HOUSE OF COMMONS

Treasury Committee

Oral evidence: Decarbonisation and Green Finance – the economic opportunity, HC 2233

Tuesday 2 July 2019

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Watch the meeting

Members present: Nicky Morgan (Chair); Rushanara Ali; Colin Clark; Mr Simon Clarke; Charlie Elphicke; Alison McGovern; Catherine McKinnell; Wes Streeting; Alison Thewliss.

Questions 1 - 66

Witnesses

I: Chris Stark, Chief Executive, Committee on Climate Change; Professor Nick Robins, Professor in Practice for Sustainable Finance, Grantham Research Institute on Climate Change and the Environment, London School of Economics; and Sagarika Chatterjee, Director of Climate Change, Principles for Responsible Investment.

Examination of Witnesses

Witnesses: Chris Stark, Professor Nick Robins and Sagarika Chatterjee.

Q1 **Chair:** Good morning and thank you very much indeed to our panel for being here this morning for the first oral evidence session in our inquiry on decarbonisation and the impact on the economy and green finance opportunities. I will ask all three panellists to introduce themselves to start off with. It would be great if you could say a little bit perhaps about your expertise in the sector or the organisation that you are here speaking on behalf of. We will then have a series of questions. This morning is as much for our information and edification as it is to help us set the scene for the rest of the inquiry.

Chris Stark: Good morning. My name is Chris Stark. I am the chief executive of the Committee on Climate Change. We are the independent body that was established under the Climate Change Act to effectively act as the watchdog over the targets and the achievement of the targets that are contained within the Climate Change Act. We have, for almost 11 years now, been looking, in an independent and transparent way, at how well we are doing on all the issues around climate change in the UK.

Sagarika Chatterjee: Good morning. My name is Sagarika Chatterjee. I have been an investment professional for nearly 20 years in the City of London. My organisation is the Principles for Responsible Investment. We are an investor initiative focused on responsible investment. We have 2,000 investor members with nearly £80 trillion in assets under management. In the UK we have about 366 members. The investor names in the UK include some names that you will be familiar with: Aviva, HSBC Global Asset Management, Legal & General Investment Management and Lothian Pension Fund from Scotland. We also have some global investor names of the largest investors in the world: from the US, CalSTRS, New York State Common Retirement Fund, AXA and Allianz. Our growth has been very significant. We have doubled our members and assets under management over the last 15 years.

Professor Robins: Good morning. My name is Nick Robins. I am a professor of sustainable finance at the Grantham Research Institute on Climate Change at the London School of Economics. Grantham is chaired by Nick Stern, who many of you have probably seen many times before. My background is working in the City and particularly working now on a couple of things. First, how do we mobilise finance for a just transition, so how do we hit net zero with an inclusive economy? Secondly, what is the role of central bank and regulators in managing climate risks and driving green finance?

Q2 **Chair:** Lovely. Thank you all very much indeed for being here. Some of our questions will be open to all of you; some of them will be directed, but please, if there is something you want to contribute, try to catch my eye or catch the eye of the person asking the question so we can make sure we hear your evidence.

I might start with you, Mr Stark. I was going to start with the Government's legislation passed last week on delivering the net zero greenhouse gas emissions by 2050, but that obviously follows the letter from the committee and the recommendation. I have just been asked this question on national TV, so I will ask you. Is the target achievable? How is the impact on the economy taken into account?

Chris Stark: It is absolutely achievable. I should start by congratulating the Government on legislating the target, and I know that that has been a difficult decision. Quite rightly, they took some time to consider that. It is absolutely necessary that the target is set. In our assessment, it meets the UK's obligations under the Paris agreement, which is the global accord on dealing with the climate. More important than that, it is entirely feasible to achieve it, we say, with existing technologies and at a cost overall to the economy that is within the envelope that was first signed up for in 2008 when the Climate Change Act was passed. We have had a period of almost 11 years in the UK of living with that legislation. Some fairly remarkable things have been happening over that period that allow us to now look forward to 2050, mid-century, and to say with some confidence that we think it is possible to go all the way to net zero emissions by that point.

It is very important that we do that. That net zero target is a more fundamental target than the target we had before. Prior to that, you will know that it was an 80% target, so reducing greenhouse gases by 80%. The fundamental nature of net zero is that, in achieving it, we will do something that we have not prior to this day been able to do, which is to stop the UK's direct contribution to the problem of global warming. The contribution that comes from burning fossil fuels here in the UK will have ended by the time we have reached mid-century, if we achieve the target that has just been legislated. It is very important that we do that. It is a demonstration of the UK's willingness to lead on that topic and it gives us some licence to then talk about what is necessarily a very global issue overall.

Q3 **Chair:** What are the most urgent steps that the Government need to take? Obviously, there is going to be a lot of work that the Government will need to engage in, and we will probe some of that this morning, not just for Government, but for others including regulators, businesses and households as well. Perhaps I will start with you but I would be interested to hear the views of the others. Where do the Government start with this?

Chris Stark: It is important to say that there is a strategy in place already. The UK has the clean growth strategy, which the present Government brought into effect relatively recently. It has within it all the right bits. There is a set of priorities within that, which more or less map on to the kind of strategic priorities that you need to see to get to net zero, but we do not have the level of ambition and delivery in policy terms that will be necessary to get to net zero. That should not trouble us as long as the Government are willing to do something about it.

There is probably a period over the next 12 to 18 months where we need to get our heads collectively around the fact that we have set this new target and put in place more ambitious plans. Those plans need to be different in every sector of the economy. There needs to be much greater ambition in every sector of the economy. That means we will have to think about this in a whole-economy way and, indeed, in a whole-Government way. At the moment, the policies we have in place are still really focused on a small set of sectors. They are not broad enough and, even in those sectors where we have policy, they are not ambitious enough.

The net zero target is, in effect, a call to arms. We need to see it run almost like letters through a stick of rock, through every Department in Whitehall and, indeed, in every other layer of Government, if we are to achieve it. That means that the Department for Transport needs a different policy towards decarbonisation; MHCLG needs a housing policy that matches that; Defra needs an agriculture policy that fits with it. We cannot keep relying on what we have had, and, indeed, what has been very successful over the last decade, which is continuing falls in emissions from one sector, the power sector. We are going to run out of road on that strategy very quickly. This is a moment to pause and reflect on what needs to come next. We cannot pause for too long, though.

Q4 **Chair:** Ms Chatterjee, how about the people you are representing? What do the businesses and the responsible investors need to hear from Government? Where are they on this? Where do they go next in terms of action?

Sagarika Chatterjee: The first important point is that there is very strong global, including UK, investor momentum behind climate change and the Paris agreement. As a specific example of that, last week 300 investors with £34 trillion in assets under management wrote to G20 leaders asking them to step up, particularly on the 1.5°C. That should give this Committee great confidence that investors would like to do more and are behind the net zero target that the UK has put in place.

However, in terms of what is needed, I would echo Chris's point that it is important for the UK Government to be long term in their vision but to be very short term in their implementation of policies. Investors will expect and assume that the policies will now be put in place.

In terms of the priorities that we would see alongside those policies being put in place, green finance should be a key strategic priority now. Why? Without the finance, we cannot enable the emissions reductions that are needed in key sectors. The investors we speak with are very keen to step up and scale up the investment opportunity side so they can be a part of this transition. There are additional steps that this Committee could take to encourage investors to do even more in green finance, alongside the recommendations that have been published today on green finance and the green finance strategy laid out by BEIS.

Q5 **Chair:** Professor Robins, where do the Government start?

Professor Robins: Building on those comments, one of the very interesting pieces of analysis that the CCC did was to conclude, as Chris has mentioned, that this is a very achievable, manageable and cost-effective strategy. The economy we are moving towards is more capital intensive, so we put more capital up front into low-emission light bulbs and less into generation. We put more capital up front into our homes, into our cars and so on. It is a capital-intensive process. It is an investment process. Therefore, the Government should start by really thinking about how we reduce that cost of capital and how we make it cheaper and easier, particularly for households but also for small businesses, which have the majority of employment and the majority of innovation. That is the gap: thinking about how we focus on the capital cost—it is an investment that generates benefits—and how we reduce that cost. The task of green finance is to reduce the cost of capital.

Chair: We are now going to look at the role of the Treasury.

Q6 **Rushanara Ali:** Good morning. I am going to start with Mr Stark. How would you describe the Treasury's approach to decarbonisation? Is it fit for purpose?

Chris Stark: The Treasury has in the past, and on occasion, been absolutely wonderful on this topic, but overall, I think it is fair to say that they treat it with suspicion.

Q7 **Rushanara Ali:** How far back?

Chris Stark: You can go back through the ages and see that, at various points, they have viewed it as an economics question. When you do so, you get to some really good and sensible conclusions.

Q8 **Rushanara Ali:** Can you give us some examples?

Chris Stark: The best example of all is the Stern review, which was the game-changing piece of economics done by Nick Stern while he was at the Treasury, sanctioned by the Treasury, which looked at the question of the cost of climate change.

Rushanara Ali: That was quite a long time ago.

