currently, oil and gas is something over 70% of our energy needs. There is an inherent opportunity to make the most of what we have and to gain the value from that. In doing so, there is a massive transfer of technology capabilities as we move into the new sectors that are opening up in front of us.

The Chair: To ask a layman's question, when you say "continued" investment, does that mean new fields?

Mike Tholen: In existing and new fields, yes.

The Chair: Should the IEA's scenario of no new field development be questioned in light of the state that we are now in, given the crisis?

Mike Tholen: Forgive me—even despite the dreadful state we are now in. I do not want to be seen to loiter on the grim situation in Ukraine. The IEA, in what it published in spring last year, focused on a perfect market happening in a perfect way. What I know after 60-plus years of life is that nothing in life is perfect. We should make the most of what we have, but do it in a way that is responsible and careful for the environment. In its publication last week, the Climate Change Committee recognised that the UK's carbon footprint from the production of oil and gas is well better than average, particularly for gas, so we are putting cleaner than average barrels out there that are well supervised. In doing so, they are offering a support to energy security and helping with the transfer of opportunities into some of the really exciting opportunities that we have both on and offshore.

Q44 **Lord Fox:** When you say both new fields and further investment, on a balance between enhanced recovery from existing fields and investing in new fields, how would you see it—50:50, 20:80 or what?

Mike Tholen: I would probably be something of a 70:30 man, with 70% in existence, but I am not very good at betting. There is a well-tapped, well-understood resource base out there, and there are still opportunities, which the Oil and Gas Authority is well aware of, that can be reasonably responsibly developed, within an envelope of the climate compatibility checkpoint which the Government propose and within the broader remit to make sure that those are consistent with the Oil and Gas Authority's energy strategy. There is a tight road to walk down in doing this.

Q45 **Baroness Kramer:** I am slightly troubled. Perhaps you could just address the issue of stranded assets. First, any company with potentially stranded assets will do everything it can to keep being able to exhaust those assets, so we are putting some conflict and tension into the system as we exploit something new. Secondly, there is the presumption that the oil and gas would come here, but it goes on to the world market, not making any difference to the world price, so there is no affordability benefit from it. Indeed, there is no security benefit, because it is headed off anywhere in the world. I forget what the percentage is that we export from our current fields in the North Sea, but it is very significant.

Mike Tholen: There are two parts to your question. First, on stranded assets, we recently met with the Bank of England to discuss that issue. The UK continental shelf is in a slightly weird situation. It is in very steady decline. It may get to 2050. I hope I do the same, but it will do that in a pretty graceful way. It does not, even now, meet all of what the UK needs.

In the 2050s, the little production still coming from it will still be well inside the envelope of what the Climate Change Committee predicts. We are sitting in an envelope where we are not looking to provide the future of the world's oil and gas in the UK, but we can provide a steady proportion of it—about half, give or take—in the years to come. There is an intense diligence of the quality of assets and the nature of those assets on a country's books. The world is quite reasonably focused on and monitoring stranded assets and issues around those. As I say, we met with the Bank of England on this subject only three weeks ago.

In terms of the focus on continued development, and import and export, almost all the gas we produce in the UK stays and goes into the UK market. A little bit moves at the edges.

Baroness Kramer: Is that your choice?

Mike Tholen: No, that is the physics of how we produce. Most of the gas literally comes into the UK. Some spills abroad, but we consume almost all the gas that we produce. In terms of oil, quite a high amount goes overseas at the minute. Much goes to Rotterdam for refining, and then returns back to the UK market.

The Chair: What percentage is that?

Mike Tholen: I would say about 60%. I am very happy to give you the exact figures. I am doing this from memory.

The Chair: If you could send us a note, that would be very useful.

Dr Nina Skorupska: I am very much in the camp of the IEA. I have been working in energy for 35 years and am definitely what you would call a poacher turned gamekeeper, or the other way round. My doctorate is in coal combustion. We have seen the needs and the musts of the energy transition and the stages that have to be brought to bear. I do not believe that we should be investing any further in long-term oil and gas. It just does not justify the investment for the new production. We should be focusing on renewable energy.

