

Scottish Affairs Committee

Oral evidence: [Renewable energy in Scotland](#), HC 51

Thursday 27 May 2021

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Members present: Pete Wishart (Chair); Mhairi Black; Andrew Bowie; Deidre Brock; Wendy Chamberlain; Jon Cruddas; Sally-Ann Hart; John Lamont; Douglas Ross.

Questions 1 - 37

Witnesses

[I](#): Professor Karen Turner, Director, Centre for Energy Policy, University of Strathclyde; Professor Keith Bell, UK Energy Research Centre Co-Director, University of Strathclyde; and Neil Douglas, Director, BVG Associates.

Examination of witnesses

Witnesses: Professor Karen Turner, Professor Keith Bell and Neil Douglas.

Q1 **Chair:** Welcome to the Scottish Affairs Committee and the first oral evidence session in our brand new inquiry into renewable energy in Scotland. We have a stellar cast for you today to get proceedings started. I am going to let them introduce themselves, tell us who they represent and anything by way of a short introductory statement. We will kick things off with you, Professor Turner.

Professor Turner: Hello. Thanks for inviting me along. I am Professor Karen Turner. I am the Director of the Centre for Energy Policy at the University of Strathclyde. I was also one of the Scottish Just Transition commissioners. We completed our duties earlier on this year. I am an economist by training and an energy and climate economist in practice in my job now.

Professor Bell: Hello, everyone. I am Keith Bell. I am at the University of Strathclyde as well. I am an electrical engineer by background and I am here today representing the UK Energy Research Centre, which is a collaboration of more than 20 universities and multiple disciplines working together to build an evidence base to inform how the energy system should transition to a low carbon system.

Neil Douglas: I am very pleased to be here this morning. I am Neil Douglas. I have a background in engineering. I have worked in the renewable energy industry for all of my career, so that is something north of 25 years now. I work now for a business called BVG Associates and we provide strategy advice to governments and businesses involved in renewables, predominantly in wind energy.

Q2 **Chair:** Thank you ever so much for those very concise opening statements and welcome to you all.

Can I kick things off to get a sense of exactly where we are in the renewables debate and what we are doing in Scotland? If we look at current statistics and projections, we can see that Scotland produces 97.4% of its electricity demand through renewables. What particular advantages does Scotland have when it comes to developing renewable technology and energy? We will start with you, Mr Douglas.

Neil Douglas: First and foremost, we won the lottery in resources for renewables in Scotland. We have a long legacy of hydropower development in Scotland, going back to the 1950s, and we still benefit from the investment that was made all those decades ago in hydropower. Obviously, in more recent decades wind energy has been the technology at the forefront.

It is a combination of the fact that we have those resources, we have the land and we have the engineering capability. That has been supported by various Government policies that have led to the expansion of wind,



HOUSE OF COMMONS

particularly in recent times. It is not just about wind—there are other technologies out there—but it is fair to say that it has been dominated by wind energy in the last two decades, since we started commercial wind farming in Scotland.

Q3 Chair: Thank you for that. Professor Turner, a lot of the wind debate seems to be about moving onshore to offshore, and that seems to be the big emphasis in how the renewables sector in Scotland has been developing. Is that right and is this really where we should be heading? What advantages do we have in respect of offshore wind in particular?

Professor Turner: One of the key advantages that we have is the one that we probably have not exploited as fully as we should have done in the previous decades with renewable energy. With the speed that we had to move at, we did not really exploit the potential for economic activity to build around renewables, domestic supply chains and things like that. It has been the subject of much debate generally in Scotland but it did keep on coming up in the Just Transition Commission as well.

As we are looking at moving offshore, we can look at this again. The ship has not entirely sailed. In the offshore sector, because we have already built up the capability through the oil and gas industry, it is an opportunity for us to look again at what capacity we already have that we have built and invested in, particularly in an industry like oil and gas where we are having to move away from what that does currently. We already have firms—we have seen it with the offshore leasing rounds and things like that—that have operated in the oil and gas space wanting to move in to work in the renewable space.

That is the real opportunity that we have in Scotland. Can we do a better job in the offshore sector to exploit the capacity that we have? At the end of the day, this is not just a transition of the energy system, it is a transition of the entire economy. We cannot sacrifice things like jobs, and that is not just a social concern. We need people to earn an income to be able to consume and, crucially, to pay taxes to ensure that we retain our tax base. It is the same message for keeping businesses in Scotland, that they are based in Scotland, they pay taxes and they contribute.

That is the advantage that we have, but we have not yet fully exploited it. I hope that through the offshore sector perhaps the avenues to building up an economic structure around the renewable energy system is a stronger possibility now and something we must look at.

Q4 Chair: Thanks for that. Professor Bell, obviously all this is an opportunity for Scotland, with COP26 coming. What do you think we should be highlighting as the world comes to Scotland and has a look at what we are doing in particular?

Professor Bell: I think that it is just what we have touched on, the fact that we have this renewable energy resource and that we have been able to make use of it as well. A big challenge in decarbonising energy



systems all around the world is reducing the dependency on fossil fuels, not using them in any kind of unabated way. There is a whole other discussion about abatement and carbon capture, but unabated use of fossil fuels is a no-no for the future.

It is about being able to give confidence to energy users and people representing them that that can be done in a reliable way. Energy demand can still be satisfied even when you have, in our case with wind, a highly variable resource. There are various engineering system challenges that go along with that that we are resolving. They are not completely resolved. There are some important things still to be addressed.

On the island of Great Britain—and we can look and see similar things on the island of Ireland—we have done a lot and in many regards are seen as world leaders in that. I think that is the big thing: the ability to make use of that fantastic resource—that lottery win that Neil was talking about—in a reliable way, in spite of the challenges to do with the variability and so on.

Q5 Chair: I am grateful for that. The UK and Scottish Governments have set very ambitious renewable energy and carbon emission reduction targets. Do you feel that still further policy incentives are required? What would you suggest to Government to ensure that this is further incentivised as we go forward? We will start with you this time, Professor Bell.

Professor Bell: The starting point has to be setting targets and setting the ambition at the right level. We have seen good developments from your colleagues in Westminster and people in Holyrood. That has set a really good example. Relative to maybe where we were 10 years ago, to be in the position we are now, with net zero greenhouse gas emissions targets, is fantastic. A lot of credit for that is due to legislators, but those targets now have to be based up with concrete policies to deliver the outcomes. That is where the progress is needed now in so many parts of the economy.

In respect of renewable energy, there have been policies over the last 10 to 15 years that have, as Neil touched on earlier, driven the development in particular of wind energy and, in other parts of the country, solar power. Biomass is another thing that has to be considered very carefully but it has played its part and will continue to play a part.

Policies to date have been successful but they need to be continued. It is good news that there will be another round of auctions for contracts for difference for renewable energy coming later this year. The UK Government have said that they will conduct such auctions every two years, I think, so that is good. It gives potentially a pathway, although they have not said how many gigawatts they are going to contract for in each of those successive auctions. I tend to think that is important in giving investors confidence and then helping to build up the supply chain and address some of the things that Karen talked about.



HOUSE OF COMMONS

The policies for renewable energy have been successful. Some continuation and getting some firmness around that would be very welcome. Partly it seems to be there already. I know that the policies for the medium to long term are under discussion in BEIS at the moment. Of course, that is something that will affect the whole of Great Britain. Exactly which way that is going to go is a bit uncertain yet. There are different schools of thought on what is argued to be in the best interests of energy users while at the same time going on the right pathway to emissions reduction.

Q6 Chair: Professor Turner, as you said, you have been involved very closely with the Just Transition Commission, so you will have seen how policy decisions have led, hopefully, to real and positive structural change. What do you feel needs to be done further to make sure that we meet the very ambitious targets that have been set?