Chris Stark: It was quite a long time ago. There has been an interesting tension between the Treasury and other parts of Whitehall when it comes to the climate and environmental questions. My headline from here is that they view it with suspicion. I hope that the decision to legislate this target encourages the Treasury, as an institution, to look at it again, as it did when the Stern review was around, and to embrace it as a question of how one turns around an economy and has all the good outcomes that come from doing that in a positive way.

I do not think that they have always approached it in that way. Occasionally, they have looked rather too hard at the questions of short-term cost rather than long-term positive benefits.

Q9 **Rushanara Ali:** Was there a marked difference before and after the financial crisis? Obviously, a lot of these important things get sidelined when there is an economic crisis, and we are facing Brexit now so everybody's mind is focused on immediate challenges. How would you describe that? What is the trend? Perhaps others could come in as well.

Chris Stark: I will offer a view that you will not see set out in any of the reports we produced in the CCC, but it is my feeling that the financial crisis had that sort of impact. More than that, the Treasury engages with the topic when it chooses to embrace it, as I mentioned. They did that 12 or 13 years ago with the Stern review. I do not think they have really done that again since on the topic of climate. It is less about the impact of events and more about the Treasury's mindset and willingness to really engage with it.

Sagarika Chatterjee: Our investor members are very concerned that, if we do not see Government, including Treasury, taking the steps needed, there is a serious risk of an abrupt transition rather than a more orderly approach. This could happen by 2025. We have been asked and are working with our members on a work programme called "The Inevitable Policy Response", which looks at this abrupt transition. The Bank of England is also looking at this. For this meeting I reviewed Treasury's objectives and priorities, and green finance very much matches the mandate of Treasury. Green finance will enable Treasury in its priorities of achieving strong and sustainable growth by raising the funds that are needed, in strong and safer banks by ensuring they have good oversight of risks such as climate change, and in regulation of the financial sector to protect the economy through an assessment of climate risk and a financial regulatory regime.

On the public finance point, from the perspective of our members, who are fearful of an abrupt transition, it is important that there is early action and that the financing mechanisms are really well thought through early on, rather than leaving this very late, which will be disruptive for financial markets and our investors.

Professor Robins: If we are talking about how to finance this, the important thing is that different policy measures have different costs. One of the biggest risks facing investors who want to allocate capital is policy risk. We have seen a number of changes, linked partly to the financial crisis, that have damaged investor confidence. We had decisions to withdraw on the carbon capture and storage programme, which is key for major industrial clusters. That is back on the agenda, which is great. We had changes around zero carbon homes, the Green Investment Bank and so on. We have seen changes that might be explained by short-termism but they have had real long-term implications, and they have set us back from where we need to be, particularly on CCS and the homes agenda.

Q10 **Rushanara Ali:** From what I am hearing, the Treasury could do a lot more to lead, particularly given its remit. There is a letter from a Minister talking about BEIS's responsibility, but there is a lot of power in the Treasury that needs to be utilised and it could be much more joined up in the way it is working.

Chris Stark: That is absolutely true. On the question of the Treasury's role, in particular, it is important that the Treasury uses all the levers it has at its disposal. It has not previously done that. Looking at this as a whole-economy transition and drawing in questions of how one uses regulation, tax and public spending, the Treasury viewing this as something it wants to support and permit, rather than as a spending challenge, is the key to unlocking it.

Q11 **Rushanara Ali:** On another separate point, what do you think of the accusations made earlier this month that the Government were trying to fiddle climate change targets by using previous overperformance to make future targets easier to achieve? Who would like to come in on that?

Chris Stark: It is probably best that I handle that, since we have been at the heart of it. I take everything we have received from Government at face value, so I do not think they are trying to fiddle it. However, we were extremely clear when we wrote to the Secretary of State and BEIS that, although it is technically possible, rolling forward any outperformance from the second carbon budget period into later periods should not happen. We set out our justification for that in some detail in the letter.

None the less, they chose to use a proportion of it to manage what they rightly regard as a future risk with the change to the emissions inventory, on which I will not go into detail here. Our position remains that that should not have happened, and we will continue to advise on what to do with the remaining flexibility that has been reserved by the Treasury and by the Secretary of State.

The most important thing is that the looseness introduced to those targets by having flexibility that can be added to future periods is far from ideal. Loose targets are not compatible with the kind of pathway we will need to be on to get to net zero. Anything that looks like it might increase the risk of underperformance against those targets will be a big risk to our future ability to meet the target. I deeply hope that the Treasury, and indeed the whole of Government, views future periods in a different way and that those carbon budgets that are set in law by Parliament, by Westminster, are observed and are as tight as possible. We need to get ourselves as quickly as possible on to a trajectory to net zero if we are going to be successful in doing that at best cost.

Q12 **Rushanara Ali:** Does the Treasury's economic modelling currently facilitate effective funding of environmental policies? If not, what should it be doing?

Chris Stark: The Treasury has several ways of modelling the economy. Some of those models are extremely appropriate and some are not. I will go back to my earlier comment that the Treasury has mostly, in recent years, viewed this as a spending pressure. I do not think that is the most appropriate way to look at this. If you view the policies that are necessary to get us to net zero in three or four-yearly periods as spending pressures, it is going to be extremely difficult to consistently make the arguments for those policies to be in place.

This is fundamentally a question of the long term, but I would say that the long term is looking increasingly like the medium term. We are getting to a point now where the policies you introduce today are very likely to still be around over most of the period that gets us to net zero. The Treasury needs to lift its horizons slightly, just as the Bank of England has suggested that every participant in the UK economy should, and to consider what steps need to be taken now. Again, we view this as a question of best value to the citizens of this country, and the Treasury should view it that way.

Professor Robins: One of the things we have found at the Institute is that the current economic models, potentially including the Treasury's, really underestimate the scale of the challenge around climate change in two profound ways. First, they underestimate the costs, because often they only price things that are measurable and we know that many of these things are very hard to measure. Secondly, they have consistently underestimated the benefits of an innovation-led process of growth. We have seen that that can happen in this country through offshore wind and so on, but that was not predicted in the models. Those are the two things, and that leads to unnecessary caution, both in viewing the challenge of climate change as smaller than it is and in downsizing the potential opportunity for the wider economy.

Sagarika Chatterjee: From the investor perspective, what is needed for investor confidence and the scaling up of green finance is for Treasury to send a very clear signal that it will be acting on the UK Committee on Climate Change's advice itself, including on the core measures and further ambition policies that are suggested; to embed net zero across the regulatory regime for all financial services firms; to implement the new green finance strategy that has been put forward today; and to consider physical climate risk and flooding, which some of your constituencies may be familiar with. Recently we had three months of rain falling in one place in a couple of days. That is shocking, with really serious implications. Businesses and homeowners are not ready for this.

The Treasury has the opportunity to learn from other jurisdictions. Last week I was in Sweden and I heard Minister Per Bolund, who is the Deputy Finance Minister, speaking. His words were, "Sweden will be at the forefront of this and it will be better for our economy".

Q13 **Rushanara Ali:** I have one final question. I am going to bring it back to the point about immediate challenges, and particularly finance ministries having to cope with that, whether it is the financial crisis or what could be a looming crisis over Brexit and how we exit. Given what we have seen over the last few years, where there has been a stalling, in my view, of some of the things that should have happened and should have been accelerated, what are the actual chances of our Government—we are likely to have a new Chancellor—maintaining a leadership role internationally? The Climate Change Act was an exemplar. How do we maintain that pressure? What would you want to see parliamentarians and the institutions doing, particularly in Government and particularly the Treasury? This is your wish-list opportunity.

Chris Stark: Wonderfully, in this role, I can step out of the politics. The period that lies ahead over the next 12 to 18 months is absolutely critical. It is critical for a number of reasons. One is that we have just set this target. This is a demonstration that the Climate Change Act as a framework for action is still one of the world's best legislative frameworks because it is the moment when the science and the evidence determines that you should up the target, and we have done so. It is an important demonstration of the lasting impact of that legislation.

We have also thrown our hat into the ring to host what is known as the COP, which is the global summit that happens every year. Next year's COP, which is the one that the UK would like to host and hold the presidency for, is a really important moment. It is the moment when the countries around the world have to submit their genuine plans for meeting the agreement that was set in Paris. We are one of those countries. The period that lies ahead, certainly over the next 18 months or so, is the period when we need to demonstrate not just our willingness to set a new target in response to the evidence we have provided, which is great, but our willingness to put in place the policies and the strategies that will deliver it. Those two things are a demonstration of genuine leadership. They give us the licence to host and to hold the presidency of that COP, and to say to other countries around the world, "You should do the same thing".

If we do those things, we have a genuine and very good case to be a global leader on this topic. If we do not put in place those policies and the steps to start the process of genuinely delivering net zero, there will be tougher questions for us in the presidency role.

Sagarika Chatterjee: It is true to say that what we invest in today really impacts on tomorrow, and there are some very significant consequences of failing to take action and failing to lead.

Q14 **Rushanara Ali:** Have you done some costings on the consequence of inaction? That is what the Treasury is being criticised for in particular.