Of course, we do welcome the North Sea transition deal, and I have spoken to Ministers about that. We have an extraordinary engineering resource and capability, and being able to transition those people over to work in all the technologies that work towards tackling climate change is absolutely fundamental. I have changed from running a gas station, an oil station and a nuclear power station, to leading a trade association on renewable energy.

The awareness in the sector of the need to change is pretty low, I hate to say. When we worked with one of the other institutes and we went through the Government's energy White Paper, it was quite shocking to understand all those different chapters and, in particular, the steps that the oil and gas sector needed to go through. I welcome the really great discourse and conversation with professionals, particularly in geochemistry and understanding the geology of the lay of the land, but there is a mismatch between what is said and what happens through organisations in this energy transition.

Q46 **Lord Fox:** Following on from using this great engineering base, Dr Skorupska, we talk about the intermittency issues, particularly for wind. What technologies do you think we need to prioritise in order to tackle the intermittency and the need to balance the phasing and all those kinds of things? How should public policy be encouraging that?

Dr Nina Skorupska: Absolutely, there are technology solutions to overcome. I do not use the word "intermittency"; I use the word "variable". We are modelling our capability to understand the weather and to make various trading assumptions that are second to none. If you speak to National Grid ESO, it can tell you when it is going to be a windy day or when the sun will shine. I cannot believe I have used that phrase, because I have had that thrown at me so many times in return.

The point is that renewable energy comes from multiple sources. Solar and wind are just two forms of renewable.

Lord Fox: They are the two forms that we have invested in substantially to date.

Dr Nina Skorupska: That is an absolutely clear point as well. The Government have chosen to invest in those areas. They have not yet invested in marine or geothermal.

Lord Fox: By “marine”, do you mean wave?

Dr Nina Skorupska: It includes wave and tidal—whatever is appropriate for taking advantage of the geographical and geological conditions of the country.

Lord Fox: We heard in the last session that what makes things successful is having a technology where you can systemise the installation and then invest in scale, which is why we went from land to offshore wind and, presumably, to floating wind quite soon. Are you suggesting that there are yet more other areas that have to be systemised in order to deliver on the green agenda, or can it be delivered with just the technologies we are deploying at the moment?

Dr Nina Skorupska: We should go from strength to strength with offshore wind. We should continue. That is totally agreed. The area about which I disagreed with the Government in various meetings over the last eight years is the promises that they made about what would be included in the market instruments to bring on these new technologies. The CFDs, if you recall, had pot 1s, pot 2s and pot 3s. When we were working on this, the promise was that each pot would be funded and would enable the different technologies to be brought forward. Fortunately, as you are aware, we have just had pots 1 and 2 funded, so that includes solar, onshore wind, offshore wind and floating offshore wind.

I know that the Government are working with our members to look at how we use that same mechanism to support carbon capture, usage and storage, linked with bioenergy and other forms that need to capture carbon. They are also looking at energy from waste and other technologies. We have 40 different renewable technologies that our members believe can be brought to bear and scaled up.

Lord Fox: I understand that. The question I have is whether it makes sense to have 40 different technologies delivering all the energy that we need, or whether it make sense to have three, in terms of scale and investment.

Dr Nina Skorupska: It is about turning it on its head. What has been remarkable is the approach from onshore—the markets that we need to see developed to encourage decentralised energy to play a role. That is when we will see true energy security, where we are not dependent on a single technology. I have had to go out and trade out a position for our energy company when a nuclear plant has fallen over. That has had the most catastrophic effect on the market. If we are looking at security, having distributed energy resources across the country, and investing in people’s homes and businesses to be more energy efficient, would be the way forward.

I have not yet touched on the point about energy storage. There is shorter-term energy storage—zero to four hours, which is predominantly battery, and there are static and mobile batteries, such as those in cars.

Then there is the longer-duration energy storage that the REA helped the Government run an innovation competition on.

Lord Fox: Is that pumping water uphill?

Dr Nina Skorupska: There is pumped storage and compressed air. There are so many different innovative ideas, as well as hydrogen, of course.

