HOUSE OF COMMONS

Business, Energy and Industrial Strategy Committee

Oral evidence: Energy security in the UK, HC 1191

Tuesday 8 March 2022

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Watch the meeting

Members present: Darren Jones (Chair); Tonia Antoniazzi; Alan Brown; Richard Fuller; Ms Nusrat Ghani; Paul Howell; Andy McDonald; Charlotte Nichols; Alexander Stafford.

Foreign Affairs Committee member also present: Tom Tugendhat (Chair).

Questions 1 - 23

Witnesses

I: Dr Doug Parr, Chief Scientist and Policy Director, Greenpeace UK; Dr Jack Sharples, Research Fellow, Oxford Institute for Energy Studies; Professor Mike Bradshaw, Professor of Global Energy, University of Warwick; Lindsey Walter, Deputy Director, Climate and Energy Program, Third Way.

Examination of Witnesses

Witnesses: Dr Doug Parr, Dr Jack Sharples, Professor Mike Bradshaw and Lindsey Walter.

Q1 **Chair:** Welcome to this morning's session of the Business, Energy and Industrial Strategy Select Committee for our hearing on energy security in the UK. We are delighted to welcome four witnesses today. Virtually, on the screen, we have Lindsey Walter, who is the deputy director for climate and energy at Third Way in the United States, and Professor Michael Bradshaw from the University of Warwick. In the room we have Dr Jack Sharples from the Oxford Institute for Energy, and Dr Doug Parr from Greenpeace. We are also delighted to welcome the chair of the Foreign Affairs Select Committee, Tom Tugendhat, who is joining us today.

To kick us off, given the tragic circumstances that are unfolding and continue to unfold in Ukraine, the political discussion has started to review energy security in the UK and Europe. Just to start the discussion, I wonder if you might give us an overview from your perspective about how what is happening in Ukraine is affecting energy supply and security in the UK, and specifically what you think might be a lasting consequence of what is happening as opposed to a temporary one.

Dr Sharples: First of all, I would like to say it is a pleasure to be here with you. Thank you for the invitation. What we have seen in terms of physical supply so far is very little disruption. The primary impact has been on price. We are talking specifically here about natural gas. Russia accounts for a substantial proportion of European gas imports and supply. Last year, it was about 36% of imports and about 29% of total supply, so anything that could affect that supply is of great importance.

What we have seen so far is that the gas market in Europe was already very tight. In the latter part of 2021, we saw substantial price rises. Since the invasion, that has just added a further fear premium to that price, so we are now seeing phenomenal, record prices for natural gas in Europe. That is the primary impact so far—this fear that the physical supply could somehow be imperilled. Of course, when gas is very expensive, like it is at present, even when you have physical supply it makes it very difficult for those who are purchasing it.

Dr Parr: Just to add to that, in terms of the lasting consequences, some of those are in our control and some are not. One of the things that could be in our control is, over the long term, how much we continue to use fossil fuels rather than continue to go after further supply. We may be able to do things that are unfortunate for the climate and possibly unfortunate for the wider peace agenda, but if we can reduce our use of fossil fuels, ultimately, we better insulate ourselves against the possible impact on the economy and on people's bills.

Q2 **Chair:** Would you disagree with any potential announcements this week

around future drilling licences or a review of fracking?

Dr Parr: I would, yes. If you look at the average length of time between a licence being granted and fossil fuels flowing in the North sea, it is 28 years, which takes us to 2050. If that is a response to what is going on in the very short term in Ukraine and over the 2020s—and I think this event is going to dominate the 2020s in terms of energy and many other things—that is not a reasonable response.

As I say, we need to come back to demand and things that we can do relatively quickly—and I emphasise "relatively" at this point because we are not talking about the next six months—to reduce our demand, particularly for gas, and that is in the energy efficiency and renewables space.

Chair: Professor Bradshaw, do you agree with what you have heard so far?

Professor Bradshaw: Yes, I do, on the whole, but I also think that maybe we need to be rethinking what we mean by "energy security". We hear statements that we do not have a high level of physical reliance on Russian gas, and that is true, but what we have come to learn over recent months with the gas crisis, before the invasion of Ukraine and now the situation we find ourselves in, is that that reliance on the market, which is the way the UK secures the gas it needs to import, leads to this whole question of affordability. I would question how secure gas supply that you cannot afford is, even if half of it is domestically produced. We need to bear that in mind and think about the impact that that has on everyone.

I would agree entirely that fracking is not the answer, and I say this based on many years of research on shale gas, attending numerous industry events and visiting the US to understand the shale gas business model. I just do not believe that shale gas in England could operate at sufficient speed and scale to make a material difference to the UK's gas security. At the moment, it is a distraction from the shorter-term measures that we need to take, which Dr Parr spoke to, in terms of efficiency, demand reduction and building as much resilience with the sources of supply and the infrastructure that we currently have.

Q3 **Chair:** Lindsey Walter, to summarise very shortly what we have heard so far, we cannot do very much about price fluctuations, and there is little that we can do quickly to resolve gas supply from different sources in the UK. Do you agree and, if so, what are the long-term implications for the UK's security of energy supply?

Lindsey Walter: Thank you for the question and thank you so much for the invitation this morning to speak with you all. The energy crisis, spurred on by the conflict in Ukraine, has illuminated many challenges for both the EU and the UK to meet climate goals while still weaning off Russian gas and also while keeping prices low and maintaining energy

sovereignty. I agree very deeply with my colleagues who have spoken so far.

I represent both Third Way, a Washington-based think-tank, and Carbon-Free Europe, which is our new European initiative advocating for the EU and the UK to reach net zero emissions by 2050 at the absolute latest. We provide research to help inform policymakers about the necessary technologies and policies to get to net zero. Our first research project explores five different pathways for the EU and the UK to reach carbon neutrality.

Just this past weekend, we re-ran the analysis with higher gas prices to reflect the current crisis and to better understand the implications for both the EU and the UK moving forward. This is a detailed analysis of the entire EU and UK energy system that takes into account considerations like land use constraints, costs and available technologies. Our preliminary results begin to paint this picture and tell a story about what needs to happen to get to carbon neutrality by 2050, but also what needs to happen in the short to medium term to move away from Russian gas supplies. The runs that we did over the weekend are consistent with phasing out gas economically by 2030.

Some key findings that I will throw out up front are that the greatest chance of achieving carbon neutrality by 2050 is to use every available clean energy technology. This is the approach that is most likely to ensure reliability, lower costs, energy sovereignty and overall feasibility of meeting our climate goals. The same is true for getting off Russian gas in the short term.

We will need all solutions, including rapidly deploying renewables at more than three to four times the rates the EU or the UK have achieved historically, electrifying heating, buildings and industrial processes, getting the most out of the existing nuclear fleet, and replacing Russian gas sources with more expensive LNG imports. Ultimately, decreasing the demand of gas from electricity and heat will be some of the most cost-effective immediate actions.

I really look forward to speaking more with the Committee today, discussing how the EU and the UK can move off Russian gas, while still meeting climate goals, and sharing any additional useful information that I can from this analysis.

Q4 **Tonia Antoniazzi:** I am going to ask a couple of questions on the impact of the sanctions imposed on Russia. How will the current sanctions affect energy security in Europe and the UK? If further sanctions are applied, what could they be?