Professor Turner: On the incentives, as my colleague said, things like renewables obligations and the contracts for difference have been very successful policy instruments. There is growing discussion around whether or not they, by their very nature, have focused attention a little bit too much on cost reduction per unit of energy and not on how you incentivise and secure the wider economic benefits or what is required to develop a just transition. There is work around local content and things, but often that can be regarded as a tick-box exercise, where there can be dodges out of things where you can meet what it says on the ticket without necessarily providing anything substantial.

It is about aligning the incentive for increasing renewable energy capacity in a way that is efficient for the energy system but that also bears in mind that cost minimisation should not be the ultimate goal if that means we sacrifice in other areas. We saw a lot of discussion through the commission's work on what the success in renewables and the success with the policy instruments we have had has delivered more widely. That is the challenge at the moment. How do we keep using these types of instruments but make them deliver more of what we need?

Q7 Chair: It is possibly a little bit more carrot and incentive than stick in terms of trying to punish people into trying to do the right type of thing when it comes to this.

Professor Turner: Yes.

Q8 Chair: We know that this is going to be hard on the economy and we know that lifestyle adaptations and changes are going to have to be made in this. Give us a sense of how all this impacts on the behavioural change that is going to be required. We have done most of what we can with electricity production, but these next steps require profound change, don't they?

Professor Turner: Yes. I think that is it. Your first point about the carrot and stick ties into the point about some of the local content things where



you have to tick a box. It is almost seen as the stick if you cannot tick the boxes; there is some penalty.

On the point that you made, there really is profound change and in a way—and I am sure that my engineering colleagues will gasp—we have done the easy part of decarbonising the energy supply. In anything that you are doing, even some of the bigger challenges that are being discussed around things like carbon capture and storage and hydrogen and things, where you are able to do them with some kind of centralised strategic plan and very focused, well designed Government support and things, they are in a way the easier things to do.

The bigger challenge that we have is that we need behavioural change across the population, but also for people to incur costs. That is one of the big challenges. Obviously, when we are changing heating systems and things like that, there will be up-front costs for people, but when we are talking about renewables and some of the costs that have been involved and the impacts on electricity prices, we are asking people to pay in how they operate their systems. With more able-to-pay consumers, there is the balance of meeting climate change targets. For people who are less able to pay, there is a challenge if we end up passing the burden disproportionately on to them. In a just transition, ideally we would be reducing inequalities in society, but at the very least we do not want to be increasing inequalities in society. There is a lot of discussion about fuel poverty and low income consumers and what we are going to do, and I do not know if we have found all the right answers.

There is also a more general point. We cannot assume that we can force the more able to pay to do things. At the end of the day, for us to deliver this transition to net zero, we need to build societal consensus that people, and particularly electorates, want to go along with this. If things are seen to be becoming overly costly in a way that people think is not fair or is not right or is overburdening them in ways that they think they should not be, you could lose that support, and that is the thing that could put us off track, rather than the technology challenges.

Q9 Chair: As somebody from that engineering background, Mr Douglas, what do you make of what is required? We are a bunch of politicians. Is there further legislative change that you think needs to be put in place to try to get us there in meeting these ambitious targets?

Neil Douglas: I agree with what Karen said that we have done the relatively easy part, which is decarbonising electricity production. We all have electricity coming into our houses. What we do not have coming into our houses at the moment is hydrogen. We do not all have electric vehicles and so on. There is a huge change needed on the demand side. We can sort the supply side, but that demand side requires different consumer behaviours. We are all energy consumers. It is that side of the equation that needs the attention from a policy and regulatory background.



HOUSE OF COMMONS

I absolutely agree with what has been said about the hearts and minds part of this as well. I think that the climate change agenda and the net zero agenda are now firmly embedded across society. That is an opportunity. It has taken us a few decades to get to the point that the urgency of the situation is now really understood. That is a good platform to build on from the point of view of addressing how we all consume energy and all of the technology changes that go along with that. I know the remit of this inquiry is predominantly about electricity, but the questions of domestic heat, industrial processes and transportation are a huge part of the equation. They cannot be ignored. The technology is there. It is how we shift that demand side and how we all consume energy that is going to take the real effort.

Chair: I am almost certain that this Committee's inquiry will touch on some of the real issues to do with transport and heating. As you said, Mr Douglas, it is a huge part of the equation and it is certainly something that we want to look at. Thank you for that. That is all from me just now. We will be coming back to some of the issues that you have raised, but I want to pass over to my colleague Jon Cruddas.

Q10 Jon Cruddas: Good afternoon, everyone. Can I ask a few questions about wave, tidal and solar energy? Scotland sits on the western fringes of the north-west European continental shelf, with some of the strongest tidal currents in the world. The obvious question is: how can Scotland capitalise on its global advantage in wave and tidal power, given that they are expensive energies to produce, and what needs to be done in policy and legislation to meet that potential and provide cost-effective energy generation?

Professor Bell: You are totally right about the wave and tidal potential. The big challenge, of course, is that we have not really converged on, certainly not for wave energy, single designs of machines that can harvest that energy. Given that the energy comes from the wind in the first place, some of that is being absorbed by the sea water and then you are trying to capture it again. It does not feel like it is going to be a more efficient means of capturing energy than wind turbines. Nevertheless, it has a different sort of time profile so it could be useful. Maybe it is best to think of it as potentially a niche application in places where wind energy is less easily harvested or something.

Tidal energy is a different matter. It seems to be getting down towards similar designs, quite similar in basic form to the wind turbines, the horizontal access rotating machines. The big challenge there—and I am no expert on this and hopefully Neil knows more about this than I do—is the forces that you are trying to capture also tend to wreck your machines. How do you design them in such a way that they are robust, they can capture the energy and they are maintainable by the time you put them on a seabed or something? Sometimes they are anchored to the seabed. It is a similar challenge, I suppose, to offshore wind. They are remote from the demand centre so you still have to sort out the cabling, the connection back to shore and through the shore.



HOUSE OF COMMONS

They are not at the same commercialisation stage—commercial viability—although there are projects that have been talked about for a few years. One or two of them are going in the water, in the Pentland Firth, just off the Isle of Jura—one or two places. They are still behind offshore wind in cost, and probably still behind floating offshore wind, which is another newer technology. That all suggests, I think, a need for innovation policy to support the developments there. Of course, that has to be done in the right way. There have been a few lessons to be learned, which some colleagues will know more about than me. A colleague of Karen and mine at Strathclyde did some work particularly on innovation support for wave energy. He looked into how that had worked and the ways in which it had failed a couple of years ago. We have to learn from that.

There are perhaps two things in particular. The first is to accept that failure is always going to happen when you are doing something very innovative. You are looking at trying to manage your portfolio and out of that hopefully comes things that will progress to commercial viability. The other is to be a little bit sceptical in a positive way about some of the claims that some of the manufacturers might be making about how close they are to commercial viability. Offer some support but do not be too much taken in by some of the sales talk.

Q11 Jon Cruddas: That is fascinating. I might ask Neil to come in on that. We have already been briefed about the variety of the machines and the costs, the breakages and the heavy investment necessary. Maybe you want to comment, following up on Keith's point.

Neil Douglas: Sure. You mentioned cost. At the end of the day, any new electricity generation technology has to be cost-effective. As has already been mentioned, ultimately costs are borne by the consumer. That has been the battlefront, particularly with wave and tidal energy. As Keith has touched upon, wave energy has a much bigger technology challenge in terms of addressing the shock loads from an engineering point of view in an extreme wave condition that you still have to survive. You cannot necessarily generate electricity but you still have to build the machine to survive that. That is a real materials and weight challenge that leads to very high costs. I agree with Keith's point that wave has a place but it is perhaps more of a niche opportunity.

