HOUSE OF COMMONS

Environmental Audit Committee

Oral evidence: Technological innovations and climate change: green steel, HC 1093

Wednesday 27 April 2022

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Watch the meeting

Members present: Philip Dunne (Chair); Barry Gardiner; Sir Robert Goodwill; Helen Hayes; Ian Levy; Clive Lewis; Caroline Lucas; Dr Matthew Offord; Valerie Vaz.

Questions 47 - 110

Witnesses

I: Lee Adcock, Environment and Sustainability Director, British Steel; Antonia Grey, Head of Policy and Public Affairs, British Metals Recycling Association; and Ana Musat, Head of Policy, Aldersgate Group.

Written evidence from witnesses:

British Steel

British Metals Recycling Association

Aldersgate Group

Examination of Witnesses

Witnesses: Lee Adcock, Antonia Grey and Ana Musat.

Q47 **Chair:** Good afternoon and welcome to the Environmental Audit Committee for our second oral evidence session on the subject of green steel, as part of our technological innovations and climate change framework inquiry. I am very pleased today that we have three representatives from the industry and from observers of the industry. We advertised the presence of someone from the GFG Alliance, but as a result of issues elsewhere they have decided not to participate today, which we respect. We are, however, joined by Ana Musat from the Aldersgate Group. Ana, could you just explain what your role is at Aldersgate?

Ana Musat: Thank you. I am the head of policy at Aldersgate Group. We are an alliance of businesses and civil society organisations, working with our members to develop policy solutions for the transition to net zero. We have been working quite a lot with the steel industry and the steel supply chains over the past couple of years to understand some of the policies and market mechanisms that can be developed to accelerate the transition for the industry.

Chair: Welcome to Antonia Grey from the British Metals Recycling Association. Could you just explain the association's role?

Antonia Grey: Good afternoon. The British Metals Recycling Association is a trade body that represents metal recyclers in the UK. We are the suppliers to the end users, such as British Steel.

Chair: Thank you, and from British Steel we have Lee Adcock. Lee, could you just explain your role within the company?

Lee Adcock: I am the environment sustainability director for British Steel. British Steel, of course, is a UK steelmaker based in Scunthorpe, but it also has hot rolling in Teesside and Skinningrove in the north-east as well.

Q48 **Chair:** Within the British steel industry, where do you rank at present and what is the scale of your operations compared with the industry as a whole?

Lee Adcock: We are probably the second largest steelmaker in the UK behind Port Talbot's Tata Steel site. We are producing up to 3 million tonnes of liquid steel a year.

Q49 **Chair:** Serving which markets primarily?

Lee Adcock: Primarily construction steel, rail, special profiles and wire rod.

Q50 **Chair:** I have a few questions and then we will pass questions around the Committee. We are interested in decarbonising the steel manufacturing

process, and it would be very helpful—if we could start with Lee—if you could give a sense of British Steel's view of the feasibility of decarbonising your production and how ready you are to embrace new technologies.

Lee Adcock: In October last year we launched our low-carbon road map. We have committed to a future that is split between electric arc furnace steelmaking, electrifying a good portion of our current production route, and then using carbon capture and storage on what would be a remaining blast furnace to keep some ore-based steelmaking going forward, and also using hydrogen and relying on grid decarbonisation to help along that journey.

Q51 **Chair:** How long is it going to take to be able to achieve that?

Lee Adcock: The low-carbon road map runs from now until 2035, and we think we can make significant reductions in line with the UK commitments for a 78% reduction and in line with the Sixth Carbon Budget over that time period. We would see electrification, a new electric arc furnace in the 2020s and then adoption of CCS at the end of this decade, 2030, 2031.

Q52 **Chair:** Antonia, is the recycling side of the trade working to a similar timeframe?

Antonia Grey: Absolutely. We recently lost our entitlement to use red diesel, which has heightened the need to look for electrification and decarbonisation, so we are fully ahead looking at that for plant equipment and getting electrification to site grids, which historically have been off-grid.

Q53 **Chair:** Ana, as an external observer advising the industry, do you see specific facilitators of this or particular obstacles? Are there any research programmes that you are involved in to help achieve this?

Ana Musat: In terms of the investment, there is obviously a lot that is happening on the side of the steel industry. We also work with companies like National Grid, for example, and Johnson Matthey, which are involved in what is happening in the industrial clusters. Again, there is a very clear appetite from them to invest and make the timeframes that Lee highlighted work. There is a lot of investment going into low-carbon hydrogen production, hydrogen infrastructure, carbon capture and storage. I think the business appetite is very clear.

We also need to make sure that the policy framework is in place and lowers the cost of investment over time. Issues like industrial electricity prices and operational costs, which I am sure we are going to touch on later, would be some of the main pinch points for industry.

Q54 **Chair:** Is there funding available from central Government? There is the clean steel fund that we will come on to in a minute. Do you think that is adequate to stimulate the initial investment from the corporate side?

Ana Musat: Yes. It is obviously very welcome to see the clean steel fund and some support with upfront capital investment. If we compare it with what some other countries are investing, it is comparatively smaller. Just one example, the Canadian Government are investing around £490 million for just a couple of steel projects. As you can imagine, it is a fairly different picture and we need to take into account that the steel sector is highly trade exposed and very competitive, so we need to take into account what is happening in other countries.

There is also a slight drawback to the fact that this clean steel fund is only going to start allocating money from 2023, whereas I think a lot of companies like British Steel and others are ready to start making those investments much sooner.