Dr Sharples: Thus far, the sanctions have really focused on Russia's financial sector. Three weeks ago, my colleagues and I published a report, and we considered back at the beginning of February that excluding Russian banks from SWIFT was very much, dare I say, the

nuclear option in terms of financial sanctions. Yet events on the ground have moved incredibly quickly, as has the dynamic of our sanctions-based response to those events. Things are now being discussed and put on the table that were unthinkable before the invasion, when everything was still very much hypothetical.

What we have seen so far is that seven Russian banks have been excluded from SWIFT, but two have been carved out from that—Gazprombank and Sberbank. There is much discussion in the media about the fact that those are the banks that handle financial transactions for the purchase of Russian oil and gas by European companies.

We also saw, on Sunday evening, comments by Secretary of State Blinken about how the US Administration was in active discussions with European Governments about an embargo on the purchase of Russian oil. Yet those of us who follow the gas market saw an immediate price reaction to that yesterday morning, and prices have continued to rise since. Even having the discussion is having an impact on prices at present.

A slight digression, if you will permit it, might illuminate this for those in the room. From 2005 through to middle of 2021, the absolute daily peak of a wholesale European gas price—the Dutch TTF trading hub's benchmark front month contract—was about €36 per megawatt-hour. During the latter part of 2021, we saw a phenomenal price rise that eventually peaked at well over €100 per megawatt-hour. As we sit here in the room today, the front month price is now somewhere north of €200 per megawatt-hour. This is an absolutely phenomenal level of gas prices in Europe already, and that is without any disruption to physical supply from Russia or any actual sanctions as yet preventing the purchase of those supplies.

In terms of what further steps there could be, it seems that sanctions against the purchase of Russian oil in the manner of sanctions applied to Iranian oil previously are now at least being actively discussed. The question is whether that is also applied to natural gas. The global market for oil is a lot more liquid and flexible, and we are much more likely to be able to source alternative supplies. For gas, there is not as much flexibility as there is in the global oil market, so the impact of sanctioning Russian gas supplies to Europe would be substantial.

Now, the Russian Government are also talking about the same issue. Just yesterday, Alexander Novak from the Russian Administration said, "If you guys are not going to let us have Nord Stream 2, maybe we have it within our power and our right" to take what he called a "mirror decision" to limit the flow of gas via the Nord Stream pipeline to Germany.

Coming back to your question, having tried to illuminate some of the context around it, the impact of a loss of Russian supply to the European market, driven by sanctions or by, for example, damage to pipelines that bring Russian gas to Europe via Ukraine in the course of the military

conflict, would be substantial. We would see price rises over and above what we have seen so far. Then there would be a whole series of supply side and demand side responses to that loss of supply, which I am happy to discuss in more detail.

Q5 **Tonia Antoniazzi:** Thank you. You have answered my second question so, if the others can talk about the impact on UK businesses of cutting ties with Russian energy companies as well, that would be useful.

Dr Parr: I do not have a lot to add, other than to say that Gazprombank is, indeed, one of the stand-out areas where UK sanctions should be extended. The other aspect to sanctions that is relevant here is what we have started to see on a voluntary basis already, which is that western companies have started to withdraw their investment from and connections with the companies that are, in effect, funding the war, like Rosneft. That is a welcome step. If there were regulatory measures that could be used to enhance that, those would be welcome.

Professor Bradshaw: The first thing that I would point to is that the oil industry has been under sanctions since 2014, but what has happened in the last few days is significantly greater activity. To pick up on what Dr Parr talked about, there is this notion of self-sanctioning. In addition to what Governments might do and announcements that they might make, we have already seen the industry and business self-sanctioning. If you take the case of the oil companies, BP says it will exit its 20% share of Rosneft. Shell is going to exit from the Sakhalin-2 LNG project. Exxon Mobil has said the same about Sakhalin-1. Total still retains its 20% interest of Novatek, which is not a state-owned company, but has said that it will not make further investments.

The 2014 sanctions had, effectively, removed a lot of potential investment, particularly in tight oil in Russia. Self-sanctioning is also happening in the marketplace, because companies are very worried about making transactions to buy Russian oil. Then there is the physical challenge of trying to ship that oil and getting insurance for shipping and so forth. That has had a knock-on effect of the Urals blend Russian oil price trading at a significant discount.

In the UK, the Government made the decision to not allow Russian ships to dock in the UK, which had the de facto impact of banning deliveries of LNG and oil. Although I understand why that was done, I would much prefer that it was done in a co-ordinated manner across Europe, because all that happened with the Yamal delivery that was going to go to Grain was that it ended up in France. You need to co-ordinate.

I would certainly echo Dr Sharples's views on the scale of reliance on Russian oil and gas, not just in Europe but globally. This is the third-largest oil producer and the second-largest gas producer in the world, and so the impact of sanctions and of any action that Russia may take has global consequences. Statements have been made by western

leaders. The market is in panic and extremely volatile. Again, it would be much better to see a co-ordinated response.

The final thing that I would say, which is not specific to the UK, is that we need to understand that different countries and sectors are in a different place when it comes to sanctions. The refinery sector, as we know from the very high oil and gas prices, knocks on into all aspects of the supply chain. We have discovered how we are using natural gas to produce fertilisers, CO_2 and so forth. All of these costs were already going up before the crisis. They are now, certainly in the case of gas, reaching never before seen levels, and that is going to knock on through supply chains.

When we get into physical shortages, that is a different matter in terms of physically not being able to produce particular products, and industries having to close down for a period of time. The more it escalates, the more that that is the case. It is an old adage that sanctions are a double-edged sword, and the west is already feeling the consequences of the sanctions that it is, quite rightly, imposing, but Putin knows that there is a limit to the amount of pain that western Governments will be prepared to take. Whether they are the short, sharp shock and awe sanctions that I have seen mention of, I do not know, but the statements by Deputy Prime Minister Novak about switching off the Nord Stream pipeline should be taken with caution.

Lindsey Walter: I would love to answer, but our research really concentrates on ways to transform the energy systems in the EU and the UK to immediately get off Russian gas and to reach climate goals in the long term, and less so on the direct impacts of sanctions, so I will leave this answer to my colleagues.

Q6 **Chair:** Dr Sharples, the consequence of talking about sanctions but not doing anything still results, presumably, in higher prices and, therefore, more profit for the Russian state.

Dr Sharples: Yes. Last year, tax revenues from the oil and gas sector accounted for about 35% of federal budget revenues in Russia, and that was split pretty much 80/20 between the oil sector and the gas sector. In both of those sectors, the taxation takes two forms—a tax on production and a tax on exports. The tax on exports in particular has a sliding scale, and so, as prices go up, the Government take a greater proportion. It is, effectively, a windfall tax. As prices go up, that means more money flowing into the Russian federal budget.

An additional point of nuance there is that Russian gas exports are less heavily taxed than oil exports, but this is part of what is, effectively, an implicit agreement between Gazprom and the Russian Government, whereby Gazprom has a legally enshrined monopoly on pipeline exports from Russia. Gazprom is the only company that is allowed to export pipeline gas from Russia. It makes a great profit in doing so, but this also cross-subsidises what it does in Russia, where it provides gas to homes

and heavy industries at prices significantly lower than it realises in the west. Even though the gas sector does not contribute so much to the Russian federal budget, it does entail a cross-subsidy of Russian economy and society.

Q7 **Chair:** We need to be really clear. If we are going to apply sanctions to Russian oil and gas, we need to do that in a clear and co-ordinated fashion. If each country starts talking about sanctions, we are achieving the complete opposite of what we are trying to achieve, by further funding the Russian military.

Dr Sharples: Yes, that is absolutely correct.