With tidal, on the other hand, the engineering is a little bit more straightforward. It is a narrower band of energy that the machine has to absorb and survive. One of the challenges with tidal, however, is that the resource globally is not as common as wind. It takes a particular set of geographical circumstances to have an exploitable wave resource. We have talked about the Pentland Firth. It tends to be headlands and sea channels between islands and so on that have an accelerated tidal flow that make it exploitable. There is a fair amount of resource globally in that sense, but not every country and not every coastline has an exploitable tidal energy resource. Therefore, you could argue that the global opportunity is less in some respects. On the other hand, of course,



we have the fact that tidal energy is very predictable. As long as the sun and the moon keep doing what they are doing, the tides will flow. That has a particular advantage because it can be treated as a baseload. We know when the tide is flowing; therefore we know when the energy will flow.

Scotland, of course, has been a world leader in both wave and tidal energy and there are some remarkable technologies being tested up at EMEC in Orkney, not least the orbital machine that you might have seen. It was towed out from Dundee up to EMEC in the last few weeks. I have seen the development of that technology over the last 10 years or so and what they are doing is quite remarkable and they continue to attract investment.

Wind the clock back a little bit and look at how wind power developed as a technology. It started off almost as a cottage industry. I am talking about the modern wind energy industry in Denmark. It grew very much from grassroots. The technology had time to mature. It took some time for the technology to mature to the point that we had turbines that were suitable for commercial applications, but that was a technology push. What we are seeing now with tidal energy is that it is more of a technology pull. We want it to happen and we want it to happen quickly. That takes a lot of investment and a lot of patience to move it forward at the pace that we might want it to do. I am not sure that pull is hard enough because of the issue of global opportunity that I mentioned.

Q12 Jon Cruddas: I would like to invite Professor Turner in as well. Not least with your economist hat on, are there any specific planning issues in all of this debate that might need to be addressed?

Professor Turner: We did some work around wave and tidal many years ago, but one of the problems for us economists is that we are always concerned about what the consequences are for prices, jobs and things like that, as well as, as you said, the costs that might come around planning to get the electricity out and on land.

To my knowledge, there has not been a great deal of work beyond the techno-economic cost per unit. That needs to be investigated, especially if it is a resource that we are rich in. If there is this distinction to the baseload thing, we need to understand the consequences: exactly how does that play out in impacting through to prices, policy costs and things like that? If in Scotland we think this is somewhere that is seriously going forward, it is about the timing of when you start to think about the consequences before you invest much more.

Q13 Jon Cruddas: Thanks for that. Can I ask one final question about solar energy? Do any of the experts here think it has a bigger role to play in the renewables mix in Scotland? I do not know if any of you are experts on this or want to jump in.



HOUSE OF COMMONS

Professor Bell: I would not count myself as an expert on solar energy specifically or, indeed, how the resource works, but we could say that Britain as a whole is not necessarily the sunniest place. Okay, maybe it is not too bad where you are based, Mr Cruddas, relative to us up here, but anyway.

The development of solar PV capacity in Britain has far outstripped the predictions. If you look at some of the older National Grid future energy scenario reports, by the time the report came out what they were suggesting would happen had already happened. That has been because across much of the renewable energies production space the costs have come down in some cases spectacularly quickly. The costs of solar PV panels has come down a lot, so why not? We have a lot of capacity now across Britain. It is so cheap even for parts of Scotland and you might as well say, "Why not?" I don't know if Neil or Karen have another view on that.

Neil Douglas: As Keith said, there has been a remarkable drop in the cost of solar panels. That has been driven by worldwide expansion in solar panel production, particularly out of China. The unit cost has fallen dramatically. In countries that have an abundant solar resource, I think that it makes a lot of sense. We see a lot of rooftop-mounted domestic solar all across the country, even in Scotland, but that was driven by a generous feed-in tariff. That feed-in tariff ended because, again, the demand outstripped expectations. That was driven by a fiscal policy and that is the only reason that happened at the scale that it did. It made it easy for homeowners to make that investment. There are some larger solar PV farms in Scotland, but they are relatively limited and there is not really a great pipeline of projects coming through, again because the support mechanism is not there.

The other aspect of solar that is often ignored is solar domestic hot water. You do see some installations but not a great deal. We have quite a high heat demand in Scotland—it is a bit colder—and solar hot water can make some sense, particularly when it is combined with things like domestic biomass and so on. Frankly, I do not see a huge number of solar projects coming forward in Scotland because the policies are not there at the moment to draw them.

Professor Turner: I have not done specific research in the area of solar, but on the domestic side, close to me we have a new housing development and all of the houses have solar PV on their roofs. That is one lens to consider solar through. The UK Government have already committed to an EPC standard and raising the housing stock to that for 2035. For the Scottish Government, Energy Efficient Scotland was launched back in about 2016 or 2017. We have a huge challenge in making homes more energy efficient and a lot of that in new builds is going on requirements for builders.



HOUSE OF COMMONS

One reason I have looked a lot at energy efficiency is because I am concerned with wider economy effects and creating economic gains. Economists always love efficiency because efficiency means you do something using less resource so it costs less. It is one of the areas where you have a clear duality between lowering household energy bills while reducing emissions. The behavioural change part becomes less challenging because households want to do it anyway. That is how I would look at solar going forward. In the building stock, particularly the new side of the building stock, does it play a role in how we are delivering energy?

Jon Cruddas: That is fantastic. Thanks for those answers.

Q14 **Sally-Ann Hart:** Good afternoon to our panel. I want to look a bit at the UK Government funding streams. Scottish Renewables has expressed concern over government funding while, for example, Hitachi ABB Power Grids and EDF Renewables are both supportive of government funding. I am looking at the contracts for difference here. I am interested to know your views on contracts for difference. Are they fit for purpose with our current renewable targets?

Neil Douglas: We have conducted quite an interesting experiment over the last couple of decades in that previously we had the renewables obligation, which was not a cost-competitive auction. It was if you turned up with a project that had a good connection and planning you were able to receive the renewables obligation certificate. It was very successful at driving volume. From the late 1990s through the last decade until the renewables obligation ended, we saw a tremendous increase in volume, so it was successful from that point of view. Of course, the view was taken that the industry has now matured; it is more appropriate that we have a cost-competitive auction system. It has been very successful for offshore wind. It has been less successful for onshore wind, largely because onshore wind has been precluded since the first round of the CfDs, although that of course is now coming back into the CfD pot, which is welcomed by the industry.

It has been particularly successful in offshore wind in reducing cost. The last round of auctions was £40 per megawatt hour or something like that. The first auctions were £110 or £120 per megawatt hour. We have seen that it has been successful in driving cost. It has been less successful in driving local supply chains. It is cost-competitive and that puts pressure into the supply chain, and those pressures are borne in all tiers of the supply chain, particularly as you get down to the smaller tier 2 and tier 3 of the supply chain and local businesses, where those cost pressures get passed down.

That is the balance. It has been very good at reducing the cost of energy to the grid and it has allowed the volumes of offshore wind that we now see around the UK.

Q15 **Sally-Ann Hart:** Thank you. Professor Turner, do you have anything to



add to that?

Professor Turner: I would reflect what Neil was saying there. The contract for difference has been very important. There are two issues. One is the set of issues that Neil was raising around exactly what that was designed to do. It was designed to bring down the costs of costly technologies. Of course, then it was less good for related reasons in building up local supply chains where, as I have said, cost minimisation is not the only thing that we need to look at. We need to look at how the benefit is spread.

It is like any instrument. You need to think about the purpose it was created for and how it needs to adjust going forward. As the energy system and how we are doing things changes rapidly, if you take in principle what contract for difference was trying to do, it was trying to make up the difference between what the cost would have to be to go into the market and what it actually was. In principle, that is the right thing to be doing and that is what you want these instruments to be doing. It is not throwing out things, it is about thinking about how you have to refine them for application in different contexts and where there are different concerns. That will apply in different types of energy production in different parts of the country and where we want to see delivery of a wider set of outcomes than simply reducing cost. We should not be looking to get rid of these things. We are just looking to examine whether or not the instrument is still doing the job that we need it to do and how we would look to refine it.