Sagarika Chatterjee: I do not have those at hand immediately. However, the Bank of England recently published its guidance for insurers on stress tests, and that was a very useful framing for thinking about these costs and the implications of not taking further action.

In terms of what needs to happen, there is still a very strong opportunity for the UK and the City of London to lead on this. There are strong commercial and trading opportunities, particularly from the green finance side. The City of London, as well as, more broadly, Edinburgh and many other areas of the UK, should be the No. 1 place for green finance and we have a very strong history in doing this. What will be important is the follow-up policies that Chris has identified, to give credibility, and the international co-operation, including through COP.

As the UK thinks about its future trading relations, for example with China, green finance is a terrific angle. It was part of this month's economic and financial dialogue between the Chancellor and his counterpart in China. Implementing green finance will be very important, building up the green brand and building up green bonds, not just for the international markets but for the UK, in a way that really thinks about regional and inclusive growth involving workers and communities as part of this transition, who are looking to the Government for their future opportunities for real jobs and real increases in wages.

Professor Robins: Companies are now conducting scenarios of climate change. One of them, Aviva, has done a serious analysis and has found that only in the scenario of 1.5°C, which is the toughest to achieve, can it see net benefits for the business going forward, whether on the insurance side or on the investment side. All others are net costs. There are real costs of inaction.

One of the priorities is translating all the analysis we have done into core economic and fiscal policies. This year's spending review would be the first real test. The investor and finance community will be looking at what we can, in a sense, call a capital-raising plan. How are you going to get this blend of public and private finance? How are individuals' savings going to come into that? We have an issue about public finance institutions. We do not know whether we will still have access to the European Investment Bank. We have the British Business Bank, which is serving SMEs, but we potentially have a major gap in infrastructure finance, and most countries' success is through a blend of public and private finance.

Building on what Sagarika said, we need to make sure this is seen to work for all the regions and countries of the UK. There is some anxiety that some of this decarbonisation could lead us to job losses and stranded communities. This can be a really good news story, but it has to be managed quite carefully.

Rushanara Ali: There are lots of ideas there for future Chancellors.

Q15 **Mr Clarke:** Mr Stark, the report estimates that the net zero target can be met at an annual resource cost of 1% to 2% of GDP. What is your confidence interval that that will indeed be accurate?

Chris Stark: I am very confident because we have been very cautious about the way we have approached this. The first thing to say is that it is a fool's errand to try to estimate what the total cost is over the period to 2050. We approached this in as sensible, level-headed, sober and cautious a way as we could. It is important to say that we have looked at the whole-economy question of reducing emissions.

Q16 **Mr Clarke:** So this is not strictly a fiscal cost.

Chris Stark: It is absolutely not a fiscal cost. The now infamous £1 trillion figure is something that we must discuss.

Mr Clarke: I intend to.

Chris Stark: I am very pleased about that.

Chair: We will come to that.

Chris Stark: We have chosen to look at the technical measures that abate carbon. We have put a cost on that and made very sensible, cautious, sober assessments about how costs of the key technologies may fall over the next 30 years. We have decided to make no sudden moves when it comes to some of the prodigious costs falls that we have seen over the last 10 years. We have not seen any of that in the future. We simply add up the costs of abatement and then set them against the direct benefits of especially not spending on fossil fuels. You then get to this annual cost, which, in each of the years to 2050, is within that figure of 1% to 2% of GDP.

It is very important to say that they are resource costs. They are not fiscal costs and, crucially, they are not economy impacts either. At the kind of scale that we are talking about, there will be an economy impact and it is possible to conceive of this, in the way that Nick Stern and others do, as a pro-growth story. That is certainly something we have seen over the last 10 to 15 years of working on this. We do not make that kind of assessment. We are simply, in every year, looking at an annual cost and then measuring that against what we assess the GDP will be.

Q17 **Mr Clarke:** It is conceivable on that basis that the cost is significantly lower rather than significantly higher than your baseline figure.

Chris Stark: My confidence in it is derived exactly from that. Because we have approached it in the way we have, it is likely that the costs will be lower than that, and especially if the steps are put in place early. That has been the lesson of not just the UK but other countries around the world: the sooner you act, and the sooner there is policy in place, the more there is a positive impact in terms of falling costs. That is what we have seen in the UK, most obviously in renewable electricity and in offshore wind, where the very existence of the policy has caused the market to respond, and an astonishing fall in the price has allowed us to now be super-confident about the future costs of electricity generation in the UK.

Q18 **Mr Clarke:** Indeed, and I see both Professor Robins and Ms Chatterjee nodding. Would it be fair to say that you share the assessment that, if anything, 1% to 2% of GDP may be at the upper end of costs?

Sagarika Chatterjee: We take as read the UK Committee on Climate Change's advice. Our view is that this is really about jobs, an inclusive economy, future global gains, the City leading and trade opportunities. To put a few numbers on that—Chris covered this a bit for the UK—today 11 million people are employed worldwide in renewables. An estimate has been made independently, by New Climate Economy, of the future economic gains to the global economy: a transition to a low-carbon economy could deliver direct economic gains of $26 trillion by 2030 compared to business as usual. IRENA, the renewable energy agency, has noted that the UK is already among the top 10 countries globally in wind employment, so it is very well positioned.

As for the City leading, financial services, as I understand it, are the biggest contributors to the UK's surplus in services trade, with 1.1 million financial services jobs in the UK, many of which, indeed, are outside London. Green finance leadership will help UK financial services really flourish. The demand is evidenced by the growth simply in our membership. As I mentioned at the start, we started with less than 1,000 investors and now have 2,000 investors. The assets under management we represent have doubled.

Q19 **Mr Clarke:** There is conceivably a real opportunity for London to become the home of green finance on a global basis as more countries sign up to net zero.

Sagarika Chatterjee: I believe so, with benefits for London and outside London as well. We have a financial services hub in Edinburgh, which is very important, as well as many support jobs outside London and the City of London directly that would really benefit from green finance.

Professor Robins: Building on that, there is therefore a real task for the Treasury to do in terms of the analysis the CCC has done, which is a very particular analysis of gross resource costs. It does not include the benefits of avoiding catastrophic climate change.

Q20 **Mr Clarke:** So it is basically static modelling.

Professor Robins: It does not include the health benefits and air pollution costs, and it does not look at these implications for growth. That is a task for the Treasury in a forward-looking way, asking, "How do we use this commitment that we have to make in the best way to drive growth, employment and wellbeing across the economy?" That is a job that would really build on Chris's analysis.

Q21 **Mr Clarke:** That goes to a key point that the costs of decarbonisation are intrinsically tangible and financial, whereas some of the benefits of a cleaner environment, cleaner air and the health benefits being an obvious example, are not so readily tangible. Therefore, modelling may take account of those as well in terms of costs saved, conceivably, to public services.

Professor Robins: In a sense, we should see this as an amazing bargain. This is an amazing bargain. We are quite used now to investing large proportions of our GDP in health and education so that we have strong wellbeing in our economy. We spend a relatively small proportion of our GDP on sustaining the natural environment and the climate, which underpins everything. In the broader sense of the investments we make in the economy, in our people, our health and the natural environment, this is a bargain.

Q22 **Mr Clarke:** You mentioned the CCS earlier and the importance of that. I obviously represent Teesside, which is an area with a lot of carbon-intensive industry. I know the CCC report explicitly points to the vital nature of investing in CCS. Can we get it on the record that there is simply no way that you can get to a credible net zero target without considerable displacement and offshoring of UK industry except by embracing CCS as a technology?

Chris Stark: That is definitely my view; you may disagree with it. It is an essential component of the net zero plan. There were conceivable ways that we could achieve the 80% target we used to have without it, but the CCS really needs to be considered now as part of the central plan to decarbonise the whole economy.

Q23 **Mr Clarke:** That is both at least cost and just intrinsically to hit the target.

Chris Stark: It is partly the cost issue. It is partly because it gives you options. The more options we have, the more confident we can be that we will achieve this. Having options and keeping those pathways open relies on investing early in CCS so that you have alternatives for the sectoral pathways that lie ahead.

Professor Robins: I have been working a little further south, in the Humber, and the key conclusion there is that CCS is essential. It forces us to think about industrial clusters and regions as a whole, rather than individual factories or facilities. The Tees, the Humber and so on have huge potential for sustaining and growing jobs, and actually onshoring and bringing back jobs in high-carbon sectors, through capturing and storing those emissions. We made a misstep in the past. A lot was going on in CCS. Now we need to drive forward on that.

Q24 **Mr Clarke:** Can we credibly leverage in private finance to that? It is often framed as a Government responsibility. The Government must lead, given the risks involved, but is there private sector interest in this?

Professor Robins: There is private sector interest. Again, we recognise that the carbon costs to bring in private capital are going to be quite high. You are probably going to need some form of Government procurement plan to procure these negative emissions. In the Humber, we have already seen Drax, a UK utility, Equinor, a Norwegian oil and gas company, and the National Grid coming together. The will is there and people see this as strategically very important. The design of these policy instruments is next and we need to stay committed to that.

Q25 **Mr Clarke:** My final question must come back to the Chancellor's £1 trillion comments, which were widely seen as a very bearish assessment. Mr Stark, can I get the CCC's official response to that, which is at variance with your report?