Mike Tholen: I will show a little of my engineering background in my reflections, particularly on energy security—how many eggs and how many baskets. There is still a gamechanger in the wind space, moving from relatively nearshore, shallow-water wind to the deep-water wind. The wind is always blowing somewhere, but not often where the wind turbines are at the minute. I am afraid that getting more out there and floating wind will be a very different game than we see in static wind at the minute, and one that I hope opens up opportunity. In Scotland, my member companies are investing something like £25 billion over the next decade in floating wind, so we are committed to that. These are oil companies in the North Sea, focused on a very different future.

In parallel to that, we need to lean on the capabilities that we have around carbon storage and the mix of power generation, ensuring that we have clean power as part of that mix alongside nuclear and, coupled with that, focusing on the interconnectivity that we have to see right across the North Sea to build on the fact that there is excess energy in Norway one day and in Iceland the next. It is a world of joined-up systems rather than simply one or two horses that we need.

Q47 **Lord Skidelsky:** You have already answered all my questions that were down, but I perhaps have one more to add. You have said that you are in favour of new and green technology, but they are different technologies. You have also said that you would like the Government to fund more than two pots. What else should the Government be doing now to dramatise the need for action on these fronts? Should they be prioritising specific technologies, saying, "We want to put our faith in these, and these are what we are going to go for"? Should the Government be giving more of a lead?

Dr Nina Skorupska: The area where the Government really need to lead is in creating flexibility in markets, looking at how our legacy and existing grid and infrastructure play their role and interact with the fantastic, burgeoning development of tech and data management. We hope to see, as soon as possible, time of use tariffs coming in, so people and businesses get to play an even more rewarding part in whether they are takers, producers or prosumers of their energy. At the moment, the UK is lagging behind by stating lots of targets and ambitions but not yet delivering this flexibility market.

When we compare the UK and 11 other leading nations across Europe on how they are developing those markets, we are right in the middle of the road. We are very good at pilots and demonstrations. Ofgem runs a great

sandbox, but it is about getting a clear market across the UK. Money is waiting, but they see the risk in switching backwards and forwards on the rules on market development.

We are also seeing that, across the UK, if you are looking at decentralised energy, the different distributed network operators are not singing one single song. They talk about open networks, but they are all bringing in different rules and guidelines at different times. How does a major power system come in and invest in battery storage and really take it to market, if they cannot see how they can make money out of these markets? If it is one thing, that is what I want. It is not about technology any more. It is about markets.

Lord Skidelsky: Mr Tholen, would you like to add to that? What should the Government be doing that they are not doing now on renewable energy?

Mike Tholen: The focus is as much on the consumption market as the production market. From the production side, in terms of the generation of renewable energy, we have to stay the course. We have seen that, as on and offshore wind has developed, the cost curves mature, and the knowledge, the gains and the skills. We have come to a market that now stands on its own in a way that it could not a decade or two ago. Staying the course is the first thing.

I would always love to see a CEEB of old be there now, not because I am thinking too much of the glorious past, but because there was a real focus in the past on developing the infrastructure, come what may, and seeing investments through that we need to see happen. With that, we should apply that focus as much on carbon storage as we do on wind, and see how it can be done in an effective way to hydrogen, so that the mainstays of energy supply can emerge as rapidly as possible.

Lord Skidelsky: This is what you think the Government should be doing. Will they? Is the present structure set up to enable them? Do they have enough powerful Ministries committed to it? Do you have any thoughts about that?

Mike Tholen: My most immediate experience is in my own sector, where offshore was trying to access renewable electricity to replace our own power generation on oil and gas platforms offshore. We want to plug our kit into the UK's grid. The work to develop those opportunities is held back by the complexity of the conversation and of the regulatory regime, and by the inability of everyone to focus on good outcomes in an effective way. There is a huge amount of good intent, but there are so many interfaces, whatever aspect of the energy market you are in at the minute, that it is really hard to get things done quickly and at the pace you need to get to where we need to be as a society.

The Chair: Could you follow up in writing, very briefly, to flesh out some of those points? I am very interested in that.

Mike Tholen: I would be delighted to. Trying to decarbonise our energy production offshore, when we are in the path of a maelstrom of investment going on around us, and trying to get what we want to get done over a 15 to 20-year period, when the energy infrastructure that we can help share an investment in will be there for a century, is really challenging at the minute.