Q16 **Sally-Ann Hart:** Thank you. Professor Bell, do you have anything to add?

Professor Bell: Yes, I would agree with a lot of that. It is trying to keep the costs down also by giving confidence. The contract for difference removes a large part of the risk by giving a guaranteed price, agreeing on the strike price. That then affects the cost of capital. Relative to the UK target of a total of 40 gigawatts of offshore wind capacity by 2030—that is about another 30 gigawatts—how are we going to get that level of investment? The cost of capital is going to make a big impact on what the total cost of that is going to be. We have touched on costs lots of times in this discussion already.

The cost of the energy transition is really important. Karen talked about where the costs fall. That is another important part of it. We are looking, for example, to see what the Treasury will say in its review that is still ongoing into where the costs of the transition to net zero fall. That is an important thing, but minimising the total cost is a part of that. I do not think that we should forget that.

How that cost is spread across the economy and across individuals is another dimension, and there is the nature of the cost as well. The cost of energy is changing from being in large part to do with the fuels and the operation of a power station and your gas boiler to being about the



capital cost of the equipment, and then the operating cost is quite low. Once you have built your wind turbine, you have an operation and maintenance cost, but the fuel is free. Once you have installed your heat pump—pretty expensive—and you have your radiators properly adapted and the insulation right, and the electricity you get with a good coefficient of performance of three or perhaps even better, and you have low-cost electricity because the marginal cost of wind is very low, then the operating costs should be very low. The up-front cost versus the ongoing cost is a different thing. How you cover that up-front cost becomes a really important question, especially if you do not have much capital at your disposal.

I also refer back to something I said earlier about the contracts for difference giving confidence to investment that there is a pathway coming. I was talking to somebody this morning who used to work for Ørsted, which as you know is one of the biggest renewable energy developers in Britain, albeit that it is a Danish company that grew out of the oil and gas sector. I was told that it had an opportunity to bid in very competitively. It won a large amount of volume in the early auctions, and by having that amount of volume it could invest in how it is going to deliver it and get some of those economies of scale through its procurement, through paying for the construction of a new ship that will be able to go out and do a turbine every day rather than every three days or whatever it is. You can get a lot of efficiency because you know you have that volume of work.

That is another part of the context for these centralised arrangements such as the contracts for difference as opposed to other options. There is a lot of discussion now. Energy Systems Catapult published a report a few weeks ago that is advocating quite a different approach. A return to the renewables obligation is one thing it looks like, actually. What would that mean for things like cost of capital? What will it mean for the investment coming through at the right time? What will it mean for the sorts of things that the Just Transition Commission was talking about around supply chains and so on?

Q17 Sally-Ann Hart: Just to interrupt you there, Professor Bell, looking at the renewable obligation scheme or the feed-in tariff scheme that you mentioned, what has been the impact of those previous funding streams? Have they had an impact on investment in the development of renewable technology and jobs, for example?

Professor Bell: As Neil was saying earlier, they help to grow the industry. The renewables obligation got the offshore wind sector in particular off the ground really at scale in this country, and the feed-in tariff led to a huge development of solar PV. There are a lot of jobs in the installation, even if not necessarily in the manufacture. When the feed-in tariff was suddenly cut all those jobs disappeared. There is still interest in solar PV now, as Karen was saying, because the cost of it has come down so much.



All of these technologies—wind and solar PV—are cost-competitive with fossil fuels, depending what you assume about the cost of the fuel. A subsidy as such does not appear to be necessary, but given the volume that we still have to achieve of decarbonising the whole energy system, which seems to mean electrifying a lot of it—not all of it, a lot of it—at the same time as decarbonising the electricity system means that there is a huge amount to be done, a lot of investment to be brought forward. These schemes have succeeded in the past, but the volume of the new investment is still very large and the total cost of it is still, therefore, really important.

- Q18 **Sally-Ann Hart:** Picking up on that—and I will go to you first and then Professor Turner—what would you like to see changed in the funding available from either the UK Government or the Scottish Government or both? Is there a lack of investment? Is there room for more? Are these Governments doing enough to encourage private companies, for example, to invest in green technology? What change would you like to see?

Professor Bell: On the supply side—and we have talked a lot about that so far—the production of energy, if we have this confidence, for example, in the contracts for difference arrangements in the short to medium term, my understanding from the industry is that the money is there. There are investors ready to come in, under the right terms of course. It is not just the big utilities, but pension funds and whatever. They like the idea of these asset-based investments that can be quite safe and secure, and that has benefits for the cost of capital.

On the demand side—and we have touched on that and it is really important—the energy transition so far has happened almost without any of us noticing. Yes, there is something on our bills, but it has not impacted on our everyday lives. As Neil said earlier, electricity supply is just as reliable as it has ever been. The next bit of it about not burning gas to heat our buildings, for example, and not burning diesel or petrol to move about, is going to be much more noticeable, so the investment in that has to come at all sorts of different levels. A lot of it is about owners of large buildings and homes having the capital available there. That is a different question that I would defer to Karen to talk more about than me.

- Q19 **Sally-Ann Hart:** Professor Turner, can you pick up on that?

Professor Turner: Yes. With the size of the challenge that we have, the more we can learn from things that we have done before, the better. That is why I am a great fan of revisiting policy instruments and things that have been used in the past to see if you can tinker with them.

We have done quite a lot of work on the demand side. It has been more in terms of energy efficiency, but we are talking about the same thing; we are talking about how people have to change their homes. One of the biggest challenges that we have with a lot of the things that need to be



done, as Keith said, is the big up-front capital costs. Where funds can be made available, grants and grant funding are one thing. We have done quite a lot of work on whether there is a return to giving public money to people. Even in lower income households that comes through reducing fuel poverty and things like that.

Q20 Sally-Ann Hart: You are looking at things like a green homes grant, that sort of thing, which is being relooked at?

Professor Turner: Yes. We have looked at grant funding here. The thing is that part of the stimulus that you can give to the economy is freeing up people's spending. Cases can be made for giving grants to some more-able-to-pay households, provided you are going to free up income to spend in the economy rather than to save away or to spend on imported things.

We have done quite a bit of work looking at things like—and this was in a Scottish Government context earlier on, when EES was first coming out—whether there is a role that Government can play, for example, in loan finance. You have high up-front capital costs. You can make quite a big difference where consumers can be given longer-term, lower-interest loans to do things in their houses. Things that strengthen it, like lengthening loan repayments from five years to 10 years, can make a huge difference to both the impact on consumers and how things play out in a wider economy context if you set that off against regulatory approaches, where you are just requiring people to spend their own money by given timeframes.

We found evidence that it is policy investment—that is not necessarily about giving people money or giving out loans, but Government can play a role in enabling low-interest loans to be given, through things like guaranteed roles—where we need to direct attention in this way for looking at EPC aims, and more generally as we look at increased electrification and wherever we are going to be asking consumers to do things that are big up-front capital costs. That is the first barrier.

The second barrier is getting people to want people in their houses, because evidence has shown that the most popular things are wanting minimal disruption to people's lives in terms of how they live, the time it takes them and the money. Those are always the most popular things. If you are wanting to bring about big changes on the demand side, you are looking at what role Government can play in minimising the disruption and cost. Even if people are still ultimately bearing the cost, you can limit the costs that they are having to pay out in any one timeframe.

Sally-Ann Hart: Encouraging demand basically, yes.

Professor Turner: We need to make it easier for people to do what you want them to do and smooth out the big, first, hard bill of up-front capital costs. That is why I think the new build sector, when we are talking about solar PV, is very important, because you can bundle up expenditures



HOUSE OF COMMONS

when people are doing things. I think when they are selling their house, they will take it as a standard thing that as well as painting the walls and making the place look nice, they may put in new heating or something like that. It is a complex challenge. How much can Government help simplify things for people that doesn't mean using taxpayer money?