Chris Stark: A trillion is a big number, is it not? The more appropriate way to look at this, as we have done, is not to roll up the costs in every year from now to 2050, because by the time you reach year 31 there is a great deal of uncertainty about what is in that number. Instead, we look at the annual cost in the strategy that you are employing at that point, to get to that gross resource cost, as Nick described it. It is not sensible to roll up those costs to get to that big number. It is not sensible because it is misleading and it gives the impression that that is somehow a fiscal cost. This is not a public spending figure. Indeed, the vast majority of that cost needs to be met outside the fiscal framework and not through public spending at all.

It seems to me that approaching it in the way Nick described it, as pro-growth, is a challenge that the Treasury can embrace. We can consider that 1% to 2% of GDP in any one year as being the envelope within which you should operate. The question of how you minimise that cost and achieve the best outcome for the economy overall is what the Treasury should be focusing on. I do not like the £1 trillion figure because it is entirely hypothetical and it would be better if we focused overall on how we can have a better economy impact.

Q26 **Mr Clarke:** Is it fair to say, Ms Chatterjee, that you would hope a new Chancellor brings a new approach to the whole issue of green finance?

Sagarika Chatterjee: We would hope that all parts of Government, including Treasury, really embrace and get behind the UK Committee on Climate Change's advice and leadership, particularly in green finance. In thinking about the risks and costs relating to climate change, it would be very important to take a forward-looking perspective and think about the potential risks and costs for the UK and globally of an abrupt transition if the UK leaves this too late. What are the risks relating to the City of London and the UK's financial services sector being left behind, as we see Paris, Frankfurt and even Hong Kong stepping up on green finance? It would be very important for the future Chancellor to take that full, rounded-picture perspective.

Q27 **Mr Clarke:** Professor Robins, we have a new Chancellor coming in at the end of the month.

Chair: You are not in charge of a reshuffle, are you, Simon?

Mr Clarke: It is fair to say that that is a base-case assumption. What would be at the top of your wish-list for that new Chancellor in this specific area of the economy?

Professor Robins: There needs to be a mental reframing, recognising that this is about investment that generates both returns financially and returns economically and socially, in terms of health, jobs and so on. That is the thing: we have too long seen this as a cost. That would be very helpful. It may need some rethinking of the models and how we do this statistically, particularly how we treat debt on Government balance sheets and so on.

I would then urge a new Chancellor to be very proud and to really seize the opportunity. The UK has a great opportunity, but we have not really realised that, by not seeing this as a process of structural economic change, which it is. That is now very clear. As Chris was saying earlier, we have about 18 months to really put that in place. We should almost be looking at this on a quarter-by-quarter basis, and looking for practical measures from the Treasury, in terms of the mood music, the analytics and the spending decisions that will come through.

Q28 **Mr Clarke:** With a view to it peaking at COP 26.

Professor Robins: Exactly. These conferences are not just big international jollies where people come together, but they really drive domestic action. We saw that in Paris. They really got the finance community together. They led some really important domestic legislation. We should see this not just as a great opportunity for the UK to ensure that we do things as a global community, but as a chance to drive forward the domestic agenda.

Q29 **Colin Clark:** Can I start with a very general question? What economic opportunity does decarbonisation present to the UK, Mr Stark?

Chris Stark: It is enormous. Going back to the points about how one frames this, this is an opportunity for the UK economy. We have approached it in that sober way that I discussed earlier and looked at cost. The story in the UK over the last 10 years and, indeed, before that is that this is not a cost to the economy, but is something that drives growth. If you approach it in that way, a host of benefits come with it.

We have already mentioned some of the benefits that come from decarbonisation and it is worth just talking about that for a second. Again, we did not want to be accused of providing you with snake oil so, when we produced our report, we looked at those costs in a sober way. Even when you look at just the air quality question, and the benefits that come to the economy from having better quality of air, which you can measure in several ways—the Treasury Green Book give you lots of ways to assess it—you can already see that you can wash the benefits against the costs and get something that looks more like zero cost to the economy overall.

Q30 **Colin Clark:** To play devil's advocate, if another country did not take the same view, as China has not up until now—it does not even achieve the air quality that we do—would that give it an economic advantage? I know that is not sustainable, but how do you compare the two balance sheets?

Chris Stark: This is the key point. My point on air quality was only to say that, even looking at that narrow co-benefit of action, you get something that is positive for the economy. The key point is that all the evidence suggests we are at a tipping point or a moment of disruption. The costs of the alternatives to fossil fuels are plummeting, and that is true in China as much as it is in the UK. Some of that has been driven by what we have done in the UK and, indeed, other parts of the world. We can expect that China will follow, as will other countries around the world, because the economics will determine that.

This is the moment for us to look at what is going to happen, I think quite quickly, over the next decade and to get ahead of that. You already see that disruption happening in the energy and power sector, and in the automotive sector. You can see the glimmer of a real disruption happening there as we make the transition to battery-powered electric vehicles. That will happen in other sectors. Getting ahead of that, making this as pro-growth a story as possible and putting in place the right policies to drive that is not just about domestic self-interest; it is about that global question and the kind of global market in which we want to operate in the future.

Q31 **Colin Clark:** Professor Robins, can I come to you? Mr Stark's report says that emissions can be cut while growing the economy—the point that was just made. Following on from Simon's point about CCS, where does hydrogen—and the other example we have heard in evidence before is CO_2 rings to decarbonise industry—feature in terms of investment?

Professor Robins: What I learned from the CCC report is that, in a sense, we are going to be building quite a different economy. The hydrogen sector in particular is going to be new and relatively big. It is about not just greening the existing economy but building new sectors. We need to see the hydrogen economy as a way of using our very ample renewables resource.

Q32 **Colin Clark:** Do you see hydrogen coming from renewables as opposed to from natural gas?

Professor Robins: Ultimately, yes.

Q33 **Colin Clark:** I am just trying to put a figure on it. I will come to Ms Chatterjee in a minute. This is about people making investment decisions now and Government sending out signals that whole industries could be wiped out. That is what I am trying to get at. Natural gas would be the answer for hydrogen.

Professor Robins: With CCS.

Q34 **Colin Clark:** Yes, absolutely, hence it is connected to the question. Can you put some sort of timescale on it? What sort of work has LSE done?

Professor Robins: We have not done direct work on that.

Chris Stark: We have done a little bit on the hydrogen questions. Hydrogen is a useful thing in any number of ways. It is mainly useful because you can burn it without causing carbon emissions at the point of it being combusted or, indeed, used in the energy sector. It is also useful for fuel switching. As you say, there is a possibility at least, where you use natural gas at the moment, of switching to hydrogen.

Q35 **Colin Clark:** Equally, there has been an investment in Acorn at St Fergus, as you will be familiar with, by the Scottish Government. We could actually take something like 12% to 15% of the carbon out of the gas ring pretty quickly.

Chris Stark: You can blend hydrogen and natural gas together. There is a point when you run out of road with that strategy and you need to consider full hydrogen as an alternative.

Q36 **Colin Clark:** Full hydrogen means big infrastructure investment.

Chris Stark: Yes. The key point is the one that Nick raised. If we are to have that sort of hydrogen-based industry and heat system, it is quite likely that we will still be using quite a lot of natural gas but taking the carbon from it, storing it using carbon capture and storage, and then using that hydrogen.

Colin Clark: As opposed to using renewables and electrolysis to produce hydrogen.

Chris Stark: As an example, it is a good partner for renewables because you can consider, for example, an electricity system in the future where you have high penetration of renewable electricity generation with flexible plants that may be using hydrogen as their source.

Q37 **Colin Clark:** The natural gas ring transfers about three times as much energy as the electricity ring. We really have to fix that, do we not?

Chris Stark: It does at the moment. You have to consider a range of strategies for that. The most important thing to do is to make ourselves more energy efficient overall so that we use less of it. The heat questions are the topic. They are the most important questions. What are we going to do to supply heat in this country over the next 30 years, in a way that is compatible with net zero? That is the big question that really needs to be opened up and embraced properly by Government now.

Q38 **Colin Clark:** Can I keep going with that and turn to Ms Chatterjee? As I said to Professor Robins, industry and investors have to have clear signals. For example, *The Daily Telegraph* reported on the Oxford Capital Infrastructure EIS on Sunday, which is a £350 million fund, half of which could now be valueless because they went headlong into renewable projects that have not turned out the way they expected. Is the UK oil and gas industry incompatible with net zero? There have been siren voices in here suggesting that we should divest from fossil fuels.

Sagarika Chatterjee: In our view, it is important that investors decarbonise their portfolios, but there are a range of ways in which investors can work on this and it is up to our investor members how they choose to go about this.

In terms of the oil and gas sector, one approach investors are taking that is proving effective is stewardship: in other words, how investors engage with companies they invest in, including in the fossil fuels sector, and vote their shares. There is a specific UK example of BP where nearly 60 investors came together and co-filed a shareholder resolution at BP's annual general meeting asking for BP to disclose on how it would align with the Paris agreement. What was interesting about that was that the BP board decided to get behind the resolution and indicated to shareholders that it would be supportive of this.