Q48 **Lord Stern of Brentford:** I just wondered, Mike, whether you have seen the letter from Lord Deben to Kwasi Kwarteng from a day or so ago. It made some quite strong arguments, which many of us found persuasive, that there is a big distinction between existing gas and new gas. It emphasised how long it took for new gas to come through from new fields. I just wanted to note that and to follow up on what you were both saying, because a very important conclusion from this report could be about clarity of policy in the way the different structures come together.

If you will forgive me, I had the great fortune as a young researcher in economics to work with the extraordinary Bob Solow, who said that economics needed faith, hope and clarity, and the greatest of these was clarity. In this particular case, investors need clarity to help reduce uncertainty. Nobody gets certainty; that is not on offer, but you can get reduced uncertainty. It would be helpful to us if you could articulate the various ways in which that greater certainty—or less uncertainty, rather—could be offered, in supply, intentions and planning, and on the demand side, energy efficiency, transport and timing. There is so much that you can do.

On both sides, could you help us with what kinds of policies would give that confidence? There are some obvious examples, but it would be interesting to go deeper. A shutout period for sales of internal combustion engines, or a date by which the grid has to be net zero, are just two examples that are already on the table. Could you help us with what kinds of things, starting with supply and then demand, would give the increase in confidence that could draw investment through in the right places?

Dr Nina Skorupska: Starting on the demand side, if I may, it is about the certainty around what we are doing with our homes. Mandates are very powerful. The tension that existed between car manufacturers and EV charging infrastructure and renewables was in play right up until the Government brought in the banning of the sale of ICE cars after a certain date in 2030. We are now waiting to see, in order to encourage the uptake of electric vehicles, whether we are going to have a ZEV mandate soon. That is going out for consultation very shortly. Another example is the banning of gas boilers in new homes. We are feeling the penalty of deferring the net-zero homes of 2016, and we have now tried to address that with green homes grants.

It is also about consistency on those infrastructure-based activities, where people are investing in the production of battery facilities or car manufacturing. That is where those kinds of mandates really allow people to align and then put all their ducks in a row in order to deliver a solution.

On the generation side, we saw the bonfire of the policies between 2017 and 2019, removing various levies and support schemes, and we have now had a rush to introduce strategies on net zero, waste and resource, and the energy White Paper.

One thing to be greatly welcomed is that the Treasury is going to do a test on where the funding from the Government will go and whether it meets net-zero requirements. The proof will be in the pudding of the choices in investment in the Government's infrastructure. This consistency builds confidence and de-risks the view of investors that the UK Government are serious.

The CFD has been a remarkable instrument but it is not the answer to everything. It has been constrained. We also need to redesign the power market, because the capacity market has let in unintended consequences. There was a period of time when the Government said that they did not pick any winners, but they let in everything else that was against climate change, such as the proliferation of open cycle gas turbines, to meet capacity market needs, rather than clean technologies.

All these market instrument rules need to be tightened up to really give clarity that we are serious that we are looking to deploy renewables.

Mike Tholen: We met Lord Deben on Wednesday or Thursday last week, ahead of the publication of the letter from the Climate Change Committee. Even in the letter, they recognised that there is no simple answer to quite a hard question. The positive side of us using our own natural resources to meet our energy needs is that we are in control of them, and we quite rightly should focus, if we are to produce in the UKCS, on making sure that those barrels of oil and gas are as clean as possible, and used as well and as soundly as possible.

As part of that, though, they got a bit off kilter in terms of the development cycle. Some fields can take an awfully long time to develop, but the likelihood, if they are going to be developed 20 or 30 years from now—perish the thought—is that they are not going to be developed. If we have a successful decarbonisation strategy in the UK that truly delivers, the market for those resources will not be there. Much of the focus, even through exploration, will be on reaching out from where they are to make the most of the resources they have. That is a good carbon way of making the most of that infrastructure, which, in many cases, is being turned over gradually to carbon storage as part of a very different energy future. Phased, careful and measured for the long term has been the focus of the industry.

Lord Stern of Brentford: I am also a member of the PM's Council for Science and Technology. We ran into real difficulties in looking at regulatory structures that had come, in large measure, from the privatisation of nationalised industries, and we just focused on the price in that industry as opposed to the way in which the different parts of our economy are regulated. It seems to have little to do with a systems structure that can promote net zero.