Q55 **Chair:** I am interested in the international comparisons and how far ahead or behind we are. You mentioned that almost double the amount of money is coming in Canada. Do you know what proportion of Canadian consumption is domestically produced compared with the UK?

Ana Musat: I am not sure.

Q56 **Chair:** Anybody else have a feel for international comparisons? It does not have to be Canada, there may be some other comparators of funds coming from government and how significant the industry is to those domestic economies.

Lee Adcock: I am not sure on the second part of question, but like Ana said, there is significant investment. I have the list here: £1.4 billion from the French Government for electric arc furnace manufacture; £420 million on the Canadian example; another £230 million is another Canadian example. Those are very significant and they are all large steel-producing countries. France is a major steel producer, and there are similar levels in Spain and Sweden as well. Wherever you look across Europe and North America, there is significant investment from government to support decarbonisation in significant steel sectors in those countries.

Ana Musat: In some of the examples from other countries, the investment from government does not necessarily have to go into supporting that capital expenditure. If you look at what is happening across the EU, for example, there is a range of demonstrated projects to test some of these technologies like using hydrogen, DRI for steelmaking and there are a range of projects going on in Germany.

I also mentioned the issue of industrial electricity costs. I think other Governments have been a bit quicker to insulate some of their industries from the volatility associated with fossil fuel markets, even before the gas crisis started biting. We need to look at all those things in isolation and together when we think about support for the steel industry.

Q57 **Chair:** Just going back to research for a moment, we are regularly told in this Committee that the UK has a technological lead at an academic level in many of the technologies that we are looking at, but does not

necessarily deploy as rapidly as other countries. Do you sense that we are currently ahead of the game in terms of developing the technology at a university or research council level and that that is at risk if we do not get both industry and a supportive environment from the Government going?

Ana Musat: From some of the engagement we have done with businesses over the past couple of years, there is a sense that, in terms of the research and the academic capabilities, we are indeed very well placed. I think there is always a challenge when it comes to translating the research into wide-scale deployment. There are a range of different things that need to happen to accelerate that.

I also think that, in a lot of the funding that goes into these feasibility studies for universities, there is perhaps a case to be made for ensuring that those universities are slightly better plugged into what is happening on the ground and are able to allocate that money to industry and the associated supply chains much quicker.

Q58 **Chair:** I have one final question for Antonia. You touched on red diesel no longer being available and therefore rising energy costs from that kind of energy use. Are you able to give us any examples of how the industry is responding to that? It would seem to me as a layman not involved in the industry that the scale of industrial capacity required to manufacture steel means that these are not very portable plants, so if there isn't a decarbonised energy source available where the plant is located, it is not a very easy decision to relocate—it is stay in the UK or leave. Is that fair?

Antonia Grey: I think they would stay in the UK but would continue to use diesel until the technology or the electrification was offered to them. We are working with BEIS and the industrial energy transformation fund to look at two elements: first, phase 2, where we are trying to get funding for companies to electrify their plant and equipment where they can; and then in phase 3 we are hoping they will help us connect to the grid because, historically, a lot of recycling sites are not connected to the grid. The cost to do that, you are talking between £70,000 and £2 million just to get adequate supply to the site to be able to electrify a plant that processes the scrap to go into steel mills.

Q59 **Helen Hayes:** Thinking of the point at which you have invested that initial funding in the transition to green steel, how do you expect the operational costs of green steel production to compare with current costs of production?

Lee Adcock: I think it is fair to say—and it seems to be a common theme as you look either at academia or consultancy or steel firms—that most people recognise there will be an increase in operating costs as we decarbonise because it is expensive. I talked about electric arc furnace capacity for British Steel, which could be a £400 million to £600 million scheme on its own, so we can see that operating costs will increase.

Specifically, if we go back to talking about Government support in other countries, there is a real risk that if that support is significant, as it is in a few of the examples we have seen, the inherent installation of the very best available equipment will help reduce the operating costs. There is a strange link or future where that increased support for capital helps support a business model and reduce the operating costs. All the operating costs will go up, it is just that some might be cushioned or have some advantage because of higher investment.

Q60 **Helen Hayes:** Could you say a bit more about that? What are the kinds of things that, if you were able to afford to do it up front, would save costs further down the line?

Lee Adcock: For example, if we look at electric arc furnace steelmaking, you can either, in crude terms, put the scrap in at the top of the furnace or continuously feed it in from the side. Both those business models or ways of working have different operating costs, and they might have different periods where you are not melting and you are not producing steel. The ones that are continuously fed could have higher operating costs, you might have more infrastructure to put in, more equipment required, but you could reduce the operating costs. The higher upfront CapEx could help reduce OpEX in the long term.

Q61 **Helen Hayes:** As things currently stand within your business planning, how are you planning to handle the increased costs of production?

Lee Adcock: First is obviously to recognise it and have that discussion with the supply chain. Fortunately, steel is a mature supply chain. Specifically if you look in the UK, we have very good links with our construction steel association and different trade associations where we engage with our customer stakeholders.

Ultimately, we also have to look at how it plays out as a globally traded commodity. How might CBAMs and other things work in the future to help protect or support and grow domestic UK domestic steelmaking, so we do not have a rush for cheaper steel in the future with higher embedded carbon? That is the real thing we are concerned about.

Q62 **Helen Hayes:** Regarding the calculations around low-carbon steel, are you factoring in the carbon within the energy supply? Are you assuming that the electricity you use for your furnaces will be low-carbon electricity, or is that outwith the calculations for low-carbon steel?