Q8 **Tom Tugendhat:** Thank you very much for letting me guest on your Committee. The question of prices that you just raised, Dr Sharples, really does raise questions for other countries around the world. I am particularly thinking of other major energy consuming nations such as China. The gas links between Russia and China are not yet built and, presumably, they would take a number of years to construct. What are the implications of $130 oil—or $300 oil, as one of the Russian Ministers put it—on an economy like China's?

Dr Sharples: In many ways, it reflects the potential impact on any economy, which is that, when oil prices rise, this impacts transportation to a significant extent, which then ripples through the entire economy. To put it in almost trivial terms, go to your local supermarket and think about the cost of transporting from depots to individual supermarkets, and then go and look at what is there and think, "Where in the world has that product come from?" If you are talking about tripling the price of oil, you are tripling your transportation costs, so this is a driver of inflation across the board for any economy. It is serious.

Q9 **Tom Tugendhat:** Perhaps we could touch on some of the knock-on consequences for the energy sector. Countries like China and Germany have been down a path towards a greener economy. Dr Parr, what are the implications for their transition to greener economies? Are we going to see a reinvestment in coal or a de-greening, if that is not a terrible term, of the economy?

Dr Parr: I would differentiate here between the short and the long term. In the short term, both in Asia and in Europe, we are going to see more coal burn. That is not something that I say with joy at all, but I do not think that there is any doubt that that is what is going to happen. That means, therefore, that those countries need to redouble their efforts to provide the clean energy infrastructure that is necessary to take them and Europe away from that.

I spoke yesterday to colleagues about the example of Germany, which is clearly going to be burning more coal. They were doubtful that the nuclear phase-out can be changed at this point. I was not quite sure why, but that seemed to be something they felt was going to happen. One of the responses that Germany has had is a €200 billion investment in clean

infrastructure by 2025. An equivalent amount for the UK would be something around £100 billion over the next three years. They are doing that despite the short-term impacts for CO_2 emissions, which are going to be bad.

The thing about climate change is that it is the ultimate international issue, and you can address that only through some level of co-operation between nations. That is why we have international COPs and so on, and it is very difficult to have that kind of co-operation when we are in a time of war and lowered security. A lack of security militates against climate change action in many ways, and that is certainly what we are going to see in the short term. That is why this war is so damaging, not only to peace but also to the green aspects.

Q10 **Tom Tugendhat:** You seem to be suggesting that, in the medium term, it may be a driver towards green energy, on the grounds that coal is going to get more expensive too. If hydrocarbons are more unstable, renewables—perhaps hydrogen, even, in the UK's case—is a responsible route to go.

Professor Bradshaw: Yes. Who knows where the gas price is going to go, but it is clearly up for a while. Coal will follow, probably to a lesser extent. Therefore, although there is energy used in the manufacture of renewables, they will go up a little bit but nowhere near as much. Relatively speaking, the cost of those renewables and, hopefully, the other things like refurbishment of buildings and so on will look a much more economic option.

Aside from the security side, that is why the German investment looks like it is a rational thing to do economically. In fact, on any kind of modelling, even at gas prices that were well before the spikes we saw before Christmas, an investment by the UK in energy efficiency hitting Government targets and in heat pumps hitting Government targets is positive for GDP as well as enhancing security. All the evidence on the economic benefits is clear, so we should go ahead and do it, now knowing that there is a security incentive as well.

Q11 **Andy McDonald:** You have all described how the Ukrainian crisis is exacerbating the energy crisis that we already have. Bills are at an enormous level already. They have got to unheard-of levels in recent weeks and months. How is that going to impact on those further increases and at what rate? Do you have any thoughts about how that is going to translate into consumer prices for energy consumption?

Dr Sharples: As I said earlier, the market was already very tight in the second half of 2021, which is how we got into a situation where we needed an increase in the price cap on 1 October last year. We also had this rash of energy companies going out of business, because they could not straddle the gap between wholesale prices and the price cap.

We already know that the price cap is going to increase substantially on 1 April, and the way the price cap is calculated is to take into account forward gas prices over an extended period of time. If wholesale gas prices remain high for the next several months, we are going to see another significant increase in the price cap on household energy bills. Unfortunately, not only will the level of prices be higher, but companies will be almost worse prepared because, in advance of the price gap going up on 1 October of last year, the larger and cannier retail gas suppliers were well hedged. When prices were spiking last autumn, those were not the prices that those retail companies were buying wholesale and then reselling to final consumers.

Now, if we are looking at 1 October 2022, 12 months further down the line, in terms of the possibility of those companies having hedged and bought their gas in advance at a set, agreed price that would be much lower—if you were buying your gas in the spring of 2021, in advance of needing it through the winter, you would have got it at a pretty good price relative to how things panned out by the autumn, but we are now beyond that—all of the forward prices are high, so it is going to be difficult not only for final consumers but for energy companies to keep straddling that gap.

This is why I fear that we may see further bankruptcies of energy providers and we may need to see a more active approach from Government in assisting consumers who are struggling to pay their bills, while recognising that there are going to be companies in trouble as well and that, every time a company goes out of business, its customers are passed on to another company that then has to deal with the problem.

Lindsey Walter: To the question of energy prices in particular and the impact on broader clean energy transitions, we are living in a fundamentally new reality. Gas prices are so much more expensive now that the economics of the clean energy transition have changed, and gas will not be cheap in Europe in the short to medium term. As my colleagues pointed out, even before the war we had gas prices peaking at $27 per MMBTu, compared to the year prior, where it was $6 per MMBTu, so we were already seeing huge spikes in gas prices pre this crisis.

At current gas prices, it is cheaper to get to net zero and to facilitate this clean energy transition than it is to do business as usual. We are seeing gas costs at around €250 per megawatt-hour right now in Europe. With today's oil and gas prices, you would not even need a high carbon price to facilitate the transition, so the question is no longer whether we can reach net zero while keeping costs low, but how quickly we can get to net zero in order to lower costs.

I would like to get back to a point that I made in the opening remarks around how to keep energy prices low across Europe. A key strategy would be to ensure that we have a diverse portfolio of clean energy technologies. We look at scenarios that rely exclusively on renewables

versus those that keep the door open for other technologies, including nuclear and carbon capture. The scenarios that rely on a renewables-only strategy cost $12 billion more a year by 2030 and $108 billion more a year by 2050. In order to achieve net zero and also to get off Russian gas in the short term, we should be thinking about the impact on prices, and a technology-inclusive approach to energy supply will be a helpful strategy to ensure that we are able to lower costs as much as possible. The regulatory frameworks and investments in clean energy technologies should reflect that as well.

Professor Bradshaw: If I could very quickly come back to the previous question about China, I would just point out that Russia and China do have a gas pipeline—the Power of Siberia pipeline. In actual fact, back in early February, when Putin was in Beijing for the Olympics, they signed a deal on another pipeline to come from Sakhalin Island, and they are now in discussions on a third pipeline—the so-called Power of Siberia 2. There is this pivot but, ironically, that is not bad news if it means more pipeline gas is going to China. They will get a good deal on it, no doubt. It means that they are consuming less LNG, which might be beneficial for others trying to pivot to LNG. That is just an aside on that.