Q21 Sally-Ann Hart: Thank you. Mr Douglas, is there anything you want to add to that about the next step for Government investment—Scottish or UK—on the demand side?

Neil Douglas: No, not particularly. I think Karen and Keith have covered that adequately.

Sally-Ann Hart: Thank you. I have no further questions, Chairman.

Chair: Fantastic. Once again, always good questions, Sally-Ann. Thank you for that. We will now hand over to Deidre Brock.

Q22 Deidre Brock: Hello to our witnesses. It is good to have you along today. Someone raised the point of cost-competitive issues and I want to ask about transmission charges. We have been told in written evidence that they are presenting quite a barrier to renewable energy development. You will probably know that a couple of days ago an analysis came out called "Charging the Wrong Way" by the Renewable Infrastructure Development Group. It references a paper by SSE Networks, which just highlighted how costly and uncertain the transmission systems of charges are. It stated that is many times higher in the north of Scotland than elsewhere in Great Britain. Could you talk us through your thoughts on that situation and maybe give us an idea of how that affects the economic viability of new projects? Professor Bell, you are nodding your head there.

Professor Bell: Yes, because I keep trying to escape this issue—having done a big report for Ofgem about 10 years ago—which was described at the time by a colleague as a nest of vipers. The fact that the question keeps coming up reflects that it is a big one and a controversial one. If you are all sitting comfortably, I will try to unpack some of the issues that are associated with it. I have seen that paper. Neil kindly pointed it out to me just yesterday, as it happens.

The first thing to say is that it can't be assumed that generation is next to demand. Especially when we are talking about things like wind and offshore, of course that is not going to be next to it. Network capacity is essential, and it has to be in the right places at the right capacity at the right time and all that.

The second thing is something we have just talked about, which is that it is not unreasonable to try to keep the total cost of energy as low as possible. Karen has talked about other sorts of economic interactions, but of the things you want to try to achieve, a low cost of energy is important.



HOUSE OF COMMONS

The other thing in respect of Scotland in particular is that renewable generation in Scotland to a large extent depends on the GB market and consumers within England to earn its revenues. That requires transmission network capacity, not just within Scotland but also down through England. The transmission charging methodology is intended to reflect the network costs of different locational choices by developers. The developers of new generation capacity are better placed than anyone else to know the tensions between, for example, their ability to get planning permission, how windy a particular place is, access to a good available labour force and so on, but part of the cost is getting the energy from your wind farm to your customers, and that cost is the network.

The paper that you mentioned raises one or two important issues. I think it over-simplifies things a bit for me, but it does raise one issue, which is about the sort of consistency or potential inconsistency with one method of reflecting locational value versus another method. I will just say in passing that my understanding—and it is a few years since I looked at this in detail—is that it is not true that generators in other parts of Europe face no network costs. There is a different way of apportioning the charges, so they have what are called deep connection charges, whereas in Britain those connection charges are quite shallow. It means that the infrastructure charges may be picked up in a different way or a different proportion of the total cost is recovered in a different way.

Anyway, the next point is that there are two basic ways of trying to reflect that locational signal to encourage developers to use the network that is already there and to not cause additional cost, and there are all these trade-offs, as I say, with wind speeds and so on. The way we have it here is TNUoS, this Transmission Network Use of System charging thing, which is a sort of formula or a methodology that is written down and it gives you different charging in different locations.

The other approach is to have a wholesale market that is based on the locational pricing and it falls out of an optimisation of what are the best resources to use at a given time, given the available network capacity. The principle that the European Commission has put in place is that there should be locational pricing, a wholesale market that is a Europe-wide wholesale market that is fully integrated and fully open but that does nevertheless have locational signals. It is only defined on a fairly crude zonal level. In fact, most of the zones are whole countries. In parts of the US it is down to individual substations.

That is what the energy economists would say is the right answer, but the TNUoS approach and the locational pricing approach are two sides of a similar coin; they are both trying to give a locational signal.

The point that Marc Smeed was making in his paper was that there is one approach to interactions with the rest of Europe and another approach to how we do it in Britain. Are they compatible? You could ask the question about, say, a wind farm in the Netherlands. Does it get access to an



HOUSE OF COMMONS

energy user in the south-east of England more cheaply than in Scotland or even one in the north of England? I think that would be a very fair question to ask.

Deidre Brock: Good, because I was going to ask about that.

Professor Bell:Professor Bell: I haven't done the numbers, I am afraid. I thought that was a good point in Marc's paper. I am afraid I do not have the spreadsheet out to crunch that. In spite of adverse signals for generation developments in Scotland, we currently have—according to the National Grid's spreadsheet just yesterday, and I wrote it down—6.9 gigawatts of wind generation connected or under construction in Scotland that has use of system rights to the transmission system. There is another 11.6 gigawatts with consents or awaiting consents, so you could trust they are pretty serious projects. Some of them already exist.

These projects were not put off by the existing regime, so what does that say? For example, the Seagreen offshore wind project is a gigawatt, so it is a massive project. It is off the Angus coast and is under construction right now, I think. Less than half of it has even got a contract for difference. The rest of it is being developed on a purely merchant commercial basis. It was not put off by the TNUoS regime. Having said that, there are details about how it is done that I think could be improved and are always worth having under review.

Q23 **Deidre Brock:** Yes. I suppose I am thinking how many more projects there would be if the prices were a little bit more evenly distributed. It was pretty clear from that paper that they are saying down in England and Wales they are paying—well, the average annual transmission charges in GB are apparently £2.53 per megawatt hour. Is that the right way of putting it?

Professor Bell:Professor Bell: Yes, I think that is the way that Marc put it in that paper.

Deidre Brock: He is saying Europe's are only 46 pence and that while generators in England and Wales pay an annual average of 49 pence per megawatt hour, generators in Scotland will pay an average of £6.42, with the average for the most northern regions hitting £6.36. He is also quoting an organisation called NGESO, which is forecasting costs will be even higher for the north of Scotland over the next few years by between 2% and 58%.

Professor Bell:Professor Bell: This is the limitation of Marc's paper. He has not taken all the factors into account, I am afraid. He has sort of selectively taken some of the factors. One factor is what revenues you can expect in selling your energy, and that is locationally dependent. Another factor is what you would pay to access an interconnector if you depend on interconnectors to get access to your customer. Another factor is your connection charge. The other point, and you started that bit, is whether we have enough. That is certainly one factor and a very important issue.



We have emissions reduction targets that are legislated, and hopefully the Sixth Carbon Budget will be legislated very soon. It is great that the net zero one is in place and we have that. That is in our interests in Britain and in our interests globally, so we have to get the right volumes coming through. That loops back to what we were talking about just now—contracts for difference or renewables obligations and all that kind of stuff.

Then if you have confidence of getting enough of it to meet our obligations relative to the rest of the economy, the question is how you do that at least cost to the end user of the energy, albeit, as Karen has said, there are other interactions across the economy. There is nothing that I am aware of to say the TNUoS charging regime has affected the volume, but it might have affected the location. It is a competition between a developer who has a project in the south versus a developer who has a project in the north.

Given that cost minimisation is not an unreasonable thing to aim for, the question then is how you take into account the cost of the network alongside the cost of utilising the wind resource of developing offshore wind, the cost of the seabed, the sea depth, operation and maintenance costs and everything else? The TNUoS regime is an attempt—imperfect as it may be—to reflect the costs of the network as part of that overall cost minimisation.

Q24 Deidre Brock: You are basically saying that you don't think that the extra costs that generators based in Scotland are having to face is having any impact on the developments that occur in Scotland; is that what you are saying?