Lee Adcock: When we calculated our road map, we looked at scope 1, 2 and 3 emissions. We included scope 2 emissions from electricity supply within that. We have assumed that, as we go through the 2030s, the supply will decarbonise, so we have seen a benefit as we go forward, but obviously there is an interim period where a portion of it is still coming from fossil fuels.

Q63 **Helen Hayes:** Is it viable for you at current electricity prices?

Lee Adcock: It is not a question of whether it is viable; it is more challenging. You have seen the UK steel price disparity report on electricity. That is one of the main things we hope the Government will do, something on electricity price support. To give you the numbers, we paid something like £31 a megawatt hour more than our European competitors last year. Despite the different energy market we face today with the war in Ukraine, the price differential is very similar. If we compare ourselves with Germany or France, that price difference is very much the same. It is not that it will kill the projects, it is just that it makes it much harder to justify and get over the final hurdle. It becomes one of the key enablers as we go through the electrification rollout.

Helen Hayes: Do either of the other two witnesses have any comments to make on that?

Ana Musat: On industrial electricity prices, I would agree. It is something we have heard from all of our business members, and I think from investors as well. When you think about committing money to a clean steel project, for example, that is quite a big barrier. If we look at the investment levels that are observed in Europe versus the UK, obviously those overheads have to be taken into account, so the higher the discrepancy the less investment is going to flow into the UK.

Because we have a strong policy framework for bringing renewables online, I think we are very well placed to tackle that issue and make sure that we decouple gas prices from electricity prices.

Q64 **Barry Gardiner:** Has British Steel developed any site-specific plans for how to decarbonise each plant that you are operating? Your road map goes to 2035, but it then says that within the following 15 years you will be net zero. What are the site-specific plans to get there?

Lee Adcock: It is one of the advantages I see when I think about British Steel, because we have only one production site, compared with something like ArcelorMittal, which has lots of different sites serving different markets. I would say it has almost been easier, although it is not an easy task to conceptualise and to look at. Yes, we have site-specific plans. Our road map specifically looks at how we decarbonise the steelmaking at Scunthorpe, the hot rolling in Teesside and the hot rolling in Skinningrove, which are our three main sites.

We have focused on the short term, between now and 2035. We think that is the important first milestone to get through in terms of the Sixth Carbon Budget and the UK's national commitment to 2035. Then we see a progression from there onwards with increased electrification to CCS and possibly hydrogen DRI filling in those last miles. What I would say is that, as we have mapped out and modelled the CO_2 emissions, we see very significant potential to decarbonise over the next 15 years.

Q65 **Barry Gardiner:** In 2021 when Xijun Cao, the new CEO, was appointed, there was an investment announcement of £26 million for the extension

of your operations. The announcement talked about allowing you to produce value-added products. There was no announcement of any clear plans to invest in green technologies, was there?

Lee Adcock: At the time of the purchase, because we came out of liquidation, our chairman at the time made some commitments to invest. We have made commitments—

Q66 **Barry Gardiner:** That was to reduce costs though, wasn't it?

Lee Adcock: Partly, yes. The low-carbon road map, I think, reaffirms the view and the commitment to invest and transform the business. When we look at CCS and electrification as the two main drivers for that, you are looking at over £1 billion-worth of capital costs between now and 2035. It is important to know—I am sure it is obvious—that the published low-carbon road map has the full commitment and backing of our Chinese owners, our chairman and CEO. It is a business model and a business commitment we have made, and we will drive that forward.

Q67 **Barry Gardiner:** Part of the £1.2 billion investment that was announced committed to the electric arc furnace in Teesside, is that right? Could you elaborate on how that is going to help reduce carbon emissions there?

Lee Adcock: That was talked about at the time. We have progressed and moved on, I would say, since then. Since the sale, once our new owners came in, we have been able to take the low-carbon road map forward and carry on developing and driving forward the reduction pathway. We have committed to an electric arc furnace. It may not be in Teesside—it could be Scunthorpe—but ultimately that electric arc furnace will replace one of the two existing blast furnaces, so that is how it will reduce carbon over that time period.

Q68 **Barry Gardiner:** You touched on CCS—carbon capture and storage—and the hydrogen infrastructure that I take it will become available from the east coast industrial cluster. Could you comment on that? How do you propose to use that local facility?

Lee Adcock: This is a good point to touch on the fact that we are obviously located in the Humber, in Scunthorpe. We are a member of the Humber industrial cluster. CCS is very important to Scunthorpe. When you look internationally, a lot of people look to the Humber as one of the premier areas in the world where CCS has very high potential and a high success rate.

Ultimately, what might be right for Scunthorpe might not be right for the steelmakers. When you look across Europe, it is why there is a different appetite for CCS and a different approach to decarbonising. We think it is important. We decided to use it in our road map to help decarbonise Scunthorpe and, importantly for us, we also know it will be a dual pipeline, so we get hydrogen out as well as putting CO_2 in. That will be important to move away from natural gas and other gaseous fuel sources once hydrogen is available in the area.

Q69 **Barry Gardiner:** Will you be developing production using hydrogen DRI, the direct reduced iron method?

Lee Adcock: It is a difficult one. The road map at the moment involves electrification and then using CCS on the remaining blast furnace. We started off in that direction because of where we are located, because it makes sense to use CCS because we are in the Humber region. It might make sense as we move towards the 2030s to focus more on hydrogen DRI, but ultimately that looks challenging because the current gas prices in the UK make DRI production unattractive, especially if you look to potentially being able to buy it from overseas. A switch to hydrogen later on then looks even more challenging.