Mike Tholen: There were two strands in my response to Lord Fox, in saying, “Let’s just keep the course of what we’re trying to do on certain energy opportunities around CCS, nuclear and wind”. We have to drive them through to completion rather than thinking that we are half way there when we have managed a couple of years of it. Some really good outcomes versus some really bad outcomes would be joined-up thinking.

The classic one in the UK is on carbon markets, where you do not know where the price is going to. I am not necessarily proposing a carbon tax, but the clarity of knowing where you will be allows people to make those investments to decarbonise. That has been very transformative. Norway used a carbon tax-like structure in its oil and gas industry, which led to it doing things more quickly and with more surety than we have done in the UK, because we have been led by a price signal market approach. Rather than just following the price, there is a lot more to do in this space, as I am sure you would tell us.

When you look in a more joined-up way at some of the emergent energy vectors, not least around carbon storage, having nose-to-tail focus on how we get the carbon out of the system and down a hole means we need very joined-up, commercial-focused regulatory approaches, rather than a wall of regulators, with one doing one bit and one doing the other.

The best example of that would be if you were ever to spend your time in my office looking at offshore infrastructure for gas in the Netherlands versus gas in the southern North Sea. The Dutch—darn them—have this really structured development of the infrastructure offshore, which looks a bit like a Tube map. The one that the British have—God bless them—looks like a pile of knitting. It is chaotic out there. We started well and then got muddled—I would like to think that we could do a lot better than that—in wind, the electrical infrastructure we need offshore, and the power infrastructure on and offshore.

Q49 **Lord Monks:** Dr Skorupska talked briefly about construction and housebuilding in her last contribution. I am interested in insulation and so on. What can the Government do in addition to what has already been announced on boilers, the green build initiative and so on, to ensure that our building standards and our construction industry match other northern European industries? At the moment, it is well behind—I do not know whether you agree with me—from draughty doors and windows to poor loft insulation. That is just in new houses, never mind the existing ones. Would you like to comment on what the Government could do to tighten up the construction industry and improve its performance?

Dr Nina Skorupska: This is a fantastic point. For my sins, I am on the board of a major construction and engineering company, mainly because I want it to do better and deliver better. This is the overall infrastructure that will make or break whether we can meet net zero. What we are building today will be around for an awfully long time, testimony of which we can see sitting in this building, if it does not get burnt down.

On the future build regulations, we need clarity around what the hell an EPC is on people's homes. There are some total inconsistencies in the messaging. We need to make it as simple as possible. It is about incentivising people to do the right thing by giving that clarity. The power is in the purse and persuading people not to put up with homes and buildings.

I have sat on a number of committees that have promoted to people that the best thing about an affordable housing block is the fact that they will have a gym. Surely, the conversation is about how we enable people to benefit from being made immune to their energy bills and, at the same time, address climate change needs. There is an awful lot more the Government can do. The Department for Levelling Up, Housing and Communities needs so much more power, and the local government players have that planning requirement to be able to ensure that what is built is fit for purpose for net zero as well as affordable homes for people.

The other aspect is that you are seeing the pressure coming through the financial markets as well. Any of these large housebuilders need to report their scope 1s, scope 2s and—blow me—scope 3s. How are they going to ensure that the houses that they build and the people who are living in them will be able to help deliver a low-carbon experience out of it?

This pincer approach to the financial pressures, the need to report and the accounting, by tackling the housebuilders through the CFOs and their requirements on raising money and debt to do all the projects they want to do, is beginning to work. Unfortunately, it is quite late in the day. We need to see ESG as a really robust, clear, straightforward way of reporting on how different corporates, including housebuilding magnates, are delivering on those fronts.

Q50 Lord Rooker: I was going to ask about renewable technologies that are most promising, but we have discussed much of that. I agree with Lord Stern about clarity, but over the top of it all is security. It is an unintended consequence that we have taken lots of good arable land out of food production, but nobody does the balance. We want the energy, but we will be in trouble with food security, if we are not careful.