Professor Bell: That is not what I am saying. I am saying that it is not necessarily having any impact on our ability to meet our emissions reduction targets.

Q25 Deidre Brock: What about you, Professor Turner? What are your thoughts on that?

Professor Turner: I think one of the points that you made is that we don't know the counterfactual, we don't know how many projects could have been attracted. We saw discussion of it recently. We were looking at the seabed leasing, offshore wind and the idea that projects might be less attractive in Scotland, and part of this being to do with transmission charges. This isn't an area I have studied, but I think, as an economist, Keith is quite correct to say—kind of boiling it down to a simpler level—that whenever a system is producing something, it bears costs and the costs have to be met.

There are different models for how you can meet costs. Wherever I am in the country, if I buy a Mars bar I will get it at the same price as somebody down south, but typically all the transportation costs have been smoothed there. We talk a lot about this in electricity, but I think if



you buy petrol or diesel to put in your car, all over the world—and maybe it is because I am an economist that I watch this—your proximity to cities and distribution points affects the price that you see at the pump, so there is a kind of equivalent of transmission charges. Basically, as Keith has said, if a study focuses on whatever everybody pays in transmission charges, it is missing out the fact that there will be a reweighting of how these costs are smoothed out over different times. The costs are going to be paid. It is about how they get paid and at what point in the system they get paid.

What concerns me is that every time I see something being said about transmission charges, the analysis will be partial or it will miss something out. It did make me think: is there a need, just like I was saying, to revisit things like the contract for difference? You want to keep instruments that have worked and just refine them. Is there a need to sit down to have rigorous research done on what transmission charges are doing and whether or not they are consistent with what we need the system to do?

I read a statement by Claire Mack from Scottish Renewables who said that the current mechanism was devised at a different time for a different electricity system and it doesn't incorporate or properly treat the shift of both the UK and the Scottish Governments in our net zero ambitions. That concerned me. It is concerning if we have something in the way that we are charging for things that is inconsistent with what we need to happen, but I don't think it means that we throw out the idea of transmission charging if that has been the best way to charge that the industry has come up with.

You need to cover the costs of your network, particularly when a lot of our opportunities in Scotland—and we have talked about wave and tidal—are quite remote. If you are going to bring remote things on to the system, you have to be able to pay the network costs. It may be just a question of how they are paid, but I think before anybody can make a decision on this, if there is a perceived problem there has to be a proper rigorous study to analyse what the system is doing now, because we don't know the counterfactual. People can always say there would have been more projects, but we don't know what that counterfactual is.

- Q26 **Deidre Brock:** It certainly sounds like there should be from what both you and Professor Bell are saying. Can I go back to something you said, Professor Bell, about European energy? Again, from that paper—and forgive me for referencing it but it came out a day or so ago and I thought it had some interesting points in it—it seems that the UK has quite a significant electricity trade deficit with Europe and has had for a long time. Is that right? You said that it probably does not take into account all the different factors that influence charging, but it did seem to suggest that Europe's transmission charges are much lower and that it doesn't pay to access the GB network in the way that Scotland has to. Is that right?



Professor Bell: Many countries are interconnected with each other across the whole of Europe. Britain is interconnected—and has been since the late 1980s—with France and more recently with the Netherlands and Belgium. There is one under construction to Denmark, Norway, Germany and a second one to France came into operation just a few months ago. When it was first conceived back in the 1980s, the idea was that there would be mutual support in security of supply because our peak demand is not occurring at the same time and we could help each other out. In practice, as a more integrated European market has developed, it has been more of a facilitator of trade. It is true that we imported more electrical energy than we have exported, although there are times of export. We tend to export more to Ireland than we import from Ireland, but import more from France. You can say from a consumer point of view in Britain that is taking advantage of their cheap nuclear power, or you could look at it another way, of the way that taxpayers have supported nuclear power in France, but that is going to change.

In my group we have done some analysis of how that will be in 2030 and 2040. We are looking, as we go out towards 2030, at more of a kind of balanced situation, so that will be to mutual benefit. When it is windy here, rather than curtailing the output because the demand isn't big enough to use all of it up, we can export that surplus energy to our neighbours. That would include to somewhere like Norway, which is very significant because its hydro resource is storable. It would welcome that because when it is windy here, we can export electrical energy to Norway. It can leave the water behind the dams in the reservoirs, and when it is not windy here, it can let the water fall and send electricity to us or to Germany or to anywhere else. As I say, that is to mutual benefit and that is the sort of thing that I think is going to become increasingly important.

The point that Marc was making about the different ways of paying for things, as Karen described it, I think is worth a closer look, especially now that we have—regrettably, in my humble opinion—left Europe and the single market. There still is trading going on, but would it seem a bit perverse if it was, all the costs taken into account, cheaper for a wind farm in the Netherlands versus one somewhere in Britain? I think that is worthy of exploration.

Then the big review that Karen talks about, the last time there was a bigish one was 10 years ago. I was involved in that and, as I say, have tried to avoid it ever since.

Q27 Deidre Brock: It sounds like it is time for a review. Very quickly, but it is very topical, I noticed today that there was an announcement of an MoU with Port of Cromarty Firth to create a commercial pathway to import green hydrogen. It is with Norway, of course, and the green hydrogen that you mentioned there, Professor Bell. But there has been some criticism already that green hydrogen is produced in Scotland. It is importing it and it is then being transported elsewhere. Is it a precursor



HOUSE OF COMMONS

to our own green hydrogen production in Cromarty? Are you familiar with the project? Mr Douglas, I am sorry, I am aware that I haven't asked you any questions.

Neil Douglas: That is fine. Yes, hydrogen is a hot topic, particularly in the use of offshore wind for the production of green hydrogen. The technology is there. There is a huge ambition from the oil and gas industry as they look at the energy transition. They are used to moving around combustible fluids and gases, so it is a natural transition for the oil and gas industry and we are supporting a number of businesses in that regard.

What is not evolving and emerging yet is what is going to be the demand case and what is going to be the application of hydrogen. Again, the technologies are there for the domestic use of hydrogen for heating and in transportation and aviation and shipping and all sorts, but that is where the technology push needs to come from, to try to develop the demand side of the hydrogen.

I would like to go back briefly to the TNUoS question. There is one thing I think is worthy of attention in the paper that has been discussed. I am getting Keith is absolutely an authority on this, but one of the points that is made in that paper that I think is a salient one is that the uncertainty about what future TNUoS charges will be is a problem for the industry because developers are seeking seabed.

If we look at Scotland, they are seeking seabed licences through the ScotWind process and people who already have projects that might be bidding into future CfD rounds need to know what their costs are because they are making financial investment decisions as they develop the project, as they seek seabed and as they bid into CfDs. If they don't know what the TNUoS charge will be in five, 10, 15 or 20 years' time, that is an uncertainty. The only way that they can finance that project is to price that risk, therefore they may be pricing themselves out, because all of these projects are competing for CfDs.

We can argue back and forward about whether it should be socialised or whether it should be centralised. However that is dealt with, that is fine and that is a valid argument, but what is painful for the industry is the uncertainty.

Professor Bell: I want to add very briefly to that, because that is a very important point about uncertainty. The alternative model that a lot of the electricity system economists put forward is the nodal pricing thing that I mentioned earlier, which it seems to me would introduce more uncertainty again. I think in asking for a big review, there is a little bit of "be careful what you wish for", because one of the outcomes could be something that is even more difficult from the developers' point of view.

Q28 **Deidre Brock:** I know that the Isle of Wight, for example, is doing a lot of development around renewables. Presumably it is paying less to hook



HOUSE OF COMMONS

into the grid—this must be the case—than those sort of developments that are based in Scotland. That is what it ultimately comes down to though, doesn't it?