Another example is Royal Dutch Shell, where investors have pressed the company to think about the Paris agreement and to be part of the transition. In that instance, Shell indicated in May of this year that it would be aligning executive remuneration with greenhouse gas emission reduction targets as well as improving its disclosure. Divestment is still an option and some of our investors take that. The Norwegian Government Pension Fund has recently excluded oil and gas companies from a risk-based approach. However, stewardship is proving a very interesting way for investors to encourage companies to be part of the transition.

Q39 **Colin Clark:** Would you accept that energy companies probably have the engineers, the skills, the technology and the capital to achieve net zero? Professor Robins mentioned Equinor a moment ago. To divest from those companies might be to cut off our nose to spite our face, because we are not going to create companies that have those skills, engineers and technology out of the blue.

Sagarika Chatterjee: It is a very valid point that these companies have many of the skills. There is, however, a question out there among our investor community. Will the present incumbents actually be the companies of the future? Will they seize that opportunity or are they going to miss the opportunity because their technology trends are going so fast in the other direction? That remains to be played out.

We are seeing some European oil and gas companies, such as Equinor—previously known as Statoil—and Shell and BP, signalling to investors that they would like to be part of this transition and taking steps in the right direction. However, much more needs to be done.

Q40 **Colin Clark:** Professor Robins, it is interesting that you brought up Equinor. It did a very good presentation recently. The world uses 4 billion tonnes of coal, which is quite staggering. To achieve net zero by 2050, the world would have to drop its coal usage to well under 1 billion tonnes. Equinor's suggestion is that that will largely be by conversion to natural gas. These companies are obviously thinking about it and they have a vested interest.

Professor Robins: Could I just build on the last point? We are looking at visions of transition within the oil and gas sector. Perhaps we need to look a little further south from Equinor to Denmark, with what used to be called DONG—Danish Oil and Natural Gas—and is now called Ørsted, which has made that transition but is selling out of its coal and gas assets and buying into offshore wind, and doing that very well here in the UK as well. That is the model. It can be done but it involves the corporate divesting of those assets. We need to look again at the strategies we have for the North Sea oil and gas sector, and the compatibility with the net zero target, and then think about the reallocation of capital, engineering skills and so on to the offshore sector.

On the coal point, that is the top priority, particularly internationally. The UK has done a pretty good job. Carbon pricing works.

Q41 **Colin Clark:** So converting to natural gas.

Professor Robins: And renewables.

Colin Clark: That is as read, because the world's energy use need will go up.

Professor Robins: Yes, but natural gas is not going to be big everywhere. It is not a solution everywhere—for example, in Russia.

Sagarika Chatterjee: Investors will make their own decisions on how they engage with companies, exclude companies or phase out thermal coal power from their portfolios. What is very important for all our investors around the world, including in the UK, is that they have clear disclosure from companies on climate risk in a forward-looking way. That is why it is very important that the Treasury be supportive of the recommendations of the Task Force on Climate-related Financial Disclosures, TCFD, which has been initiated by the Bank of England's Governor, Mark Carney, as this gives investors the kind of insight and visibility they need, particularly in forward-looking climate scenario analysis. Investors are then able to make their own decisions, engage with companies on the transition and, where they think this is important, which will be in many cases, encourage those companies to align behind net zero.

Q42 **Alison McGovern:** I want to invite the panel to give us some comment and insight on an issue that we have not picked up so far, which is the idea of a just transition as we change our economy, particularly in relation to the impact of the diverse economy that we have across the UK and what we know about different groups of people who will be affected by transition. Would each of you like to say what you take "just transition" to mean and why you think it matters?

Chair: Professor Robins, you mentioned it, so why don't you go first?

Professor Robins: This has really risen up the agenda and it was highlighted in the CCC's report. Unless we deal up front with the social implications for real people, we may not get the buy-in and we may have a stalling of the process. What does "just transition" mean? It means the implications of the transition for workers in particular, for communities as industries cluster in places, and, in this country, for consumers.

The just transition has an upside to it and potential downsides. The question is how we maximise the social opportunities from this process in terms of new jobs, good-paying jobs, decent work, community empowerment—a lot of communities want to invest in their local energy systems—while mitigating the risks, identifying which sectors and communities could be at risk, and involving those workers and communities in the process of change. With the work that we have been doing, there has been an anxiety that this transition could happen like previous transitions, particularly getting away from heavy industry, coal and steel, and a concern that there will not be this upside and that you could have stranded regions and communities.

It is on the agenda and there are many things that we need to do. We first need to anticipate what these are and map these. We estimate that one in five jobs could be affected. What we mean by that is that about 10% of jobs at the moment will have increased demand for their skills, which is good, but 10% of jobs could have reduced demand. That is going to be very high in certain sectors, such as construction, manufacturing and transport. We will have to think that through very carefully. It does not mean people are going to lose their jobs next week; it is just that the skillsets they have will need to be upgraded and so on.

It is about workers, communities and consumers, and the importance of enabling people to be part of that process of change through dialogue.

Q43 **Alison McGovern:** Which regions of the UK are most at risk?

Professor Robins: The ones we have identified are perhaps not surprising: the west and east midlands, Yorkshire and the Humber. The interesting point on Yorkshire and the Humber is that it has a very high proportion of the manufacturing jobs that have the skills that are needed. In a sense, those have the highest proportion of exposure in terms of both jobs at risk and skills that are aligned. Perhaps that is not surprising.

Q44 **Alison McGovern:** What should the Treasury do to make sure that the costs of transition do not fall on the poorest in our society?

Professor Robins: All good policy should be effective, so we should hit the goal; efficient, so at least cost; and equitable, so fair. That is the piece that we need to think through now: a very clear process for evaluating the fairness of policies for those communities and regions that may be vulnerable to this. We have to think, ahead of time, about the investments we need to increase skills and to revitalise communities through investment. We found working with PRI that there is a lot of interest from investors in this. They recognise the strategic importance. We have to make the transition fair, but a lot of investors also want to target investments that have positive social impact.

Q45 **Alison McGovern:** Why do they want to do that?

Professor Robins: It is because their ultimate savers want to do that. Investors are invested in the risk-return and the returns they are going to get. They also recognise that a growing number of investors, pension funds and so on want to see their investments build the future into which they want to retire. They want to achieve a positive impact, and this area is a particular one. There is a huge potential for local financing strategies—for example, Leeds City Council is looking at a local green bond that can be issued through a crowdfunding process—so drawing on local resources as well as the resources of the City.

Alison McGovern: Does anybody else want to make any comments?

Chris Stark: It is so important that we think about these issues of fairness. The just transition, which almost has a trademark next to it, as a term that people use more and more, is one way into that, but there is a whole range of ways in which we need to consider the fairness of the transition that lies ahead. It is of such fundamental importance that this really is the thing that I would like the Treasury to look at closely.

Yes, it is the question of regional balance and how we approach this regionally. It is a question of jobs, but, more important than that, it is a question of how competitive the UK economy is overall. How are we viewing the question of industry and what we have in the future in the UK? For me, this is one of the fundamental questions for avoiding regressive impacts. All of that sits quite nicely underneath the just transition banner, and all of it requires the Treasury to engage its strategic economic brain.

Crucially, the point of all this is that there is nothing to be afraid of in this. This is a transition that needs to happen globally. It is not just here in the UK. We have to get to net zero throughout the world or we will keep warming the planet. We can predict with some certainty that this will be addressed, so let us get ahead of it and consider those fairness questions now so we get the right kind of transition overall. We know that we have seen in the past these kinds of transitions happen, albeit not at this scale, in the wrong way. This is something we can predict with confidence that we should be planning for properly.

Q46 **Alison McGovern:** Despite your description of the Treasury's strategic economic brain, which maybe it does still have, what makes you think that the Treasury has the capacity to understand the potential injustice of what is described as stranded regions that might come about? What makes you think that the Treasury has a brilliant strategic regional economic brain?

Chris Stark: It is a really good challenge. I suppose I know that there are some really excellent and wonderful people in the Treasury. Perhaps they have not been asked the right question, I would say. The key thing is that we have just set this target, so there is now a need for the Treasury to view it as a whole-economy transition that is going to happen. In that respect, what is classically called distributional impact is something the Treasury is very good at. I accept that the question of regional impact is something it has not always been so good at, so we can now highlight that as a theme for the review that we have recommended the Treasury undertakes and that Government have accepted it will do.

We recommend in our report on net zero that the Treasury should review how costs of the transition are allocated. That is a very economics-based way into this, which is really a way of saying the Treasury needs to look at how this will work. They have accepted that. If that review is done well and in a thorough way, regional impact questions, employment impact questions, as well as questions of cost to the consumer and competitiveness, can be all wrapped into that in a really effective way.

It is not about the Treasury spelling out in detail the plan over the next 31 years. It is about them accepting that they have tools at their disposal, especially some of the fiscal levers through the tax system for example, and their willingness to put in place the right policies to drive the transition using private investment. All of that has an angle on fairness that, if the Treasury uses it properly, will be very important in its role.