Ultimately, I would say the next six to 18 months will be key in terms of the policy signals that we get from Government on support for hydrogen, CCS and electrification to help provide that last bit of steer for our road map on which direction we will go with the ore-based portion of steelmaking.

Q70 **Barry Gardiner:** What will flip you one way or the other?

Lee Adcock: As we talked about with operating costs, it is whatever will help to support the best operating cost model that enables us still to be competitive.

Barry Gardiner: I am sure others will come in on Government support in a little while. Thank you very much. Do any of our other panellists want to add anything? No.

Q71 **Clive Lewis:** I have one question for you, Lee. How critical is CCS to your Sixth Carbon Budget and 2035 decarbonisation strategy? Could you give us a sense of how important a functioning, scaled-up CCS is to your capacity to hit targets?

Lee Adcock: When we look at those two different levers, be it electrification or CCS, from our modelling both achieve a similar level of decarbonisation. They are both critically important. They are the two biggest things we can do to decarbonise. One is slightly greater than the other, but it depends on how you build the plants and on numbers that might move around slightly.

I would say it is hugely significant and, because there is the dual pipeline, being able to take hydrogen off and use it instead of natural gas is hugely important as well. Even if there were price indicators or policy signals that would encourage us to move down the hydrogen DRI route, we would still want the CCS network to be able to use the hydrogen to feed back on to site, so it is critical.

Caroline Lucas: Have we mentioned the Cumbrian coal mine yet? Did I miss it? I am surprised Barry did not bring it up.

Chair: No. I was about to, but why don't you?

Q72 **Caroline Lucas:** Marvellous. You will know there are rumours that the Secretary of State is going to make an announcement on it next month, and I wondered how critical you think it is to the future of British Steel to have that coking plant go ahead.

Lee Adcock: At the moment we import coke and produce coke, so the road map has it laid out. It assumes electrification as well as a remaining blast furnace that would need coking coal. Ultimately, for us the Cumbrian mine comes down to a simple commercial decision. If the mine is available, we would look to see if it was commercially sensible to use coking coal from there. If it is not there, we would need to buy coking coal from abroad. I am not trying to avoid the question, but it does become a commercial decision. We have survived very well for a long time without having UK domestic coking coal, that is true, but if it is available and it is economic then potentially we could use it.

Q73 **Caroline Lucas:** But you are not lobbying for it?

Lee Adcock: No.

Q74 **Chair:** You would be a customer if it was competitive with your other sources, but not otherwise?

Lee Adcock: Yes. Like I say, it would ultimately be a commercial decision. If the mine was operating, we would look at it in the same way as we do any other source of coking coal and decide whether we are going to use that or another source.

Q75 **Sir Robert Goodwill:** Obviously a lot of coking coal comes from Australia. Is it a drop in the ocean, the amount of fuel used to get it here, or is it a significant factor in terms of the carbon footprint of coal produced here in the UK, whether it is domestically produced or whether it is imported from the other side of the world?

Lee Adcock: I do not have the numbers, so I cannot answer it directly, but if I may give my thoughts on that. Obviously, while we are bringing materials from the other side of the world, there are more emissions associated with transport, that is very true. The Cumbrian mine has made those points and there is data out there on that.

Specifically in terms of our own CO_2 footprint, around 82% is scope 1 and scope 2, so only around 7% or 8%, maybe 9%, depending on any given year, is associated with raw material supply, transport of raw materials or emissions from the production of the raw materials. Rightly, our focus is on scope 1 and scope 2 and we have not focused so much on reductions we could achieve through change in transport routes, because we should be focused on our direct emissions from our own installations first, I would say, before we move on to scope 3 emissions.

Q76 **Sir Robert Goodwill:** Is security of supply an issue? Maybe we could buy it all from China, which is closer than Australia, and just close down the UK steel industry. Are there strategic reasons why it is a good idea to

have a steel industry? There are employment reasons, obviously.

Lee Adcock: Yes, there is. Between us we could probably spend all day giving you lots of different reasons why it is very important. If I give you one that is specific to Scunthorpe, Scunthorpe makes rail sections that are longer than 100 metres, which is one of the things that enables high-speed rail transport. Because you do not have the joins between the rails, trains can move faster and that is a good thing. We cannot import 100 metre-plus length rail sections, so having Scunthorpe producing rail where it can go straight on to the network and be installed is strategically important for a green transport network in the future.

Q77 **Ian Levy:** Antonia, I will direct some questions to you that are very much about recycling. Increasing the amount of scrap steel that is recycled is one way the industry can decarbonise. How do you envisage this would look in reality? I am particularly thinking about old motor vehicles that have come to the end of their life, which will be mixed with plastics and pollutants. How would it work, to use that in the industry, and would you have a big enough supply?

Antonia Grey: Right now we are recycling more steel and plastics than can be used domestically. On average we have about 11 million tonnes of ferrous metals arising, and 2 million of that is going into the domestic supply chain, so we export the remainder. On average we are recycling about 96% of a car. That car will go into a process called a fragmentiser and will be shredded. All the different constituent parts—the plastics, glass, rubbers, metals and the non-ferrous metals—will all be separated out. We are very effective in what we do.

As markets grow, the supply chain for the amount of scrap available is going to grow, therefore I do not think there will be an issue for the amount of scrap going forward.