Neil Douglas: Yes. That is what the locational guidance that is nuanced does. That is the effect of it. The other point is that that system was developed before we had imagined 1 gigawatt offshore wind projects in the north of Scotland. If you look at the ScotWind zones, there are projects off to the west of Islay and off to the west of Orkney and there is stuff in the far north-east. That situation of having gigawatts of fixed bottom or floating offshore wind in those locations wasn't dreamt of when TNUoS was designed, so it is an opposing force there.

Deidre Brock: Thank you all very much.

Q29 **Chair:** Thank you, everybody. That was a fascinating debate and thank you all for that. I think this is going to be such a key part and feature of this inquiry. Listening to you particularly, Professor Bell, I was struck by the contextualising of the IRDG paper and what was suggested from that. Is there any way that any of you could help us find how we get to the heart of all this? Professor Bell, I think you spoke to the predecessor Committee about this, maybe not quite 10 years ago, but this has been an ongoing feature with transmission charges for all the time I have been a Member of Parliament—for 20 years. It has never been properly explained and defined in a way that we could understand exactly what is going on. Is there any way we could find that?

Professor Bell: I can send you the report that I wrote 10 years ago, which people tell me is still a reasonable reference, in spite of it now being a bit elderly.

Chair: We look forward to seeing that. Listening to that exchange, we will have to think about how we take this forward as an issue, just so we can better understand exactly what is happening, but thank you for that.

Q30 **Mhairi Black:** Thanks to the witnesses. This has been fascinating and very informative. If I could turn your attention to a different topic and focus for a second on employment within the renewable energy sector, we know that in the past, previous estimates and targets for the number of jobs in the renewable energy sector haven't been met. What has to change for us to meet these targets? Can you give us a general view of what the sector looks like now for employment? That is open to whoever wants to start.

Neil Douglas: I am happy to come in there first. I think we have been quite successful in creating jobs in certain segments of the industry. I will talk about wind and Scotland. The development of the wind industry, both onshore and offshore, has been successful in Scotland in creating jobs in project development, project design, engineering, management and environmental studies—that side of things. There is a large body of people who work in that side of the industry. It has been less successful



HOUSE OF COMMONS

in creating jobs in manufacturing and fabrication, which is where the big CapEx spend comes from, and it is a certain type of employment.

The reason for that is that we don't make wind turbines here. We make certain components. There are a couple of wind turbine blade factories in the UK. We have made some wind turbine towers, but we are not producing the whole turbines. As is well documented, it is Denmark and Germany and also the US; China has its own domestic market in wind turbine manufacturing. We did make wind turbines in Scotland back in the 1980s. There was a company called Howden that was exporting tens, if not hundreds, of turbines out to California in the early days of the development of the industry, but there wasn't a domestic market. The lack of a domestic market meant that Howden turned its attention elsewhere. There have been other UK-based manufacturers that faced a similar fate.

I would argue that a pipeline of projects is the most important thing to drive the supply chain. Developers and investors need to be able to see a decade or more ahead for what their opportunity is in a market before they start investing in projects and potentially investing in supply chain.

I would also hold a mirror up to the oil and gas industry in Scotland, which has been a huge part of our economy and provides a huge amount of employment in Scotland and the UK as a whole. Of course that is a big part of the discussion with the energy transition. The Just Transition Commission report that Professor Turner was involved in is on what the impacts are on people and communities of that shift in energy sources.

In Aberdeen, which is one of the global capitals for oil and gas, the jobs are not in manufacturing or fabrication. We do some steel fabrication of rigs and so on, but the vast majority of the steel structures in the North Sea were not fabricated in the UK, let alone in Scotland. What Aberdeen has been fairly successful in is similar to the wind industry: project development, design, high-tech solutions, service industries and so on.

We are starting to see the green shoots of the impact of offshore wind in Scotland. Operations facilities have been set up in Wick, Fraserburgh and Eyemouth. We have seen the announcements about NEG and Cromarty and yesterday Port of Leith came out with some very ambitious plans about fabrication and marshalling yards. Dundee is being used as a marshalling yard for construction for projects off the east coast. That will naturally happen. The bigger the market is, the stronger the pipeline, the more confidence there is in the future, the more that will happen.

But if we want to get the steel fabrication manufacturing jobs, that takes Government and industry to work together to decide where to invest, because we don't have the facilities or the size of yards required to do the volume of fabrication that is required. They need major investment. Of course we are competing with big yards in the Middle East and the Far East and different parts of Europe that do have those facilities, where investments have been made. It is finding a way to take all of that



HOUSE OF COMMONS

ambition and say, “We are going to invest in this facility in this location and make it work”.

Q31 **Mhairi Black:** Are you aware of any projects that are seeking to do that, to invest and develop in this?

Neil Douglas: I have referenced some of them already in what is happening around NEG and Cromarty and Leith and so on. Yes, the ambition is there.

Q32 **Mhairi Black:** To follow on from that, and you touched on this there: how easy is it for people to move between the oil and gas sector and into the renewables sector?

Neil Douglas: There is a huge number of transferable skills. A very good report came out from Robert Gordon University in the last week or so that looked specifically at this. It talks about the fact that at the moment there are about 160,000 full-time equivalent jobs in the energy sector in Scotland. That is dominated by oil and gas at the moment. Their prediction is that over the course of the next decade, taking into account all of the dynamics of the energy transition, that will grow to about 200,000 full-time equivalent jobs in Scotland in the energy sector. That would be dominated by renewables, mostly offshore wind—65% of those jobs would be in offshore wind—whereas it is a very small fraction of the total 160,000 now. That potential is there.

This solves a problem for the offshore wind industry. One of the big challenges that offshore wind faces globally is supply chain and skills and facilities. A report that came out, I think just today, from WindEurope, the trade association for wind energy in Europe, talks about the fact that to meet Europe’s ambition of 450 gigawatts of offshore wind by 2050—this is a report that BVG authored for them—requires investment in ports alone of €6.5 billion to have the capacity to build that out. The demand is going to be there. The industry needs skilled people in engineering and all parts of the supply chain to meet those ambitions. I think it is about a firm focus on training and skills development and making that shift from one part of the energy sector to the other. The report that Professor Turner looked at in the Just Transition Commission very much focused on that.

Q33 **Mhairi Black:** Do you think there is enough training currently available for people to reskill into different sectors?

Neil Douglas: Frankly, I don’t. Scottish Renewables, the trade association here in Scotland, has been quite vocal about this, and rightly so, saying that it is not going to happen by accident. It needs a concerted effort between industry, Government, academia and vocational training organisations to focus where the skills are required and to support that.

Q34 **Mhairi Black:** Is there anything that the other two witnesses want to add to that?



Professor Turner: I have not read all of the Robert Gordon report, but the author notes that these are opportunities. Your initial question was around the kind of ambition targets for jobs. On the one hand is the aspiration of what might potentially be needed, and then there is what we manage to secure in Scotland. But I think frictions in the job market and in training and things like that and a lack of certainty are the real challenges we have. I am sure you will remember late last year, when we were starting to finalise our Just Transition Commission report, the thing that happened with BiFab going into administration again. Now they have eight contracts for these platforms, so that is great.

What you hear is that these are highly skilled workers, so as an economist I want them to keep spending and paying taxes in our economy. One of the challenges is that when these people are highly skilled, they are not going to sit around waiting. It is a feasible training opportunity for them, where they can still earn their income while they are doing it to smooth the transition. They might not like it and you hear a lot of stories that they don't want to go away from their families, but these workers, to keep up their earning power, will leave Scotland. They can get a job. We import from overseas. There could be Scottish workers who have moved somewhere else.

I think it is not just about the number of jobs, it is about our job creation. It is the people and the jobs that we have in the economy at the moment. It is how best Government can play a role to secure and smooth things so that we don't get these frictions. You manage to keep the people who have been trained in their skill and their trade. It is not just the jobs, it is about us retaining the human capital. I think that is the problem. As the report said and as Neil said, there are opportunities here. An awful lot is going to have to be done. Whether or not we secure it for Scotland and whether we secure it for Scottish workers in a way that they want to stay here—it is not just Scottish workers, but workers that we have brought in from all around the world to the industry—it is about keeping these men and women here.