When it comes to this question of price, one thing to point out is that it is a bit like households with long-term contracts. Dr Sharples talked about hedging. Most of the LNG going into Asia is on the basis of long-term contracts indexed to oil. Normally, when the oil price goes up, that gets expensive, but the gas price has gone up so much more than the oil price that they are not paying the kinds of prices that we are seeing in Europe. The problem for us in the UK, and Europe more generally, when it comes to LNG is that we have no long-term contracts that we can see, but it is also partly that the industry is not at all transparent. We cannot determine what the contractual basis for LNG coming into the UK is at the moment.

I would make one other point. I am not an expert in this; electricity markets and capacity markets are way beyond my competence. You need people with a bigger brain than mine to get their hands around it. My colleague Professor Michael Grubb at UCL has made the point that one of the problems here is that, because of the role of gas in power generation in the UK, it is the marginal source of supply. We have not talked about the fact that electricity prices have gone up in unison with the gas price. If you look at our power generation system, it is nuclear plus wind, with gas in the middle as a source of flexibility. There is a lot of power generation attracting a very high price, which is not high cost to produce.

I can understand that the capacity market in the case of wind will recoup some of those funds, but Professor Grubb has some suggestions as to how we might look at the structure of our electricity market going forward, particularly as more and more renewables come on to the system, to reward customers for the lower cost of renewable power generation. At the moment, they are being penalised for the cost of gas.

As I say, I am no expert in this area, but it is well worth considering. If you are running a heat pump at the moment, the high cost of electricity is just as big a problem as whether you have oil-fired or gas-fired central heating.

On the point about natural gas, it really puts blue hydrogen out of the money, because it is using natural gas as a basis to produce the hydrogen, so maybe we need to rethink the hydrogen strategy as well.

Q12 **Andy McDonald:** That is interesting. The argument has always been that we need to establish the market in the first place by using blue hydrogen to get to green. That is an interesting perspective. There is this volatility in the energy prices that people are paying. Are we saying that decoupling electricity from gas can have a contribution? It was a volatile market before the Ukrainian crisis, so what calming measures can be brought to bear, if any, or are we just stuck in this spiral until it takes its natural course?

Dr Sharples: You are absolutely right that prices were already rising substantially well before the military conflict began. What the latter part of 2021 was already showing us is what we refer to as inelasticity in gas demand. You have a situation where, in many other commodities, when the price of something goes up and up and surpasses a certain level, people stop buying it. Gradually, demand falls away and the market falls back into balance. What has happened with natural gas is that we have seen the fact that gas demand was inelastic.

If you take the UK, between 80% and 85% of households use gas for their heating, so, when prices for consumers have been going up, people are cutting back on their other discretionary spending before they stop heating their homes, for example. When you look at power generation, as Professor Bradshaw rightly pointed out, gas is the balancing fuel. You have nuclear and renewables, but renewables are variable. You have days of strong wind and of calm wind, and solar in the daytime but not at night-time. Gas is needed to step in and make sure that we have sufficient electricity for the grid, so you cannot refuse that on the basis of price and you are being forced to keep using that gas, even at a very high price.

Where we are seeing demand destruction on the basis of price is pretty well concentrated, so far, in heavy industry. The problem of the manufacture of cement, aluminium, ammonia or fertilisers was raised earlier. That is the nub of the problem here—that, when gas prices go up, we lack the ability to rapidly switch to alternative fuels. There is not really very much that we can do about that in the short term. I absolutely agree with the comments made by my colleagues, in that we need every available alternative technology as we try to get towards net zero, but the problem is that that does not help over the next six months. That does not help us as we prepare for the winter of 2022-23.

Dr Parr: Just to build on what Professor Bradshaw said and the ideas that Mike Grubb is espousing, where you have a low-carbon market where those costs are relatively low, the ability to fulfil electricity demand from that market preferentially, with innovation around how you balance the whole system—the sort of innovation that the UK is comparatively good at—could have the desired effect of lowering electricity prices, but it is not the sort of thing you can bring in over six months. Over the next six months, as we approach the next winter, we, as a country, are going to have to do some pretty rapid thinking about what we do to support people. People are already on their uppers in terms of the choice of heat or eat.

It is going to get worse on 1 April, and all the signs are that it is going to get worse again on 1 October, as we head into next winter. Therefore, we are going to need a package of measures that are not really about greening the system but just about basic humanity, to shelter people from invidious choices that they are otherwise going to have to make, because they are going to end up not properly heating or eating. Colleagues in the fuel poverty sector have a few ideas about that, which I am very happy to share if that would be useful.

Q13 **Andy McDonald:** I would invite contributions on that more broadly, because we are now in a situation where, as you rightly say, heading beyond 1 October 2022, people are going to be in the most dreadful situation. You say that the last thing that people will give up is heating their homes, but they are at saturation level now and it may get to the position where that becomes a reality for people. Absent any major fiscal interventions from Government in other areas, which are always available, what direct assistance could Government extend to consumers? What could they and should they be doing to prepare for this potentially major crisis for us beyond 1 October? What measures and assistance could be brought to bear that would help people keep their homes warm?

Dr Parr: The policy measure of choice seems to be the warm home discount, but it needs to be extended to include all those on universal credit as well as other families who are accessing local authority help. That needs to be expanded substantially in order to access what has been calculated to be about 6.5 million households, or about one in five, that are going to be in fuel poverty. It is quite a large number of families.

There are other measures that would make some sense and which are a bit broader. There are the legacy renewable levies for projects that have long since been under operation, for probably at least seven years now. Those are levied on bills, which is quite a regressive way of levying those legacy charges, and they could be moved from bills to tax, because a lot of that is going to have to be paid for in the case of these fuel-poor homes anyway. Those are the measures that we would be advocating to deal with this.

Q14 **Andy McDonald:** In terms of business consumption and the heavy industries that we have talked about, is there any further assistance that

should be given there? This is going to cause major problems.

Dr Parr: It is a tricky one, because the situation is sort of analogous to the situation at the beginning of the pandemic, where there was a sudden shock to the system, and the Government were able to offer loans. That may not be exactly analogous, because we are not quite sure how long this price elevation is going to go on for. I would suggest that, if those loans are offered, they come with strings attached about protection of workers and making sure that the loans are not being used to pay dividends, and with a plan that will take the industry sector away from fossil fuel use as far as possible and, ideally, make it Paris-compliant. I know that that is going to be difficult for some areas, like ceramics, but those conditions can be attached to the loans, and Government then come in to support them to continue to operate and compete against international competitors.

Professor Bradshaw: I have a suggestion, not as an expert but as a homeowner and someone whose long-term contract just expired and who is now paying the variable rate. The IEA came out with a 10-point plan last week. One of the things it talked about was turning your thermostat down by one degree centigrade. There is a bigger issue here, which is that most of us are not running our households in a very energy-efficient manner. We tend not to get our boilers serviced until they break down, when it is too late, so they are probably not running efficiently. We can turn our boilers down and we can turn radiators off. The problem with suggesting that everyone insulates their houses is the supply chain, and perhaps why they have not done it already.

We do need to think of ways of building resilience going into next winter, where people can make adjustments. They have the summer to do it. More importantly, they need to understand how their heating system works, and what measures they can take to turn it down and save money. Those small, marginal savings across the millions of households that use natural gas for heating, for example, can add up. Like many in the room, probably, I am old enough to remember the energy crisis in the 1970s, when there were all sorts of campaigns to save energy.

Come what may, gas prices are going to be very high next winter, as are electricity prices, and perhaps we need to learn the lessons from the past. We perhaps also need to look at Japan's experience with Fukushima, where behavioural change was able to manage a reduction in demand. It is about not just how we secure our supply but how we can improve efficiency and reduce demand in the short term, because these can be relatively easy wins. They are things that are "no regrets", because they will help us to keep our energy consumption down in the longer term.