Q78 **Ian Levy:** Would that still work when scrap comes out of buildings as well and is contaminated with cement? Is that broken down the same way?

Antonia Grey: It is already separated out. A lot of our heavy melting scrap will come out of the construction trade, which is already a very mature sector.

Q79 **Ian Levy:** What is the quality of the steel that comes out at the other end? If you are using second-hand steel, is the quality the same?

Antonia Grey: Are you talking about the reuse of steel in buildings?

Ian Levy: Yes.

Antonia Grey: That will be down to health and safety in the main, depending on how a building is deconstructed. If it is done rapidly, the impact on the steel is going to be concerning. If the I-beams and the steel are taken apart carefully and they are measured and checked for

wear and fatigue, I would assume they could be reused. However, in the main right now, because of those safety concerns, a lot of it is cut up.

In terms of the quality, I think you heard last week that the scrap industry in the UK simply sorts, cuts and melts. That is not true. We have very high processes so we can fragmentise the steel into very good steel to go into the melt and produce good steel. What we have at the moment is a healthy demand for heavy melting scrap. HMS 1 and 2 we cut and shear, which makes it less expensive.

Q80 **Ian Levy:** Do the panel expect many current blast furnaces to convert to electric arc furnaces?

Lee Adcock: We do. Ultimately electrification is attractive, assuming the electricity is at an affordable cost, because it is a proven technology. CO_2 emissions from electric arc furnaces are significantly lower than from blast furnaces. There are some steel grades made in the UK and other places through a blast furnace for lots of reasons that could be made today through an electric arc furnace process. There is an easy path there to decarbonise a portion of steelmaking quickly.

Ultimately, there will be more electric arc furnace steelmaking in the future. Where in the UK steel production is heavily skewed towards blast furnaces, globally it is maybe 71% blast furnaces and 29% electric arc. North America is predominately electric arc, with only a very small number of blast furnace operations.

Q81 **Ian Levy:** Converting to electric arc furnaces, do you think the amount of steel would increase or would it still be about the same as you get from a blast furnace?

Lee Adcock: In terms of the output?

Ian Levy: Yes.

Lee Adcock: At the very top end of electric arc furnaces it can be very similar. Typically, today the largest electric arc furnaces that are installed produce maybe 2 million tonnes a year depending on grade, how they are processing it and where it is going.

Q82 **Valerie Vaz:** Ana, how do you think the UK compares with other national steel industries in terms of progress on our commitments to green steel?

Ana Musat: Obviously we have our targets. The CCC has recommended that we should reach net-zero primary steelmaking by 2035. The Government have published a range of strategies to give a sense of how the industry should move towards net zero.

As I mentioned earlier, if we look at other countries, such as Germany, you can observe that there is a lot more investment going into hydrogen DRI. In Canada there is more support for using DRI technology for steelmaking. A lot of it is co-investment with government; it is just that

the amount government commits to those projects is higher than what the UK Government have committed to date.

There are other parts of the value chain that we need to look at. Upfront investment is one of the challenges, but operational costs and—as I mentioned before—industrial electricity prices can be another deterrent when it comes to investing in clean steel. In other countries, such as Germany or France, you have a better sectoral strategy to make sure those prices are lower for energy-intensive users. For example, the way network costs are recovered in some of these countries are skewed away from energy-intensive users so they do not end up paying more of the burden.

For example, in France you have the Exeltium consortium, which is a group of around 27 energy-intensive users that have negotiated a power purchase agreement with EDF directly over 24 years. That is very good for giving you certainty in terms of price stability, ensuring you are not exposed to volatility in the fossil fuels market. I think we also need to look at that side of the support.

Finally, I will also mention the support for creating demand for low-carbon steel. As you have heard today, there is obviously going to be a cost premium attached to green steel, especially in the first stages, until we reach economies of scale. It is very important for steel producers to have some guarantee that there is going to be a market for that steel. For example, in California you have the Buy Clean California Act that looks at embodied emissions in constructions from materials like steel, cement and insulation materials and is looking to encourage the use of low-carbon alternatives, especially in public infrastructure. Likewise, in the Netherlands you have some procurement mechanisms that are trying to put more weight on what the project developer is doing to lower emissions and bring some of those cleaner materials into the infrastructure.

In the UK we have a good start. There have been a range of consultations on creating demand for low-carbon steel. We have some voluntary initiatives like SteelZero. It is important now to think in the longer term about regulation to create a floor for that ambition and to make sure we move some of the laggards along and boost that demand.

Q83 **Valerie Vaz:** You mentioned that the Government are not doing as much as other Governments. Are you able to put a figure percentage-wise or in terms of money?

Ana Musat: In terms of the upfront cost support that would be needed, there are obviously very different figures from Governments like China, but I do not think anyone would expect the UK Government to commit similar figures. From what we have heard through engagement with businesses, I think the main blocker is the point around electricity prices. I would say it is not just about the upfront cost, although that is important. Industries can take steps to stagger that over a few years. For

example, you do not want to replace existing furnaces with electric arc furnaces straightaway, but you move to DRI and swell the assets you have. However, with high electricity prices like we are seeing right now and were seeing even before the invasion of Ukraine, it is quite difficult. I think that is where the bulk of the support is needed.

Q84 **Valerie Vaz:** Lee, can decarbonising steel production provide an opportunity for the UK steel industry to compete in the global market, given what we have heard so far?

Lee Adcock: That is an interesting question because a large portion of what we produce, as we talked about with rail, goes on to the domestic market. We do export material, and we export that material all over the world.