It is about trying to smooth the frictions and acting to make sure that training opportunities coincide so that there is not a drop in income levels. People with mortgage payments can't afford to take a career break while they wait for something to happen, but maybe in a practical workplace setting.

Q35 **Mhairi Black:** How big a problem is this now? Is it something that we should be ringing the alarm bells about? Do we need to start investing?

Professor Turner: I think so, yes. I think we need to act on it. This is a very emotive area. I don't know how much discussion you have had with Scottish trade union membership and some of the voices there, but somebody bought me a uniform, because I had a rainbows and unicorns comment from the Scottish secretary of one of the unions about green jobs and things like that. I think there have been past experiences where things haven't worked.



HOUSE OF COMMONS

I think there is an opportunity. We are moving forward. BiFab has just secured these contracts and this is a very active market. I think we do need to act on this quickly. I think it would aid the just transition, because working at the commission I was very aware that we, as the experts of the people who were brought together, could say what a just transition should look like. At the end of the day, whether or not the transition is just is going to be down to the perceptions of the people who are affected. I think particularly when we have seen this as such an area of concern to get people on board with the transition and the justness of it—that is another reason to act. With market conditions, if we are building up in renewables, we should be looking at where the opportunities are for us to build in the supply sector for that.

Professor Bell: I will add to that. That is a great point Karen made about a just transition, what it means for people in reality and the points there also about timing. There are so many different dynamics going on within this. We have seen over years and years that the oil industry tends to be not boom and bust. They always seem to be—well, apart from the last year—making money. They tend to take people on and get rid of them in response to very short-term variations, but when they do take people on, they pay a lot more than the electricity sector has ever paid. The point about the global market for those sorts of particular skills and how much they are going to earn internationally is another very important dimension to it.

A further thing is that the kind of skills that are required in the oil and gas sector or indeed the renewables sector are not uniform. There are different kinds of people and different kinds of activity: engineers, technicians, geologists, natural scientists who can look at impacts on wildlife, project managers, lawyers, finance and so on. Quite a lot of these skills are transferable immediately and don't need any extra training, whereas for other things there are courses that might be done. I can't remember if it was Karen or Neil—it was probably both of them—who talked about the push and the pull. How is your income going to be affected in the interim if you are making a jump out of one sector into another and you want to do some retraining? Is the job there by the time you finish your course, for example?

At Strathclyde we have an MSc of wind energy systems. We are thinking that is an opportunity for people coming out of different sectors. This is one example. It doesn't prove anything—it is a sample size of one—but the anecdote might be interesting. I was talking to a person a couple of months ago who is taking one of my modules, and we had a bit of chat about his background. He left the oil and gas sector and thought, "Right, things are changing. We are all going towards renewables. I am going to come and get into this". He had applied for 20-odd jobs and did not get a single interview. He didn't seem like a bad lad—he did not seem like he was completely incompetent or anything.



It links back to what we were talking about earlier, about the CfD auctions and the next round of investment that is coming through. I am sure the companies are—Neil, you probably know better about this—just waiting as to the extent of the next round of things.

Chair: Thanks for that. I am just conscious of the time.

Professor Bell: Sorry. Yes, of course.

Chair: I know there is a temptation to stray into a whole range of issues with something as important as this, but thank you for that.

- Q36 **Wendy Chamberlain:** I will do my best to be brief as well. When the Committee previously did an inquiry into renewable energy in Scotland in 2016, it pointed out in its recommendations that there was still work to be done in improving engagement between the two Governments. I suppose with some of the issues, particularly on the questions from Deidre Brock around transmission, there is a number of areas where we still need our Governments to work together.

Professor Bell, you said that there were successful Government policies from both, but the question is: how effectively do we think the UK and Scottish Governments are working together to maximise the opportunities from the sector?

Professor Bell: Obviously there are certain powers that are reserved—energy policy and energy markets, not just electricity—and then other powers that are devolved. In particular, I think of planning. We have not talked about that very much at all this afternoon. That is an issue for the development of wind farms in particular, but electricity network capacity even more so. That is going to be a major challenge. The criteria—maybe let's put it this way—for the assessment of planning applications should be consistent with the broader goals of net zero. Of course there are absolutely totally valid local considerations and issues around natural capital and its protection and so on.

UK ambitions will be impacted by Scottish planning rules, for example. The other thing we talked about—we only touched on—was the demand side and how we are going to build increased demand for renewable energy, particularly in heating and transport. A lot of those powers are devolved—building regulations, transport policy and so on. The supply of renewable energy has to be aligned with the demand for renewable energy, so again I think you can see a reason for getting better co-ordination.

Neil Douglas: There are two issues I would highlight about the Scottish and UK Governments and how ambitions have been a bit different—let's put it that way. One is in onshore wind. As I mentioned much earlier today, the fact that onshore wind was removed from the CfD process after the first round led to a dramatic slowdown in new onshore wind projects. I think you can argue that that impacted directly on us meeting targets and the decarbonisation agenda. Of course that has changed now.



HOUSE OF COMMONS

As I mentioned, that is welcomed, but it was not the Scottish Government who removed that from CfD. I think that was a difference of ambitions and a different perspective that led to that situation.

The other aspects that we have not talked about here are community energy and the drive towards community ownership, rural communities owning and having a share in smaller renewable energy schemes. The feed-in tariff that we have talked about was fairly successful with small turbines owned by farmers or owned by community groups, all across Scotland and right out into the rural areas. We talk about hearts and minds. When people feel part of an energy project, there is a great pride in that and I think that is very good from a societal point of view. The end of the feed-in tariff has been lamentable from the point of view of community energy.

Q37 Wendy Chamberlain: That is very good to know, particularly representing a rural constituency and talking about district heating yesterday with the University of St Andrews. Thank you very much for that.

Professor Turner, if I can come to you last, where is the role of the Scotland Office, if you are aware of it, in that intergovernmental work that is so important?

Professor Turner: Fundamentally, ideally it would be—and whether or not in practice this is what could be done—all about collaboration and communication. I think when we are talking about net zero, 2050 sounds a long way off, but it is not, and a lot of action needs to be taken very quickly and rapidly. We are looking at effective delivery, where targets for renewable development are met, supporting the development and use of local supply chains and things like that. All of that is dependent on collaboration between the UK and Scottish Governments. Is that the role for the Scotland Office? It can get quite complex.

It is not just about the Executive bodies of Government. For example, Crown Estate Scotland is playing an increasing role the more that we are looking at offshore. It had jurisdiction over the seabed leasing in Scotland but, for example, it doesn't have control over the other levers such as the contract for difference auction, transmission charging and things like that. Where there is a mismatch or a difference where one has responsibility and another holds control, it cries out for collaboration and communication. As I said, on the timeframes that we are on, there isn't an awful lot of room for error or delays. If there is a role for the Scotland Office in this, you need somebody there that—

Wendy Chamberlain: It almost sounds like a governmental project management office.

Professor Turner: Yes.

Wendy Chamberlain: Great, thank you very much.



HOUSE OF COMMONS

Chair: Thank you ever so much. I thank all of you for getting this inquiry off to quite an interesting, fascinating and stimulating start. We are very grateful to you. I think Professor Bell is going to help us out with some of the issues around the transmission charging, and we look forward to seeing your work again, Professor Bell. Given you are our first guests this morning, please keep in touch with us and let us know if in the course of this inquiry you have any thoughts on anything that could help us in these proceedings. It is an inquiry that is very important to this Committee and we are looking forward to hearing and exploring and discussing some of the issues you have raised with us today. But for today, thank you ever so much for your attendance.