Lindsey Walter: I absolutely agree with Professor Bradshaw that this is not just a question of replacing supply but also reducing demand, and that is a really important point to emphasise.

I wanted to add two quick things, first on the point of how to reduce vulnerability to volatile gas prices. Again, Professor Bradshaw brought up the IEA's 10-point plan, and there is a piece of this that is replacing Russian gas with imports from other countries. In that assessment, it predicts that, within the next year, around 30 billion cubic metres can be imported from countries besides Russia, which can be used to help displace some Russian gas. To put that in context, in 2021 the EU imported over 155 billion cubic metres from Russia, so there is a strategy here that is figuring out, in the very short term, how you swap out supply.

That will decrease volatility, but, as Dr Parr pointed out, this does not solve the fact that energy prices are going to be high. You can stabilise supply and reduce volatility, but prices will still be high for the ongoing future. The IEA report points out the importance of subsidising energy costs for vulnerable groups as well, and I agree with my colleagues on that point.

The other point I wanted to reiterate was how essential storage is, especially over the summer months. Again, this is in the IEA plan and I highly recommend that you read it. When we see gas consumption across Europe, there are huge spikes in January, followed by huge lows in the summer months. A big strategy moving forward to reduce the vulnerability to volatile gas prices is to restock the supply sources and to make sure that, even when not quite economical during the summer months, Europe is considering how to restock its natural gas supplies to prepare for the winter months ahead.

Professor Bradshaw: Again, as many of you in the room will know, we had a long debate back in 2017 about the Rough storage facility, and the Government decided not to intervene to support it. One of the problems that we have is that we do not have any strategic storage. We have a small amount of storage that is used for market balancing.

There are others places where we could look, and that is how we use the three LNG terminals that we have. They are not storage but they could be used in that way in the short term to incentivise them to maintain a certain level of stock through the winter. If you look at the National Grid's data on storage levels, that fluctuates greatly through the winter period, so there are possibilities of looking at that.

I would also stress the importance of a Europe-wide approach to this particular challenge. We are not part of the European Union but we are part of a European gas market and are still very much connected into the European system. Our LNG import facilities can transit gas into Europe as well, and that has been happening in the last few months, because of price signals. Our interconnectors then give us a connection to European storage.

The European Union has its rules and regulations, and the solidarity mechanism and all that kind of stuff, but, if we have a Europe-wide

discussion about co-ordination to build resilience through the winter, the UK has a part to play with the infrastructure that it has. I would suggest that we need to make sure that we are part of the right conversations, which are not an EU conversation but one about particularly north-west Europe, which would involve the Norwegians, who are critical to our security of supply.

Dr Sharples: Just as a quick addition to follow up on what Professor Bradshaw just said in terms of prices and dynamics, the UK is very much part of the European market, but it is also worth remembering that the European market is the balancing element of the global natural gas market. You have substantial centres of production and export in the US, Qatar and Australia, and then a raft of smaller suppliers, and you have two main demand centres in Europe and north-east Asia.

Up until the present crisis, north-east Asian prices would generally be at a premium to those in Europe, so, when the global market was supply short, the cargos would go to Asia and Europe would rely on its own seasonal storage stocks, its imports from neighbouring suppliers and some of our own production. When the market was supply long, all of the excess would flow to Europe and we would benefit from very cheap gas prices. That is what happened in the middle of 2020.

I wanted to raise this to emphasise what Mike said. The UK cannot decouple from the rest of Europe in a pricing sense. Because we are now importing more and more LNG from the global market, Europe is exposed to dynamics on that global market, and this is something that we cannot control. We cannot control wholesale prices, so, instead of trying to, we need to focus our efforts on how we adapt to and cope with those prices.

Q15 **Richard Fuller:** Professor Bradshaw, in terms of domestic shale production and security, I heard your comments and those of Dr Parr on how long it takes to bring nuclear on board. Just for the record, in your 2020 report you said that domestic shale could account for between 17% and 20% import substitution of gas. Is that right? Is there a role for that? If we needed to, how quickly could we spin up supply from domestic shale?

Professor Bradshaw: I am not quite sure what report you are citing. I must be repeating what the industry said, because that is not a figure that I have ever believed. That aside, there are three reasons. It is not because I have never had a view, one way or the other, about shale. It is really based on the evidence. One is geological. We are coming to the end of a four-year research programme, funded by UKRI, on unconventional hydrocarbons in the UK. The geologists are suggesting that those gas-in-place estimates are just that—they are estimates of the physical gas in place. They are not reserve estimates and it is quite likely that they may have been overly optimistic.

Equally, on the seismicity issue, it seems that the complexity of the geology in the UK is such that managing seismicity is going to be much

more of a challenge. More generally, what they seem to be saying is that the US did not prove to be a particularly useful analogue for the geology across the north of England, so it is going to be more challenging, which means more expensive and more time to prove as a commercial prospect.

On the economics of it, although we hear about 50 years of gas underneath the ground, that is the gas-in-place estimate. If you asked me what the current level of reserves of shale gas in the UK is, the answer is zero, because we have not gone through an exploration programme. That is what the whole discussion was about when the 14th licensing round was awarded. The industry needed to go through a programme of exploration and, in three and a half years, it managed to drill a handful of wells and tried to frack two.

I spoke last week with industry representatives at UKOOG, who said that they need 20 to 40 wells to be drilled across a range of geologies in England to get through the exploration phase. That is going to take quite a bit of time to do, and only then can we reach a decision as to whether it is commercially viable to develop.

On the social dimension, shale gas proved to be very unpopular with the communities most impacted upon. I would accept that the longer-term impacts, once producing, are fairly minimal, but the shale gas model requires lots and lots of wells to be drilled. Even though it has advanced and you can drill multiple wells from a single pad, they become semi-permanent. The British population has shown no interest in shale. More than 30% are undecided, only 17% support it and 35% are against it in the most recent Government surveys. I fully accept that the high price of gas may focus minds, but it is more likely to focus minds in areas of the country consuming gas, not those that are likely to be the subject of shale gas exploration.

For all of those reasons, I come back to my earlier statement. I simply do not see that the industry can gain the pace and scale to make a material difference. As we have heard from other panellists, it makes far more sense to accelerate measures that get us off fossil fuels. If you come back to the issue of climate leadership, which has been discussed in relation to our attitudes to exploration in the North sea, developing shale gas onshore in the UK does not sit well with trying to lead the world in addressing climate change. Its time has passed. We had a conversation. At the moment, there is no way that it really should be part of our discussions, because it cannot deliver on time, let all alone all the other problems that I have talked about.

Q16 **Charlotte Nichols:** While our exposure to Russian gas is fairly small, higher prices and a move towards alternative sources, including countries like Saudi Arabia, Kuwait, Iraq, Iran, Qatar, Nigeria and China, none of which has exactly exemplary human rights records, are potentially storing up future issues. I am concerned, in the case of China and Saudi

Arabia in particular, that in order to divest from Russia, given its invasion of Ukraine, we are potentially funding genocide elsewhere. How can this crisis be harnessed as a global turning point to accelerate efforts to tackle climate change and build energy sovereignty, in order to insulate us from international price volatility and to ensure that we are not just funding despot A versus despot B when it comes to our energy supply? What can the UK do in its role as COP president to facilitate this?