I want to raise, again, a security issue. It has been raised by both ends of the room: battery technology. We do not have the chemicals here that we can dig up. We have to get them from somewhere else. The markets are already being reorganised. Yet hydrogen can be used for internal combustion engines. I have seen internal combustion engines powered by hydrogen. They were former diesel engines that were converted—big, it is true, because of the capacity of the engines. There are family cars on the road with internal combustion engines driven by hydrogen, where we do not have the problems of security of supply that we would have with batteries, and yet it does not seem to be a priority.

A comment on this would be useful. We look at hydrogen in the sense of energy production for homes. I do not know how many cars are on the road—27 million—but people will still want personal transport. If we put

all our eggs in battery technology, to the exclusion of everything else, we end up, some years to come, with another security problem, ie the chemicals for the batteries, which we are not going to get in this country.

Hydrogen does not seem to be pushed in terms of production for use for internal combustion engines, and yet it is technically possible. What could be done in this respect to balance up? Is it the lack of private investment or the lack of push from the Government? I know they produced their hydrogen report, but the fact is that it is all about batteries and charging units, without looking at the consequences of where the chemicals are produced and the batteries are coming from. All the eggs are in the wrong basket again, by the look of it.

Dr Nina Skorupska: We have to be careful in understanding where the materials and resources for battery technologies, as they are evolving rapidly, come from. You are absolutely right. Just like everywhere else, we have not even scratched the surface of that second economy of recycling and reuse of batteries. I do not know if you are aware that many of the existing Leaf car batteries are reused at the end of their period of life, which is not short, and become static batteries or are used as cassettes in storage facilities. Already, industry and sectors are recognising that the battery sector has to look at sourcing and reuse.

The Chair: What about manufacture? China is dominating the manufacture of batteries.

Dr Nina Skorupska: Britishvolt wants to build a plant in the north-east.

The Chair: If we are saying that, essentially, we should be rapidly increasing in renewables to address security of supply, building on what Lord Rooker is saying, the question is whether we are guaranteeing that security of supply, given where we are right now in terms of production of these renewables and the supply chain.

Dr Nina Skorupska: Both are growing hand in hand. The worry is whether we have enough renewable power to ensure that the cars we are going to drive, which will be battery cars, will be powered with low or zero-carbon power. All of this is evolving hand in hand, and we have to keep an eye on it.

Maybe I would put a question back to you. In hydrogen, the chemistry behind the predominant form of production is from fossil fuels. It is not a low-carbon source in its own right, until we move to the use of electrolyzers. We need to invest in that, and the UK wants to invest in and to become leaders in what is called green hydrogen production. We should be aiming for net-zero hydrogen. That is the ambition, not hydrogen in its own right.

The Chair: On a wind turbine, for example, could you briefly talk us through, in layman's terms, where the main components come from?

Dr Nina Skorupska: They come from right across Europe, but the aim for us is to start, in the eastern part of England, to produce those

individual components. We are a society that builds components in different nations and, in the last two decades, we have become an awful lot more about assembly rather than fundamental production. Our solar panels are not produced in this country. They come from China and other nations, which have taken those first steps to realise that these were opportunities.

With anything that we manufacture, whether a gas power station or a renewable source, we need to break down every supply chain and see what we can do here in the UK to secure that supply, and then to realise how we mitigate any risk of not having access to it. We have to ask the questions up stream, but the benefit, ultimately, is that we will see lower-cost energy provision that is more secure.

Lord Rooker: You raised the issue, when you did your introduction, of transport. There are 15 million to 16 million personal vehicles and people are still going to want to move around. It is all eggs in one basket. If there is a problem with hydrogen—I fully accept that there is green and blue, and everything else—it is not easy. If there was a drive from the Government to make the technology of the internal combustion engine at a family level, as opposed to the big JCBs, viable for hydrogen, that would surely be better, from a security point of view, than having to worry about China digging up the chemicals in Africa that are needed to make the batteries, because it has bought the countries.

Coming back to security, it is over all of us and it is not just about gas. I agree with you about the North Sea, by the way, in terms of the gas, and that we should capture the carbon. The fact is that it is all eggs in one basket. Should the Government be doing anything to promote the forms of hydrogen that can be used for the internal combustion engine, so that we can be less reliant on batteries?