I think it could do. We mentioned CBAMs in the UK and Europe, which could be a way of facilitating the export of low embodied carbon steel to different markets. The challenge will entirely be around how different countries are supporting their own domestic production, be that through capital support or operation support, for example, on electricity prices, and how that affects the ability to export and be competitive. We are seeing a world that is more protectionist and more interventionist than it has been in the past. Looking down at my list of different investments going on in the world in steelmaking, as we mentioned before, all of those do affect or will affect operating costs and ultimately our ability to be able to sell to their domestic markets, too.

On the one hand, yes, we could end up with really good low embodied carbon products that we could export. Ultimately, I think there are a lot of miles to go before we understand what the picture is globally in terms of global supply of steel from different regions and the cost of that steel in those home-grown countries.

Q85 **Valerie Vaz:** Do we not need to get a move on?

Lee Adcock: Yes.

Q86 **Valerie Vaz:** Antonia and then Ana, what role do you think a CBAM could play in supporting this?

Antonia Grey: I think the most important thing is pushing forward the use of recycled content. The more you can have that, the more benefit the steel producers will get from our green credentials.

Ana Musat: CBAM could be very important because we need to think about levelling the playing field and ensuring that domestic producers can compete with importers. CBAM can be useful, but it also depends on how it is being implemented. If we look at the EU proposals, which are probably some of the most advanced among economies that are thinking about this, there are a few things we need to think about.

First of all, in order to be compliant with WTO rules as we introduce CBAM, we need to phase out free allowances. Obviously we cannot do that overnight because the steel sector has had quite a difficult few years anyway. Therefore being clear about whether we are introducing CBAM and what the plan is for phasing out those free allowances will be very important so industry can adapt and plan accordingly.

It also depends what sector it is going to be introduced to. As you probably know, in the EU the proposal is to introduce it to about five sectors initially, steel being one of them. There is always a risk that it could promote inter-material competitiveness and create some market distortions. For example, in packaging are we going to start using more plastic, which is less recyclable, instead of steel, which is more highly recyclable, because there is a premium attached to it because of CBAM?

We have heard how politically contentious it is. We have seen in the EU that implementing it can take a while and there are all these challenges that come from different countries. It is very important to think about CBAM and to create a proposal for it, but let us not put all our eggs into one basket.

Q87 **Valerie Vaz:** Do you think there are any other measures?

Ana Musat: Yes. Measures like product standards, for example, could be a very useful tool. They are much better suited to create market demand. Basically, CBAM is an instrument to make sure that you compete on a level playing field, but it does not create a market. Product standards could really drive that market production.

The same with procurement mandates, either public procurement or private procurement. It is interesting that there is already a range of voluntary initiatives in this area. There are some lessons we can learn as we think about how we implement these and how we make them mandatory over time, so we would not be starting from scratch.

Lee Adcock: I agree. Ultimately, if Europe moves forward with a CBAM, I do not see any other option for the UK but to do the same, otherwise we run the risk of steel from the far east and South America coming to the UK instead of going to Europe and disrupting our own production supply chains. Once somebody moves and introduces CBAM it is inevitable that other CBAMs will have to follow.

Ana is absolutely right. Ultimately, product standards and public procurement policies designed to encourage domestic UK low-carbon steel consumption is an excellent way of promoting that growth and helping to drive the sector forward.

Antonia Grey: I absolutely agree. Green public procurement policies are very important. Something along the lines of the Government's planned spend for SMEs, the £1 in every £3, is a good way of moving forward.

Also mandating recycled content and low-carbon content, particularly in infrastructure projects, is very important.

Q88 **Valerie Vaz:** Antonia, why do you think the UK exports most of its scrap steel?

Antonia Grey: Because we do not have enough producers internally. There are not that many people there. We give them everything they need, 2 million tonnes a year. They do not have capacity for more. As they switch to electric arc furnaces, they will probably want more and we will export less. We literally do not have enough steel producers in the UK.

Q89 **Caroline Lucas:** We have already touched on some of these questions, but if there is any more you want to add at this point, please do. The first question is what role do you see for the Government in supporting the industry's transition to green steel production?

Antonia Grey: It is again supporting the production of UK steel that has high recycled content and low carbon. I think it is as simple as that.

Caroline Lucas: Introducing some product standards?

Antonia Grey: I think product standards, mirroring eco-design standards so that products are designed for end of life so they are made to be easily recycled rather than, as now, designed for manufacture, to get them off the product line as quickly as possible. If you could get the technology there with, for example, washing machines, so you could get rid of all the wiring and copper, there will be less contamination for the steel going through the fragmentiser.

Lee Adcock: I will mention four things. We have already touched on electricity prices, where we see a price disparity with Europe. That is an excellent way to promote increased use of electric arc furnaces. We gave a few examples earlier. North America has many more electric arc furnaces than most of the rest of the world and obviously has very advantageous electricity prices, so that is no surprise. The UK has been very slow at adopting electric arc furnaces, probably over the last 20 to 30 years, and I would say that is primarily to do with high electricity prices.

The second one is carbon embodied adjustment and product standards, and we touched on that in the last question. I think that is inevitable. The world is moving in that direction and we should follow suit.

We have also talked about funding. The clean steel fund is not at the same level of ambition as in other countries. We gave some examples in our written evidence, and I think other people have as well, so those are there for people to look at and to come to a conclusion.