Sagarika Chatterjee: In terms of the investor support that Nick mentioned for thinking about the social dimensions of a transition and just transition, I mentioned that last week 300 investors with $34 trillion of assets under management wrote a letter to the G20 that specifically include just transition, so global investors around the world are signalling to Governments that they are very keen that this just transition and social dimensions are considered.

We are aware of other jurisdictions where just transition commissions are underway or have taken place, including Canada and Germany. We are expecting to see more of those. As an example of what we are doing for investor capacity-building, we have an investor working group on just transition. We have a partnership with the International Trade Union Confederation. We believe that there are experts out there that Treasury would be able to draw on.

Q47 **Charlie Elphicke:** Morning. Let me turn to green finance. This morning, the Department for Business launched a green finance strategy document, so I do not know if anyone has had a chance to review it in detail, and it includes a £5 million fund for the private sector to pilot innovative products. Do you think this is a game changer?

Professor Robins: I am not sure the £5 million is going to be a game changer, but it is a very good signal. This builds on Chris's point. It is focused particularly on mortgages and housing, which is the big area we have not really been making progress on, and that will engage the banking sector. Essentially, we have to make sure every mortgage from now on thinks very clearly about the energy efficiency and carbon performance of homes, not least so that consumers can make their homes cheaper, cosier and part of the transition. We have not done very well on this.

This is partly going to be a data issue. Banks when they make mortgages do not link that with the energy performance of homes. There is the energy performance certificate. They do not link that with energy efficiency. That could be part of the advice process, to speak with consumers, if we had that data, about how investment could enable people to reduce their long-term costs.

This fund of £5 million is a great signal. It is a small amount but a great signal to really get that process going, because that is going to be one of the large pools of capital investment by people. I would say it is something that has not really been engaged yet. We are working with a couple of UK banks to start doing this data matching, to have their loan books and then start looking at these energy performance certificates and so on, but this fund could help get the market dynamics going and really make it relevant for consumers.

Q48 **Charlie Elphicke:** I go and get a mortgage, and under this I get a lecture about the importance of energy efficiency in my house. I tick the box and move on. Is another way to do it to make the market incentives for individual consumers such that they will want to switch to green energy and to make their house more efficient? Would that not be a better strategy, rather than the statist tick-box-type strategy that is being outlined in this idea?

Professor Robins: Incentives are great. We need incentives. One of the incentives for consumers is the price of energy. We do not charge the carbon cost in the price of energy, for understandable political reasons. This is a very sensitive issue on gas. We have some price vis-à-vis electricity. That will be a clear incentive.

Our assessment is that, across the board, you could raise about £20 billion from carbon pricing, and this is one of the areas where that could be reinvested. You will need to have prices working to make the market work, but also people really need help. One of the things with energy efficiency is that we know it is already cheaper to lag our lofts and all the rest of it, but it is a very hard process. Finding the business models and entrepreneurs that can make this process easy for people, and probably doing that at City scale, is very important.

Q49 **Charlie Elphicke:** I can see you are a big fan of price mechanisms and higher taxes, but let us say we were going to go for competition, proconsumer, reducing the prices and the impact on consumers, because not everyone lives in London. My constituents in Dover do not have a lot of money and that is true of many parts of the country. Outside London, there is a big country where a lot of people do not have a lot of money, so the idea of people who live in London increasing taxes on people does not go down very well. What about the possibility of making more competition? Let us take solar. Rather than having tariffs on solar panels, would it not be better to have low tariffs on solar panels and make them as cheap as possible, so people could adopt them as quickly as possible?

Chris Stark: It is hard to argue with the logic of that. You need a mixture of things. You do need carrots, so the incentives that Nick talked about, and you do need sticks. It is important to give clear signals to markets and consumers about those things that pollute and cause climate change.

The other thing that is often forgotten is that you need carrots and sticks, but you also need tambourines. You need something that demonstrates why we are doing this and why people should feel motivated to be part of it. If I may, that is what has in the past been absent from Government policies towards some of the difficult things that Nick talked about.

Energy efficiency is a really tough question in the home. We know it makes sense on a rational investment basis and yet people do not do it. If we provide rich incentives for people to do it, they still do not want to do it, so there is a question of what you do to motivate people to act on those things. At the end of it, in the majority, people who choose to make their homes more energy efficient are net beneficiaries of that decision. Therefore, it is a big and tough question for policy about how you motivate that properly, and this is my tambourine point.

Q50 **Charlie Elphicke:** This is really important and it is a conversation we need to have, because part of the problem of making the case for action to protect the environment and climate change is that many of the advocates want to increase taxes and increase the burden on people, and, therefore, people reject it. They think, "I cannot afford this". Instead, you could simply do what we used to do with the whole home insulation scheme, which worked very successfully until a bit over five years ago, when the whole thing was changed and completely messed up.

We could have a campaign for everyone to change their light bulbs from halogen to LED, which massively reduces the energy consumption. That sort of advocacy—"It is in your interest; it will cost you less"—we are not doing. Should we not be doing more of that to make the positive case for going green, going environmentally friendly, and it costs you less?

Chris Stark: Yes.

Sagarika Chatterjee: Completely, yes.

Q51 **Charlie Elphicke:** How about we have some popular greenery rather than just saying, "Let us tax people until the pips squeak"?

Professor Robins: I hope I did not give the impression I was talking about higher taxes. I was talking about switching taxes. Certainly, in this century, we should not be having taxes on labour and workers, and we should be maybe taxing those things we do not want, such as carbon. Our estimates suggest you could have about £300 per person, which then could be given back to people as a dividend. It lands on your doormat and you say, "That is fantastic. How am I going to spend it?" You could reduce other forms of taxes, on enterprise, national insurance or whatever. It is not higher taxes; it is going to be a switch in taxes.

The main thing is that, other than Warm Front, which worked relatively well, none of the schemes so far has really thought of this from the consumer and community point of view. How is this going to be easy, particularly given that most buildings we are going to have in 2050 are already built? The turnover cycle of mortgages is not always very frequent. We will have to go into people's homes when they are living in them, and that is a very disruptive process. We will have to think about a very smart business model, so that people want to invest in this, just as people may want to invest in a new kitchen.

Q52 **Charlie Elphicke:** I would submit that, rather than calling them into interview to patronise them, making it worth their while and making it pay is better. As soon as you say to people, "We are going to take half a loaf from you and give you half a loaf back", which is the history of so much of environmental taxes, people switch off and you lose public support. You will gain more environmental success if you make it populist and make it pay, which brings me to electric cars. I want to buy an electric car, but I dare not buy an electric car because there are no electric charge points and the Treasury has done nothing to invest in those charge points. The Treasury, frankly, is a disgrace. Do we need to do those charge points by public infrastructure finance or can it be done by green finance?

Sagarika Chatterjee: I believe there are many opportunities in green finance. Investors would look for the policies, as we mentioned, which you are rightly saying need to be scaled up, along with the public acceptability to consumers, the opportunities and the revenue growth side all being much easier. There are some good lessons from other jurisdictions. The UK Committee on Climate Change's report mentions that, in the Netherlands, for example, green mortgages have really worked, where you can borrow £25,000 and use it for energy efficient retrofitting.

The same thing goes for electric vehicles. Many of those are produced in the UK, but on the consumer side I am sure much more could be done, including on the charging points and infrastructure, to make, as you say, all of this easy. A simple way of putting it is that it needs to be a no-brainer.

Q53 **Charlie Elphicke:** The simple fact is this. If I can charge up for 3p a mile, I am going to go for it, because that is what the cost is. There will be a gap before the Treasury works out that it is losing finance from tax revenues to do road user charging, so as a consumer I am going to clean up with an electric car, but I cannot charge up the car, so I am not going to adopt it. The real challenge is to make sure we have the infrastructure to make it popular, so that we have that electric revolution. I pose this question to you as experts: is it not the case that, in reality, you get a phased shift in emissions if you get everyone into electric cars, because they just dump the internal combustion engine in a trice?

Chris Stark: Electric vehicles are probably the most interesting thing to look at right now.

Charlie Elphicke: Or hydrogen.

Chris Stark: Hydrogen is different, because it is not quite at the same point of maximum disruption, which is really what we are looking at now. The assessment that we have done very recently looking at the costs of the transition in the whole economy to electric vehicles shows that we probably have a single-digit number of years left where those cars are on a whole-system basis more expensive than fossil fuels, and then we very rapidly switch.

Regardless of your view on climate change, the economics of that will drive a transition, and this is exactly what you see happening now in the automotive sector. There is now this awakening, this view and increasingly this understanding that these cars are more efficient and, on a whole-system basis, including the cost of the infrastructure to charge them, are cheaper than internal combustion engine vehicles.

We have an issue of perception, which is the one you have correctly raised. People talk about range anxiety. People do not have range anxiety so much as charging anxiety. I agree with you that the Treasury and the Department for Transport should address that. I have to say that it would not take very much to get rid of that anxiety. We all could be charging our cars mostly at home. Even those who live, as I do, in a flat have the opportunity to charge on the street if we have an enlightened view from local authorities up and down the land.