Dr Nina Skorupska: It is an economic question to weigh up. The car manufacturers will ultimately decide on the vehicles that they want to put into mass production and, ultimately, what can be brought to bear and link in with the infrastructure that we want to deliver here in the UK. The war for cars and light commercial vehicles has predominantly been moving towards a battery technology solution, because the battery technology has evolved at rapid pace, and the costs of those batteries have come down significantly over the last five years.

Hydrogen still has a long way to go in making sure that it is net zero—there is a cost implied in that—as well as persuading a car manufacturer. Potentially, the champion of that would have been Toyota, which set up the global Hydrogen Council and wanted to start to promote that, but the other car manufacturers have not gone down that route.

Mike Tholen: You are right to say that we should not neglect hydrogen. The North Sea transition deal, which our industry agreed with the Government on a year ago, focuses on how we, as a sector, can help develop 50 terawatt hours of hydrogen by 2030, which is a strange unit but a lot more than we have now. That has to look at both demand and

supply, focusing on supply, blue as well as green. Equinor is out there with a vessel looking at how we can use electrolyzers to generate blue hydrogen at the minute. As mentioned, Toyota, outside Europe, has focused on automotive hydrogen-based markets, rather than battery-centric markets. We need both out there and we would be foolish if we did not look at both opportunities and push them as hard as we can, because we will need hydrogen as part of our energy mix into the 2050s and beyond.

Q51 Lord Griffiths of Fforestfach: I would like to ask a question of Mr Tholen. It is really about the role of oil and gas in the transition and is in two parts. First, given that this is really top of your mind, could you state the exact case for oil and gas in the transition? Secondly, what is the weakness of the case for saying that we should go all out for renewables?

Mike Tholen: There are two very interesting sides to that coin. The case for oil and gas is that, at the minute, the economy in the UK and around Europe is based on an energy mix, in which, this last year, 75% came from oil and gas. We must move away from carbon-intensive energies or ones that are carbon backfill. I completely accept that. We should do that at the best pace we can, without losing our shirts as a society in the process.

The opportunity for us in the UK is that we keep focusing on electricity and electrons. Oil and gas do an awful lot more than that, whether it is in space heating in people's houses, industrial processes, and even down to the irony of us—my goodness—running out of CO₂ for food packaging, which is coming to and fro because of the cost of gas. We have built a society around oil and gas in a way that, 100 years ago, we were not even thinking about, so we cannot simply jump off the cliff without a parachute.

The blessing for us in the UK is that we have the technology, the knowledge and the capability to do that in a way that allows us to make the transition and decarbonise at a pace that many other economies cannot, but it would be foolish for us not to make the most of that heritage by doing it in a way that allows us to responsibly decarbonise, producing and using it in the least damaging way possible. That is the blessing for us. Behind that is the supply chain. We are world class in how we develop and produce oil and gas, and those technologies and companies are reaching out right across the energy firmament, based on those skills here in the UK.

I have met Scotsmen in the Middle East working in very remote places, doing amazing things in the oil and gas industry, and I look forward to them doing the same in some very strange parts of the world in the wind industry and other parts of the renewables sector. As a society, we have the capability, resources and knowledge to be there. We need to get after them.

The weakness of relying on renewables in the transition is to go into this with our eyes closed. Embrace them. There are some fantastic and really

exciting opportunities out there, but we need to have the courage to see them through, without just jilting all the old friends on the way through. Some of them will be needed, but make sure that they are clean and responsible, and that they respect and honour what they are trying to do as part of the energy mix to see us through to a very different future from where we have come from.

Lord Griffiths of Fforestfach: Sorry, I did not mean to exclude you from answering, but Mike had made so much of oil and gas.

Dr Nina Skorupska: He is speaking on behalf of the oil and gas sector, which is evolving into other offshore technologies, for sure. We now have even more and better technology that can assess what is happening with our oil and gas fields. We can now see how well the oil and gas sector is dealing with fugitive emissions and whether it is playing its part in addressing and being the world class sector that it needs to be. That is one of the first principles in any further investment that goes to the oil and gas sector. It needs to get its house in order in terms of those fugitive emissions. There are drones that fly over to look at methane plumes and other escapes. It is not acceptable to say that it is not economic now—economic to whom? It is not economic to this planet not to do the best that we can in order to do that.