We also think the time is right, and the consultation on ETS is a good opportunity to make some targeted changes to ETS to help with the

transition from blast furnace to electric arc. I could probably spend the next three hours explaining the nuances of how, but—

Caroline Lucas: Can you do the summary version?

Lee Adcock: —I will do the summary version. We will obviously respond to that consultation. We think there are some mechanisms that can be introduced to the way allowances are allocated to support the steel sector's transition from blast furnaces to electric arc furnaces. We think there are some changes that can be done to help with that transition and some of those transitional costs.

Q90 **Caroline Lucas:** Is that cheaper allocations? What does it look like?

Lee Adcock: It is a change to the historical activity level. The historical activity level, the two-year average, triggers changes to allowances. If that can be extended by a few more years, it would change the profile of allowances to match and coincide with the change in production method to help manage that transition for the business.

Ana Musat: I agree with what Lee and Antonia have said, and I am not going to repeat what we have mentioned so far. One thing I would add is the need for some clear infrastructure plans, which are very important for the steel industry. Obviously CCS is an option for decarbonisation, and the use of low-carbon hydrogen is also an option. All of those will require additional amounts of electricity.

If we reflect on the lessons from offshore wind, deploying some of that infrastructure can be quite difficult because of the planning regime and it can be quite time consuming. Therefore a steel producer making an investment decision will need clarity on whether they are going to have access to hydrogen production sites and whether the transmission and storage infrastructure is going to be available to them. The transmission and storage infrastructure might be quite expensive to build out to Wales, for instance.

It is also worth saying that a lot of steel production is concentrated in industrial clusters, but there are also some steel producers located in dispersed sites. If we think about heavy industry in general, almost half of our industrial emissions come from dispersed sites. It is therefore very important to think about how we are going to link those sites to these bits of infrastructure and facilitate some abatement options for them.

Q91 **Caroline Lucas:** We have touched on procurement already, but what effect do you think the Government's publication of their steel procurement pipeline has had?

Lee Adcock: It is an important step. As we touched on before, having those clear signals and encouraging production and consumption of steel produced through low-carbon routes is very good.

One of the issues with public procurement specifically is extended supply chains. If you take the example of construction steel, we might supply some steel to somebody who is making a small fabrication that is going at the bottom of a tall skyscraper and they could be a fairly low-tier supplier within that overall programme. It is how we ensure those public procurement commitments go all the way down to the bottom of the supply chain and cover all aspects. It is not just the building infrastructure itself, the things you can see, but the bike shed and the small things at the bottom that are equally important as the structure itself.

Q92 **Caroline Lucas:** Does that mean a change to the way in which that procurement pipeline has been designed?

Lee Adcock: I am not an expert on the pipeline specifically, so I would have to go away and have a look at that. Ultimately, we would look at all those public procurement policies. It is how the commitment funnels down the supply chain and does not just stop at the level 1 and level 2 tier suppliers.

Q93 **Caroline Lucas:** What role is the Steel Council playing in the transition?

Lee Adcock: I think the Steel Council should, and does, play an important role. It meets periodically. It tends to meet when there is more drama in the steel sector, if I might say it in that way. I think it needs to continue. It needs to carry on providing support all the time, and not just when there is particular drama with a particular company or the sector for some external reason. I think it is very important. It just needs to be more continuous and provide the support and direction on an ongoing basis.

Caroline Lucas: Any dissenting voices?

Antonia Grey: No, I absolutely agree.

Q94 **Caroline Lucas:** We touched on the clean steel fund, and my colleague will ask some more about it in a second. As we know, it has not yet been made available. It is reported that the Government are looking for signals as to how the industry will spend any investment. Is the industry in a position to provide the signals the Government are looking for that would hopefully unblock the fund?

Lee Adcock: Again, I am mainly talking from a British Steel perspective, so not from a sector perspective. British Steel decided to launch its low-carbon rate last October. Part of the reason we wanted to do that was not only to give our customers and supply chain a clear signal of where we are going and our intent, but also to give a signal to Government and other stakeholders as well. Therefore from a British Steel perspective I feel confident we are giving—and will continue to give—our thoughts on what our plans are, even down to what CapEx is required and how we see the clean steel fund and other things interacting with that rollout.

Q95 **Caroline Lucas:** One last question before I hand over to my colleague. If there had been a signal from Government that from 2035 no further fossil fuels could be used in the steelmaking process, even if it was abated, what implications would there be for you?

Lee Adcock: It is a very interesting point, and it has two answers almost. If we think about fossil fuels—as in coal, coking coal, natural gas and other large-volume fossil fuels—we know we can operate with electric arc furnaces as a portion of production. There is an issue that we have not talked about today around ore-based steelmaking being able to produce things like rail with low residual properties, low carbon and low phosphorous in other examples, which help prevent the rail from cracking.

Q96 **Caroline Lucas:** Are you suggesting that could not be done using recycled steel and electric arc furnaces?

Lee Adcock: No, it cannot.

Q97 **Caroline Lucas:** We had evidence last week and it seemed to me, as I remember it at least, there was only a very tiny number of things that the witnesses suggested would not be possible, as long as you had a robust enough process for getting rid of contaminants. They were not sitting here saying they did not think recycled steel and electric arc furnaces could not produce the whole gamut of steel uses. Do you contest that, to be clear?

Lee Adcock: Yes. When we look at the level of copper in ferrous scrap supply now, there is an element of that because some manufacturers and makers of component parts might mix metal together for very good reason, but some of that is a little difficult to separate.