Dr Sharples: We need to engage in almost dual-track thinking at the moment. Given the conversation that we have had thus far, there is a very immediate short-term issue—let us say the next six to 12 months—of how we deal with very high oil and gas prices at present and, if it comes to it, how we deal with the loss of Russian oil and gas supply to the European market, whether it is sanctions, counter-sanctions or a physical disruption due to damage to pipelines in the course of fighting in Ukraine. Either way, that is a very immediate problem to be addressed.

At the same time, I would very much support the comments of my colleagues thus far that we need to be, at one and the same time, focused on a longer-term journey towards reducing our dependence on imported hydrocarbons from wherever. As long as we are exposed to that international market, we are exposed to price fluctuations on that market, which then directly impacts both the UK economy and UK society.

In terms of where we buy our hydrocarbons, companies that purchase hydrocarbons internationally are, generally speaking, not too picky about where they go. They will go to where it is cheapest. They will go to where they can get production licences. What we are seeing right now in terms of self-sanctioning, which we discussed earlier, is really something quite remarkable and very unusual for the industry. It would be wonderful if every country from which we purchased hydrocarbons was Norway, but sadly the global distribution of hydrocarbons does not take too much account of the nature of the political regimes around the world.

In the longer term, you need to reflect upon, as you put it, energy sovereignty, with greater development of renewables and reduction of hydrocarbon import dependency as meeting multiple aims. It helps you towards net zero; it helps insulate the economy to a greater degree from the vagaries of international hydrocarbon markets. Yes, there is a political component to it as well, but we must be mindful of the fact that that is a long-term journey that will take time, investment and political will, whereas we also face a very immediate short-term issue of how we deal with the present market conditions.

Q17 **Charlotte Nichols:** Insofar as, when we are dealing with the present crisis, we are moving away from importing from Russia, with a lot of countries and companies around the world doing the same thing, that has a very direct and immediate impact on the human rights situation in a lot of these countries. Suddenly, because of increased prices, which mean they are getting more for their supply, as well as the fact that this quite

significant part of the European and wholesale gas markets has moved towards them, this potentially increases the risk of further human rights abuses.

Dr Sharples: There are two aspects to this—the supply side and the demand side. If we dramatically reduce or even completely cease purchasing oil and gas from Russia, that supply from Russia will, to a certain extent, be locked in by the very nature of the infrastructure that is in place. Most of what Europe imports from Russia in terms of oil and gas is delivered via pipelines, and there is not a lot of flexibility to redirect those.

Mike made reference to Russian gas exports to China. Just as an aside, at the moment the vast majority of Russian gas is produced in north-west Siberia and up on the Yamal peninsula north of the arctic circle. A small proportion of that is exported as liquefied natural gas by Novatek and Total from the Yamal LNG project, but most of it is exported to Europe by pipelines and there are no pipeline connections between that region of Russia and any other export markets.

The gas that Russia exports to China is produced in eastern Siberia and exported across the border. That is not connected to the west Siberian element of the system, so Russia cannot balance its pipeline exports between China and Russia. It is making plans to build new pipelines that will enable it to do so, but they will take years to come to fruition and I would be surprised if we saw that in place much before 2030, let us say.

A certain amount of what Russia produces and exports would be locked in by Europe turning away Russian oil and gas, but a certain proportion that is exported either by ship in the form of liquefied natural gas or oil on vessels will simply go to other markets—China, for example, most likely being one of them.

We will have a period of a shakedown in the global market, where those that are prepared to accept Russian hydrocarbons will get them, and sources that were previously going to those markets will then start to make their way to Europe, so you could almost get this division in the global hydrocarbon market between those that are willing to accept Russian cargos and those that are not. It then displaces and it will take a little time for it to shake out. That is the impact of what is happening right now.

Dr Parr: I was struck by what you said about harnessing the moment. This is a moment that needs to be harnessed. It is a case of "support Ukraine, lag your loft". In the end, as I outlined at the beginning, you have to control the controllables. We are linked to Europe in terms of our gas price, whatever our absolute quantity of gas that is coming from Russia. What we have under our control is what we do about policies and infrastructure that use gas. To your point, we are going to be in a world of making uncomfortable choices, just like switching on some coal-fired

power stations in Germany, which we really would not want to be doing, in terms of where we get our future gas from.

There are quite a lot of things that we can do and need to do, because we have the worst housing stock in Europe. We have barely built any onshore wind since 2016-17. Our solar industry is a lot more moribund than it should be compared even to the estimates the Climate Change Committee were talking about in the pre-Ukraine war period about how quickly we were going to get off fossil fuels. There are all sorts of things that we could do that are within our control, and we should harness this moment to get on with it.

I mentioned the housing stock. We have one of the poorest heat pump industries in Europe in terms of our installation levels. That is going to be an essential part of what needs to happen. Even if you put a heat pump in a house and it runs off a gas-fired power station, because it is electrically powered, you are still reducing the amount of gas use. You can go through the numbers, but you reduce the gas use by about a third compared to using a gas boiler.

We can have a discussion about other technologies, by all means, but what is clear is that practically the only thing that we can do during the 2020s is to build shedloads of renewables, because that is the thing that we can do and we can do it—and I emphasise the term again—relatively quickly. Wind and solar are relatively fast to deploy compared to other technologies.

Of note, at the current gas price, it would seem that green hydrogen as a means of storage is cheaper even than just producing it from natural gas and chucking the CO_2 into the atmosphere. If we are thinking about storage, that is one of the cheapest ways of doing it. The thing is that, at the moment, we do not have enough renewables to really make that worth while, even though one of the world's best electrolyser manufacturers, ITM Power, sits in Sheffield and, I am sure, would be very glad of the orders.

There is a lot that we could do, and we could even start with the spring statement, frankly, because some of these industries that we need for doing that infrastructure conversion need building up, given that the insulation and solar industries in particular have been kicked from pillar to post in terms of changing around of Government policy.

Lindsey Walter: There are three questions here. How do you get off Russian gas in a way that is economical? How do you get off Russian gas in a way that is in line with our climate goals? How do you get off Russian gas immediately? I believe we should be aligning our short-term strategies with our long-term goals. As my colleagues have pointed out, returning to a system dependent on fossil fuels without the flexibility to rapidly evolve, rather than moving towards a clean energy transition, is a dangerous strategy. I love this question about what the long-term

transition and goals should look like, because, in many ways, these conversations are one and the same.

I also wanted to add a bit of context for scale. Dr Parr was discussing how essential it is to build out renewables rapidly, and it is really important for the UK and the EU to understand the level of build-out that we are talking about over the next decade.

Historically, on average, the United Kingdom has built around 3 GW a year. Out to 2030, to get off Russian gas and to be in line with our climate goals, we are talking about building somewhere between 7 GW and 12 GW a year, every single year. We are doubling or tripling the build-out of renewables over the next decade compared to historically. In the EU, it is even starker. Historically, the EU built around 23 GW on average from 2011 to 2020. What we are talking about now is building anywhere from 70 GW to 106 GW a year, every single year, across the EU.

It is really essential for policy makers to understand the scale that we are talking about here and why it is so important to have all options on the table. We do need to build our renewables as soon as possible. There are some constraints to reaching this scale. Whether that is supply chain, manufacturing, permitting or siting, that will be up to policy makers to help us overcome.

I also wanted to emphasise one other short-term strategy that is going to be really important, which is doing our best to get the most out of the existing nuclear fleet. Across Europe, we are not currently running the existing nuclear fleet at full capacity, for various reasons that depend on the country and on the power plant. Even in the IEA's plan, it outlined getting the most out of our existing clean energy resources as an essential strategy.