Over the next 10 years, this transition is going to happen, and it may happen very quickly indeed, so that draws in the Treasury again to the question of what we do about dwindling taxes from taxing fuel. This overall question is a classic case of the Treasury and Government needing to get ahead of something that is going to happen very quickly and put in place the right policies to make it happen in an effective manner.

Chair: We are going to move on.

Charlie Elphicke: I have one last question.

Chair: We do need to move on, because, Professor Robins, I know you have to go at 11 o'clock. If you do need to go, do slide out.

Q54 **Wes Streeting:** That was an interesting range of questions on charging infrastructure. The Government announced in Budget 2017 that they would establish a charging infrastructure investment fund and appointed Zouk Capital to oversee it, but the last I could find from the Treasury was that it would launch the fund in spring 2019. I know the Treasury does not always see seasons in the same way as the rest of us, but perhaps we could just send a note to the Treasury to ask them where that is.

I just want to delve a little more deeply into the issue of the risk of climate change to financial services firms, to the industry, to assets and to investors. Ms Chatterjee, starting with you, how are financial services firms vulnerable to climate-related risk?

Sagarika Chatterjee: The first point is that all financial services firms are vulnerable to climate risk and there are two types of risk, really. There are physical climate risks, such as flooding, et cetera, and transition-related risks from the process of adjusting to a low-carbon economy, such as we were just talking about with the rapid technology changes happening in electric vehicles.

Then, if I turn to the different types of financial services, for the banking sector it would be important that it had the capital to withstand a potential climate shock and climate risks. For insurers, they face really significant losses from the physical climate impacts, including the most recent example of the Californian utility PG&E, which had some really significant liabilities and faces over 600 lawsuits. There are insurance implications of these kinds of things as well, such as the wildfires in California.

From the investor side, the risks are really in the portfolios from investing across the economy, but particularly the fossil fuels sector. The reason why this is important is that the pension funds have very long time horizons. I was with one of the Swedish public pension funds, AP4, last week, which said, "We have a 40-year time horizon for our pension fund beneficiaries. In our investments, we have a 10-year time horizon. Therefore, this is very material. This is going to play out for our beneficiaries and members while we are looking after their money". I heard a very good phrase, which I mentioned before. The Swedish Deputy Finance Minister, Per Bolund, said, "We either have sustainable finance or we have no finance".

Q55 **Wes Streeting:** Indeed. Before I bring in other members of the panel, you set out beautifully there the range of risks that lead to the following questions, but, in terms of how investors are currently assessing climate risk, how well equipped are they and what tools do they need in order to assess the risk?

Sagarika Chatterjee: I can speak to global investors and then turn to the UK, if that is helpful. Global investors are stepping up in how they manage climate risk, and the key thing is that they are stepping up in forward-looking climate risk assessment. As a specific example, we have worked with an organisation called 2° Investing Initiative on a climate scenario analysis tool that lets an investor to look for free, because we are not commercial, at its portfolio against two, three, four degrees and other scenarios. We have had over 600 investors using that tool as they try to assess forward-looking climate risk that may be relevant for their portfolios.

However, it is very challenging for investors today. The tools are emerging; the methodologies are emerging, but they cannot get the right information from the companies. Companies are increasingly disclosing in a forward-looking way, but this is really essential; otherwise investors cannot aggregate up the risk in any way and take a view on what they should do about the risk and the options open to them to decarbonise their portfolios.

Q56 **Wes Streeting:** Picking up on a couple of issues that arise from what we have just heard, in terms of how extreme weather events are already affecting financial services or asset values, and how climate risk could affect the pensions or investments of our constituents, what other issues or areas ought we to be aware of? Perhaps we could begin with you, Nick, because you may need to leave.

Professor Robins: We are already seeing extreme weather events having impacts, and we can now track on an asset-by-asset, location-by-location basis, so the data is there. As Sagarika said, the problem is that investors do not have all the data they need. There are frameworks. There is the TCFD.

One thing that was interesting in today's green finance strategy was an expectation from the Government and Governor Carney of the Bank of England that all listed companies and all large asset owners, so all the large pension funds that many of your constituents will be in, should be reporting according to this framework by 2022, so quite soon. That then gives you a sense of reciprocity of disclosure. The companies are disclosing, but also the pension funds are disclosing. That then means that the companies do not see this as a routine tick-box disclosure. They know that it is on both sides, including the asset owners, the people whose money they are managing.

One step that probably needs to be taken when you have that is to bring that information to individual savers and beneficiaries of pension funds, because there is this very complicated disclosure and assessment process, but the transition, in terms of what it means for individual people who are in pension funds, as everybody now is, has not yet been made.

Chris Stark: I do not have much to add to that. Nick is very much the expert here. I will make the same point about the importance of mandatory disclosure. I have not read the strategy that was released today in detail, but I have seen that it has within it this pathway to mandatory disclosure by 2022. That is an enormously important step forward in realising a better understanding of the risks that we face here.

A really important point is that net zero is great, we should do it and the world will need to do it, but it does not stop the changing climate and that is a global concern. The risks here, especially risks to asset values, are very real indeed and it is quite right that central banks around the world have woken up to that. That is really a failure to look only at the right time horizon. The changing climate is something that we will be dealing with for a long time and is something, therefore, that investors should be considering as well. Mandatory disclosure of those risks is a very important step into that more effective capital market.

Q57 **Wes Streeting:** I have a final question across the panel. It is often assumed that markets are always rational and that all information is priced in. In this area in particular, are markets really pricing in climate change risk?

Sagarika Chatterjee: No, they are not.

Chris Stark: No.

Chair: That is clear.

Wes Streeting: That was a simple, short, sweet and consistent answer. Thank you very much.

Chair: Professor Robins, did you have anything to add on that note?

Professor Robins: Definitely not.

Chair: Right, lots of agreement. Excellent, thank you very much.

Q58 **Alison Thewliss:** Professor Robins, can you tell us a bit more about the role of private institutions in financing the low-carbon economy? You hinted earlier at the success of other countries through a blend of public and private finance.

Professor Robins: Yes, that is right. Private capital is what is going to be needed in pension funds, banks and so on, but often we need public capital to work alongside. We have seen the role of the European Investment Bank and, in Germany, the role of KfW, which, to deal with the point Mr Elphicke made earlier, provides low-cost capital to retrofit people’s homes. That is one of the challenges we have here in the UK. We have great strengths in terms of green finance in the City and the private sector.

There are two areas I would suggest we might want to focus on. First, what public finance institutions are going to work alongside the private capital? As I said earlier, we have the British Business Bank for SMEs. It would be useful to think about what it can do for net zero. There could be a gap if we do not have access to the European Investment Bank. Do we need a national infrastructure bank? One of the tools that many countries have, such as Sweden, the US and so on, is a municipal bond market and local raising of capital. We do not have that in the UK and it would be good to focus on that. That will have to be co-created by Government and the private sector.

Q59 **Alison Thewliss:** I visited KfW as part of my work on the Communities and Local Government Select Committee some time ago. I was impressed by how its intervention in how it loans and how it encourages people to invest in energy efficiency measures in their property had changed that market. Do you think Britain needs something similar in order to move things over?

Professor Robins: I do. Again, the model that is useful is to think about the various steps. KfW is not a retail provider, so it works through the commercial banks that you and I would use, but it can provide lower cost of capital. It can use the public balance sheet for that, so that makes it easier. Also, KfW is a large issuer of green bonds, so that can go into the portfolios of pension funds and so on. Perhaps one of the things that the UK should be considering is a green sovereign bond. The Treasury should think about how it can issue a green sovereign bond that would link the financing that is going to be needed for a just transition to people's pension portfolios. France and Chile have done that, and it is one of the areas where the UK can take a lead.

Alison Thewliss: I am happy to let you go at that, if you want.

Chair: Thank you very much for your evidence this morning. It is much appreciated.

Q60 **Alison Thewliss:** I wanted to ask the other members of the panel what the balance should be between private and public funds in financing decarbonisation.

Sagarika Chatterjee: I do not currently have a view on that. It would depend on how much finance is estimated to be needed overall for the transition, and an estimate view of what could come from institutional investors. I believe the EU has already done this, and that exercise in itself has really helped the EU in thinking through, "Then what do we need to scale up institutional investment?" That in itself has resulted in the production of a taxonomy on sustainable finance, which is a dictionary of what is green and what is sustainable. That is one of the first starting points. From that, the additional steps will need to be how to get more of the projects and how to get the finance flowing in the right direction.

Chris Stark: It is not possible to say what the right mix is, because this is where the politics lie. This is where the question lies. What is the appropriate mix between public and private? I can say with some confidence that the majority of it will be private. Occasionally, you hear the discussion of climate change and decarbonisation as being one about how much public spending you put into it and, indeed, you can have a very publicly driven transition. Even in that circumstance, the more important policies are those that get the private finance to flow.

That is what we have seen, for example, in the power sector. In the last five to six years, we have had really good policies that have driven investment and have driven costs down. Again, I will go back to my friends in the Treasury. It is the willingness of the Treasury to have those kinds of policies in place that matters more than their willingness to put public spending in. Thinking about this in the round is really important. It is not just about public spending overall.