Like I said, the knowledge, engineering and capability need to be pivoted as quickly as possible to providing renewable or clean technology solutions. I am all for working hand in hand with that sector to do that. As for this belief that we need to take it slow and that this can all be done by 2030 or 2040, I am sorry, but we have to wake up and smell the roses. We need action in these next three years. Renewables can be deployed in six months to a year for a solar farm or an onshore farm, if planning, regulation, communities and people are engaged, and we use our land correctly. All of that is within our gift as the populace if we put in the right rules, regulations and support mechanisms to make it happen.

Q52 **Viscount Chandos:** A low level of interest rates may be the result of not just central bank action such as QE, but a surplus of capital globally. The money is there. What should government be doing to harness that money for the energy industry of the future?

Dr Nina Skorupska: I am very fortunate in the REA to have a finance forum of some sterling crowdsource funding members right through to the big banks. They are all clear that they need enough clarity, not certainty, on policy and regulation to understand what that cost of capital is. Low-carbon investment must scale up to £50 billion a year. That is our view of the CCC. Private capital contributed £20 billion back in 2019. That is what PwC said, not me. They are waiting for those rules and that clarity around how they can invest in those.

Something that we have not really talked about is the flexibility market. We will see a significant amount of funds come in once we understand how that flexibility market will work. Solar and co-located battery farms

are now already receiving power purchase agreements, but the problem there is about planning and other regulations.

It is about breaking down all of those barriers that are on the risk hitlist of our investor community. I am desperate for the UK to rise up our energy transition readiness index by knocking over all these different barriers, so that more money comes to the UK rather than to the Scandinavian countries, which seem to have a better, more willing market structure and make things happen.

The other thing is not to flip-flop. The green homes grant that we saw last August, which was to address skills and build back better, was a debacle. It has not gone from people's memories that they took the trouble to put themselves forward and start to look at insulation, building up significant businesses around this, and then the rug was pulled out or it was mismanaged. Those reputational things are also reasons why people do not come to the UK.

Mike Tholen: To build on that, line of sight in terms of durability of investment is essential. Most investments in the energy sector are of multigovernmental duration, from five to 10 or 20-year cycles to even get the darn stuff out there. There is almost a thought experiment around one of the reasons why the Climate Change Committee is as successful as it is. It has seen several Governments out already and will see a lot more out in the process, so it is giving that enduring focus on where we need to get to. Those signals that can withstand one government cycle are very important in the investment sector.

Wherever you sit in the energy sector, there does not seem to be a shortage of cash to invest in energy, which is great and exciting. It always comes with conditions, as any good investment should. Investors who are willing to come to the UK almost want a little bit of certainty out there sometimes, not a "the world is flat; just get on with it" type of certainty, but knowledge that the regulators are not going to change their minds and turn left, then right, when the investments need to be enduring on these things for us to get the cycles going.

Viscount Chandos: Would both of you say that it was primarily the regulatory regime and as much simplification, clarity and longevity as possible, or is there government intervention, whether through broadening CFDs, loan guarantees and so on, that is needed to make the difference?

Mike Tholen: From my own perspective in the heavy energy investment sector, it is a mixture of policy and regulatory, so that you have line of sight on how the investment will evolve sufficiently to bring different investors in and out over the life cycle of that investment, and they know what they are signing up to. Coupled with that, you cannot beat a bit of good regulation now and again.

Dr Nina Skorupska: As well as all those things, interestingly, one of my members highlighted government-backed loans, as we saw during Covid,

and how well we mobilised them. You will have different views of how successful they were or whether the Government will be able to recoup those loans in the future. Linked to something so specific as renewables, they would unlock a lot to do with other perceived risks or uncertainty linked with regulation, or in a particular region of the country. The government-backed loan type of scheme seems a way of being able to take that step further forward.

As for CFDs or annual auctions, we do not know how much will be available, their duration or where, but the announcement that the Government are willing to commit to that has perked everybody up. We have a little bit of a heads-up as to what is coming next and everybody is waiting at the door, so we need this information to come quickly. I know we are distracted at the moment, in a terrible way, in other areas, but we need the government machines to be aligned and working in concert to enable more renewables to be invested in.

The Chair: Thank you very much indeed for a very useful discussion. We have covered a lot of ground. Thanks a lot for coming in.