In Europe, we have four nuclear power plants set to shut down by the end of 2022 and another one by the end of 2023. If we were to extend in a way that maintains the safety and security of these power plants, as recommended by the IEA, that would offset about 12 billion cubic metres of imported Russian gas every single year, which is 8% of the current supply coming from Russia.

I bring this up because it is part of the scale question. We have a lot of resources at hand. Some are more energy-dense than others. We have a massive challenge in front of us and we need to have our eyes open in terms of what we are talking about, not only over the next year but also over the next decade, in order to get off Russian gas while still doing it in a way that is economical and in line with climate goals.

Q18 **Alan Brown:** Dr Sharples, it has been made clear that, in terms of North sea production, the UK, even if it increases production, cannot do enough to decouple itself from prices and cannot affect the global price. Is that correct?

Dr Sharples: Yes.

Q19 **Alan Brown:** If we look at it as a pure energy security measure, there are arguments that say we increase production from North sea oil, which might reduce reliance on imports, and we already hear that the UK is less reliant on imports from Russia. In a worst-case scenario, Russia turns off gas supplies to the EU, the UK increases production of North sea oil and we get a third of our gas from Norway and LNG from Qatar, so the UK is okay because we have our own supply, or is it the case that it is still traded globally? Would the UK control the extra oil and gas that was coming out? Would we still have first dibs on the stuff from Norway, as it were?

Dr Sharples: That is an excellent question, because we have spoken a lot about what would happen if we lost this Russian supply. The UK is relatively secure in terms of its physical supply. You rightly mentioned that we get a substantial proportion of our gas imports from Norway. We produce probably about half of what we consume, and I am speaking specifically about natural gas, which is my primary area of competence. About 80% of our supply of gas is either produced domestically in the UK or imported from Norway. That is physically secure. The remaining 20% is liquefied natural gas that we import from the global market. The largest suppliers to the UK are Qatar, the United States and Russia, and we get smaller amounts from countries like Algeria, Nigeria, Trinidad and Tobago, Peru, and a couple of other smaller suppliers.

The UK's physical supply, in the current context, is relatively secure, but the problem is price. Physically speaking, we are connected to the European market by two interconnector pipelines—one between here and the Netherlands and one between here and Belgium. In the Netherlands, you have what is called the title transfer facility, which is its equivalent of NBP. It is its gas trading hub and is generally considered to be the north-west European benchmark.

If the price of gas in the Netherlands is higher than it is in the UK, traders buy gas in the UK and ship it out through the interconnectors, and the markets gradually come back into line, so it is very difficult for us to decouple in a pricing sense. If prices were spiking across Europe, you would see an outflow of gas from the UK to the European market, with traders just taking advantage of that price differential.

If we tried to insulate ourselves and took a unilateral move to close the interconnectors and keep the UK gas market somewhat flooded, you would find that the LNG that would normally flow into the UK would simply be redirected to other European terminals. We cannot decouple from the European market, so it is primarily a pricing question. I would not say that there is a danger of the UK facing a physical shortage of gas, even if Russian supplies were curtailed or shut off entirely, but we are incredibly connected by trade, and so we would feel the price impact pretty much immediately.

Q20 **Alan Brown:** You mentioned decoupling. If the UK unilaterally shut the interconnectors to stop exports from the UK, would that be within the gift of the UK Government or would that need some form of nationalisation or other measures?

Dr Sharples: The pipelines are owned by non-UK companies, to the best of my knowledge, and we are bound by treaty obligations in terms of gas market regulations Europe-wide to keep them open. Diplomatically, it would be an absolutely terrible move. It would really be perceived as a betrayal of our European partners. That is altruistically thinking.

Selfishly thinking, we rely on those interconnectors as well, because we do not have, as Professor Bradshaw mentioned earlier, substantial gas storage for seasonal purposes here in the UK. Generally speaking, during the summer, gas flows out from the UK through those interconnectors to Europe, because we are a little bit supply long. The seasonal demand that was mentioned earlier does not quite line up with our production profile, and so, during the summer, we have a bit more gas than we need, which flows out to Europe. A substantial portion of that gets put into storage in Europe and, during the winter, it flows back into the UK, so it is absolutely imperative that those interconnectors stay open.

Q21 **Alan Brown:** Without storage, which the UK does not have, because it relies on European storage, and without acting in bad faith, increasing production from the North sea or from fracking does nothing for price or security, because there is so much interdependency.

Dr Sharples: Additional UK production would enhance our physical security of supply, but in terms of price we remain absolutely connected to what is happening to the broader European market. One of the things that we think would happen if Russian supplies to Europe got cut off is that the UK would import a lot more liquefied natural gas and then, pretty much immediately, re-export it to continental Europe, because the liquefied natural gas import terminals in north-west Europe—in Dunkerque, France, in Zeebrugge, Belgium and in Gate Rotterdam, the Netherlands—would pretty much all go to full import capacity immediately and would still be trying to suck more gas in. The UK would act as a land bridge, allowing more liquefied natural gas to reach north-west Europe, so we would play a key role in helping mitigate the impact of the loss of Russian supply.

Professor Bradshaw: Just to add to that, I mentioned before the EU solidarity mechanism, which is part of its energy union legislation, whereby they are supposed to help one another in a gas security crisis. It is not really designed for this scale of crisis, but we should not forget that the Republic of Ireland is very dependent on the UK to supply its natural gas. It has its own smallish offshore field, which has peaked and is now in decline, but we are a transit state within the EU to deliver natural gas to Ireland. That would mean that you could turn the question on its head. Would Europe turn off the taps and close the interconnectors? It is highly

unlikely that they would do that, because of the problem of gas supply into Ireland.

I would reiterate the need for a European approach here. Norway has pipelines connecting to the UK and to continental Europe. We need to look at this north-west European gas market. One of the other problems that Europe has is that a lot of LNG import capacity in Spain is very poorly connected with northern Europe, which means that it cannot bring that LNG into the wider market. As Dr Sharples pointed out, we can do that, so we have a role to play in a Europe-wide strategy to build greater resilience in the coming months, and we should make the most of that.

Q22 **Alan Brown:** Doug, in terms of moving to renewables and away from fossil fuels, what would your key asks be in the forthcoming budget? We keep hearing that there needs to be a move to nuclear energy, which is another way to take us off fossil fuels and to get energy security. What are your comments on that?

Dr Parr: First of all, just to address the point that my two colleagues have talked about, which is that we are heavily connected with other countries across Europe, if the media briefings are believed to be true, it is disappointing that the Prime Minister is doing an energy supply speech when we, seemingly, do not have anything coming through on energy demand. As I hope this session has illustrated, that is the thing that we can control. If we go purely for a supply strategy, it is not moving the deckchairs around—that is the wrong analogy—but you get the point. There is a fungibility about the way in which gas is moved around, there are diplomatic issues, and it is just not a helpful way to look at it purely through the supply lens.

To come to the question, the most important thing that the spring statement can address now is properly kicking off with a long-term vision and immediate funding for the energy efficiency industry and the heat pump installation industry, with the certainty of a pipeline of demand, so that those companies that are in that business can invest in the skills, training and supply chain to deliver the sorts of outcomes that we need during the rest of this decade.