We know a great deal about what needs to happen in each of the sectors to get to net zero. What we do not know is how we will do that, and it is quite appropriate that the politics comes in at that point. Let us just deal with Whitehall, because it is simpler. I would love to see each of the Departments of Whitehall properly take responsibility for that strategy and ask itself a question: "How can we do this so that it benefits the economy in the best way and it follows that it benefits the consumer in the best way?" We know how to do this kind of stuff. It just requires us to think in that way about it.

Nick talked about a change in mindset. That idea of reframing this as a mission that we know we have to achieve, and we have to do that in the best way possible, could drive the transition in a more rapid way.

Sagarika Chatterjee: To follow up on this question of how much is needed from the private sector and how much is possible, China introduced its green finance policy framework in 2016 when it was hosting the G20. It was a big moment for China, and President Xi himself was very behind the green finance concept. They since went on from zero to hero in the green bonds space. One of the key points is that they estimated then and put the number out there, which was a helpful signal, even if the number was not totally perfect, that 85% of the finance would need to come from foreign institutional investors. Again, it is the sense of an exercise having happened to work out where the financing is going to come from.

There are opportunities in the UK. I believe there is an infrastructure consultation underway right now that could give some interesting insights into how much institutional investor capital is ready and available for green infrastructure, as an example.

Q61 **Alison Thewliss:** Can I ask about the framework and capacity of the private sector? Hinkley Point C was constructed using private financing. That has been quite challenging, to say the least. Could lessons be learned from that project as to how to do that better?

Chris Stark: Hinkley Point is an interesting one. My belief overall is that there is perfectly available capital to do all this. Indeed, the kind of transition we are talking about, although it is very capital intensive, is well within the investment levels we have at the moment across the UK economy and the global economy, so there is not a problem with availability of capital. If the right conditions are in place, that capital will be cheap, and that is where the Hinkley Point lessons come in.

There are a set of risks attached to building a nuclear power station that are hard for private investors to manage. The policies that were put around that to drive that investment—let us be clear—have worked, because the project is happening now, but there is probably not much you can draw from that particular project that you can replicate in other areas. I would say, though, if the Government were willing to put in place the kind of long-term policies that have driven that investment in other sectors, you would very quickly see private finance flow to some competing and alternative priorities for decarbonisation overall.

What has worked well in Hinkley Point is that the Government have been willing to put in place a contract for a very long time. There are other sectors where those kinds of conditions would drive investment in the right way. We have talked about some of them already today. If there is any lesson from Hinkley Point, it is less about how one builds a nuclear power station and more about the willingness of the Government to stand behind those plans, sector by sector, for a long time. If that happens, we can be very confident that net zero will be even cheaper than we are assessing it.

Sagarika Chatterjee: The suitability of the investment opportunities is a really key point. Dialogue with institutional investors themselves, whether our members or others, about how they are looking at this more technically across different asset classes and what they hear from their clients, the big pension funds around the world as well as in the UK, could bring some useful insights.

Q62 **Alison Thewliss:** I wanted to touch briefly on the Green Investment Bank and what impact the privatisation of the Green Investment Bank has had on the availability of funding for the UK low-carbon sector.

Sagarika Chatterjee: It is a shame that Nick has gone, as this is really his specialism area. I am afraid I do not have those facts available to me, but I would be very happy to go back and get as good a view as I could from our investor members on this. Our own sense, putting aside the privatisation question, is that things like the Green Investment Bank are really important in catalysing more investment. When I take a global perspective, it has been interesting that, inspired by the Green Investment Bank, there is now something called the Sustainable Banking Network, which is over 20 banks around the world that have come together to follow and learn from the model of the Green Investment Bank. The Green Investment Bank has been a part of this, in thinking about how they can have a catalytic role to attract more capital from the private sector.

Chris Stark: I do not have much to add. It is hard for us in the committee to make a deep assessment of what impact the privatisation of the GIB has had. I would say from previous roles in which I have worked with the Green Investment Bank, when I have been in more policy-setting roles in Government, their involvement at an early stage in some of the sectoral transitions where major finance is not so interested is something we probably miss. For example, we did a lot of work while I was in the Scottish Government looking at energy efficiency, which the GIB was happy to support, even though that was unlikely to become a major category investment for it. I would like to see some role for an institution looking at the more nascent finance challenges and I feel, although it is only anecdotal, that some of that is now missing.

Sagarika Chatterjee: The Green Investment Bank in its current form, from what we see, remains very engaged on these issues. It is often involved in green finance dialogues. It would be useful to get its insights.

Q63 **Catherine McKinnell:** I wanted to ask you about the European Investment Bank and to what extent you consider the UK's green economy to be reliant on it. Clearly, we have seen a significant reduction in European Investment Bank funding since 2016. Have we seen effects from that?

Chris Stark: It is not my specialism.

Catherine McKinnell: Is this Nick's specialism again?

Chris Stark: This is definitely something Nick would have been able to comment on.

Sagarika Chatterjee: The only thing I would say is that it would be very important to have in place the arrangements for future funding and some kind of arrangement in place in the post-Brexit world that the UK will have.

Catherine McKinnell: I have all sorts of questions, but clearly it is Nick's speciality, so we may have to come back to this or maybe get some written responses from Nick. I could keep probing you, but that might not be fair.

Q64 **Chair:** The final question we had is perhaps for Mr Stark primarily. Has the UK's net zero legislation placed us as a global leader on environmental issues? Ms Chatterjee, you offer a view from international investors as well. Where are we compared with the rest of the world?

Chris Stark: Absolutely, and the evidence is there for that now almost immediately. In the report we published, which was only published on 2 May, we said it is very likely that, if the UK sets this target, other major rich, developed economies will follow, and France has just done so. With a few notable exceptions, most of the participants in the G20 summit very recently were willing to set a carbon neutrality pledge. The fact that the UK has done so and was the first of the major economies to do so has made that a heck of a lot easier.

We are a global leader on this again, but I will go back to the point I made earlier in my evidence that it is not just about setting a target. Setting targets does not magically reduce emissions. The effort that then is employed, particularly through Government policymaking, over the next couple of years to achieve that target is the real demonstration of leadership. If we are to host the COP next year, which I very much hope we do, because all of the UK's diplomatic might will bring about a good resolution there, our credibility in presidency rests on not just the net zero target, but the policies to achieve it. For the moment we should bask in the sunshine, but there is now a need to act in the form of the filthy business of domestic policymaking to achieve that target.

Q65 **Chair:** Ms Chatterjee, what about from the perspective of international investors? How do they view the UK in this area?

Sagarika Chatterjee: The UK is absolutely seen as leading on net zero and that is fantastic. We have seen California commit to going carbon neutral and there are some other countries too. California is the seventh largest economy in the world, albeit the federal Government is not particularly behind net zero, as you will know. The particular area to push on now from our perspective, in terms of leadership and the signs of leadership, would be green finance, taking that forwards, really having Treasury at the forefront of this, having the financial services regulatory regime really behind net zero, embedding this and working with investors, who are very willing to consider how they can be a part of this scale-up in the finance that is needed.

Q66 **Charlie Elphicke:** This is what I was trying to get earlier, which we are now touching on. It is all very well to have targets and other forms of virtue signalling that politicians like to do, but they do not do the job. One thing I worry about is the Treasury's Green Book. Should we rewrite the Treasury's Green Book so that it includes the dynamic effects, the wider positives and, indeed, the wider financial positives that come out of embracing so much of this agenda? Do you have any ideas as to how that can be done: the dynamic effects and that side of things?

Sagarika Chatterjee: As I mentioned before, when I look at Treasury's priorities and objectives, this is very aligned, and that is the mindset shift that is needed. This is completely within scope and the UK will be leaving money on the table if it does not get behind this agenda and make the most of it. Things are moving very fast in other jurisdictions, so it is a moment that is very important.

Finally, in the words of the former CEO of AXA, Henri de Castries, we cannot insure a 4 degrees world. That is the reality and that is why Treasury absolutely must now get behind net zero and decarbonisation.

Chris Stark: I will add to that by endorsing that message, but also saying that, in the work we did on net zero, we put together three expert groups, one of which looked at the question of costs and benefits. They had a very interesting take on this question of dynamic policy and its impact. It is the existence of policy to decarbonise, and I would include within that the target, that makes the market respond. It is the market response that drives down the cost. That dynamic impact is hard to measure.

I have some sympathy with the Treasury bods who are responsible for the Green Book. It is a difficult thing to look at this. The dynamic impact does not always happen. You do not always get the right cost impact, but in the right conditions you do and, more importantly, if we do not have that signal that the net zero target now provides, you do not immediately get to the point where people start to pay attention.

The combination of the target, the policy and the market response is what drives the pro-growth story that we have been talking about today. It is what will drive the costs to be even lower than we have just assessed them to be if we are successful in it. There probably is some space for the Treasury to be more creative in the way it views that in the Green Book, but the Green Book is naturally a conservative document and should continue to be so.

Chair: Thank you both very much indeed, and in his absence Professor Robins, for your evidence this morning. We are very grateful to you for this. It was a very helpful first session. Thank you.