I draw on figures at this point from the Energy Efficiency Infrastructure Group, whose members include the CBI, E.ON and other energy companies. It estimates that it needs about £3.6 billion over the rest of this Parliament for the owner-occupier sector. We need something a bit shy of another £4 billion for heat pumps up to 2025—that is additional to what we already have—and something like a further £2 billion in the low-income family and social housing sector. Of course, the Government have, fortunately and welcomely, put some money into that. If you tot that all up, it is not far short of £10 billion.

This is now a security matter, not a nice climatey thing where people can constantly kick it into the future. That is the sort of scale of spend that we need purely on the building stock, and that is purely on, essentially,

domestic building stock. You could imagine a parallel strand for SMEs that are in the building space and, of course, the public sector decarbonisation fund, which has been going well, as well as the local authority fund, where public sector buildings are insulated. I am sure that a bit more would be very welcome, because local authorities have shown themselves well capable of spending that well.

On the renewables front, it seems to me absurd that we are still building new houses that do not have solar panels on. This is a small contribution, but you can add solar panels on new build for very low costs indeed—far below the £5,000 that we are now talking about for retrofit. I do not know why we are still charging VAT on solar panels and on energy efficiency products. It just disincentivises the homeowner's desire to make that happen.

We need some clarity for a facilitative planning environment for offshore wind. We are certainly not in the business of arguing that you should strip away all the red tape but, at the moment, the planning regime around onshore wind is very difficult to unpick if you are a developer, at least in England. Scotland is a lot easier in that regard, and we do have a pipeline of planning acceptances up there.

The Government did, very welcomely, move to annual auctions for contracts for renewables. We would like to see these planning changes, including clarity on solar farms, bring more of a pipeline into that space, because we are still rather short. I thank my colleague Lindsey for outlining the sort of scale-up that we are going to need for the rest of this decade.

In terms of other policy that we need, the backbone of what we are going to produce from renewables and the clean power we are going to get this decade is going to come from offshore wind. The two challenges in the offshore wind space are that we need to be able to site in a way that is not damaging to marine biodiversity. I am in extensive discussions with some developers and others like the RSPB about how we might go about doing that. The approach that has been taken in Scotland around the ScotWind allocation of seabed is one that can be built upon. It certainly bears in mind the sorts of challenges that we have with seabirds and benthic flora.

The other challenge with offshore is the grid. It is much easier to plan an offshore grid that reduces costs if you have an idea where the many tens of gigawatts that are going to be needed by 2035 are going to be built. It also means that a co-ordinated offshore grid will minimise onshore disruption, which is important because communities on the coast—particularly in East Anglia at the moment, but it could go elsewhere—are, understandably, getting fed up with a policy regime that was designed for where we were going to have single figures of gigawatts of offshore wind and we are now talking about 40 GW by the end of the decade. The policy regime means that every individual offshore wind farm needs its

own separate connection into the onshore grid, and so there is lots of infrastructure that is completely unnecessary. It is not even redundancy, because it is serving only one farm. If, instead, you had a proper offshore grid, you would minimise costs and onshore construction as well.

Those are a few of the things that we need to see in this moment, because we have to harness this moment. As other panellists have said, this is a moment where there are short-term but also long-term issues, and we need to align our immediate demands around the long-term vision.

On the point of nuclear, very briefly, nuclear does not really offer anything this decade. Hinkley Point is under construction and will be opening in 2027 or something like that. If the Government were to press go on nuclear, the date that EDF thinks it will be able to open Sizewell C is 2034. There are small modular reactors, but remember that they have not been built yet. There is not even a prototype. There is only one example of small modular reactor construction in the west, which is in Utah, where already some of the consortium members are pulling out because of costs and delays—a somewhat familiar story, if you have been tracking the nuclear industry.

I emphasise that Greenpeace does not like nuclear. We do not agree with it. We think it is wrong for a number of reasons, which I am not going to go into now, in the interests of time. That does not change the short term, which is that we have to get on with renewables, because that is the only thing that is going to deliver on the supply side this decade.

Q23 **Paul Howell:** The primary point that I want to come to is about UK and EU co-operation, which there has been a lot of discussion on. Just before I go there, something that has been discussed quite a bit today is about what you can do quickly. I know from my time in business that you can turn off costs more quickly than you can bring in new sales. It does seem as though the initiative to bring more effort to reducing consumption levels is a more immediate thing that can be done than delivering the new supply or where it comes from.

You talked a lot about the need to develop heat pumps and things like this. In previous situations, we have heard that there is just not the capacity to supply them in the first place, so it is also about making sure that we reflect on the ability of the market to supply the things that we are talking about using in terms of green energy.

On the specific things I want to make sure we come back to in terms of the UK and the EU, you have talked about the link between not just the EU and the UK, but the fact that you then have a world market and the dynamics that go there. It has been very informative. Rather than go into that in too much detail, one thing I would ask you is what level of co-operation you see happening in that space at the moment. In terms of the UK, the EU and other world markets, is there a level of co-operation, discussion and consideration of what should happen next or is it just

every man trying to work it out for himself at the moment?

Dr Sharples: It was very interesting to see, in recent weeks, the efforts by President Biden meeting with other world leaders—meeting with the Qataris and with Japanese buyers of liquefied natural gas—and trying to get some sense of co-ordination. It is our view at the institute that, to a large extent, if there is a supply crunch—if we lose access to Russian gas supply, for example—the response would be market-driven. It would not be Government leaders going and asking other Government leaders for assistance. What would happen is that prices would spike in Europe and then, to the extent that supply could be redirected to Europe, it would be, because European prices would be higher than in other parts of the world.

Just to give you a sense of this, the United States, Qatar and Australia are three of the world's largest exporters of liquefied natural gas. They really are head and shoulders above pretty much everybody else in terms of volume. A lot of what comes out of Qatar is under long-term contracts with destination clauses. The agreement is in place that the LNG will be produced and delivered to X country. Once it gets there, decisions can be taken about whether you regasify it and inject it into your national grid or simply turn the boat around and deliver it to somewhere else. A lot of what is coming out of the US are portfolio contracts that are destination free. If you are the company that is taking gas on to a ship in the Gulf of Mexico, you can choose where to send that gas.

Two things would happen if we lost access to Russian gas in the immediate short term. European prices would spike above those in Asia, so you would see the destination-free LNG flowing to Europe. To the extent that something like 15% of Qatari exports are also destination free, they would come to Europe, but you might also get LNG-importing countries in other parts of the world that are more price sensitive and less able to accept LNG cargos above a certain price choosing not to regasify those cargos but, instead, simply to resell them straight off the bat. I am thinking of places like India, Pakistan and Bangladesh in particular.

It would be a market reaction rather than a diplomatic effort that would bring more gas from the global market to Europe in the event of supply disruption.

Dr Parr: At this point in time, as I mentioned earlier, there is a thing about controlling our demand side, and I would like to see the UK co-operating with Europe in terms of building up supply chains, capability and the North sea offshore grid, for example, as way of addressing the long-term issues around reduction of demand.

Lindsey Walter: Another thing that the UK can do to support the broader transition in Europe is to use its high-quality offshore wind resources to help provide hydrogen and to begin exporting that hydrogen to mainland Europe, and to consider what type of pipeline infrastructure

needs to be built. Keep in mind that the United Kingdom has some of the best-quality offshore wind in the entirety of Europe, and that is a real asset to look at, both for this crisis and for the climate transition moving forward.

Chair: That brings this session to an end but, clearly, the discussion will continue and we will continue to want to look at Government announcements, here and across Europe, and what we think should be happening. Thank you to all of you for your contributions this morning and, no doubt, we will speak again in due course. I will bring this session to an end.