Q98 **Caroline Lucas:** A little difficult, but if the political will was there—if you had a hard thing saying you cannot use any other method—presumably there would be some innovation to mean that process could happen.

Lee Adcock: Yes, but it is more nuanced than that. Some steel grades have copper in them inherently. You could have two pieces of carbon steel, one would have copper content and one would not. In our case, we would not want to use the former near rail production because rail has a very low copper content.

It is interesting because one of the consequences is not that you cannot make rail from electric arc furnaces. It would be daft of me to say that is the case, because you go to North America and they make rail with an electric arc furnace. However, when you weld it together in the field, weld non-copper and rail that has copper in it, the copper moves between the rails and creates a weakness. There is a safety concern around how that is done, and more work is needed to overcome that problem. You could make rail with higher copper, it is just that we do not think you could roll it out on the network as we sit here today. Whether we could do that in

15 years with enough will is a different matter. With all these things it is quite complicated, because it is not a black and white answer.

Q99 **Caroline Lucas:** I am quite sure it will not happen unless there is a signal to suggest it should, because it is a hassle and will need investment to make it happen.

Antonia Grey: I agree, there is a known issue with copper in ferrous metals. However, I think both sides are sitting down to talk about that issue and to look at innovation in technologies for taking it out, whether that is through heat means or chemical means. The problem has been recognised and steps are being taken to see how we can come together to look at how we solve that issue.

Lee Adcock: Even if we all move to electric arc furnaces, electric arc furnace steelmaking quite often adds in an additional carbon source to get the right carbon content. Currently in an electric arc furnace that could be metallurgical coke or metallurgical coal. Ultimately, if we want to move away from that, things like biochars, biomass-type materials and others could be quite important.

When we are looking at the longer-term picture, 2030 and beyond net zero, finding an answer for that last-mile carbon source use in the electric arc furnace is going to be very important. That is where I feel there is probably an element of research and development needed to understand how that is done.

Q100 **Clive Lewis:** Listening to you on the signals that British Steel is making—I know you do not represent other parts of the steel sector in the UK—it sounds like you are on top of a building with a big mirror, jumping up and down and signalling. Do you think other parts of the industry are pulling their weight in that respect?

Lee Adcock: We are part of UK Steel and last week you had a representative from UK Steel, which represents all the UK steelmakers. I have worked for two over the last few years, so I have a bit of history.

I would say the UK steel sector knows what it needs to do, and I think the steel sector globally knows what it needs to do. British Steel ultimately has made a decision that it wants to put out a clear signal of where it could go and to look for support to build on that journey. There might be a different view in other companies.

Q101 **Clive Lewis:** Do you think the British Government could release the clean steel fund sooner than 2023 in that case?

Lee Adcock: Yes.

Q102 **Clive Lewis:** Are you ready?

Lee Adcock: We are ready. If the clean steel fund came today, there are projects we would want to put forward for that clean steel fund, absolutely.

Antonia Grey: Absolutely. We want to support our end users, so anything that will help them plan ahead and help us plan for what they will need, the sooner the better.

Ana Musat: I agree. There are a lot of projects that could be invested in. The supply chain is ready and the demand is there. We are already seeing admission to the SteelZero coalition and auto manufacturers, like Volvo and BMW, are already requesting clean steel and going above and beyond what the regulation demands.

Q103 **Clive Lewis:** Yes, champing at the steel bit. I have a couple of questions to tie up some of the points that have been raised. On procurement and legislating for standards on steel products, obviously there is a catch-up. Some parts of the world are in a different place on this. Is there any concern that some of your steel products will become relatively more costly than some of the imports that could be coming in? Is there anything that needs to be done in trade deals to ensure that, if you are going to decarbonise your steel, people in this country cannot import cheaper, more carbon-intensive steel? Is that something that needs to be addressed?

Lee Adcock: As we talked about earlier, there is a cost to this. Decarbonising the steel sector generally will be extremely expensive. There is a real risk, globally, that if it is not clear to end users that they may need to change their habits and not just buy, in some cases, purely on price, you could see steel continue to be produced in areas that have high embodied carbon or even move to areas with lower regulatory controls than there are today and supply into our market. That is a concern. I think that is where CBAM and other mechanisms come in. That is why we mentioned CBAM and product standards in the same sentence.

Q104 **Clive Lewis:** This is a supplementary question. Is the industry looking at using green hydrogen or blue hydrogen, or both? Is there a difference in the arc furnaces' performance?

Ana Musat: From what we have heard, the assumption is that blue hydrogen would be easier to deploy at scale initially and would be more cost competitive. Obviously because of the gas price crisis the equation around that has changed, so I think it makes more sense to focus primarily on green hydrogen now. It makes sense to do that because we have all these commitments around bringing more renewables to market and we have yearly CfD auctions. However, we need to make sure we have the right transmission infrastructure to be able to support those renewables and supply the electricity needed to industry.

Antonia Grey: This is something I cannot comment on.

Lee Adcock: I completely agree. There is a risk that there is a rush to decarbonise in the short term that sees a switch away from, say, natural gas or some fossil fuel onsite to hydrogen production that has equal or maybe only marginally lower CO_2 emissions on the whole. We have to be

careful that we do not just move CO_2 emissions from one place to another. Ultimately we would want zero-carbon hydrogen to fit in with our road map. We recognise in the interim there could be a world that supports hydrogen produced with a carbon emission as a transitional arrangement to help that new sector take off, commercialise and be up and running.

Clive Lewis: It sounds like the sector needs stable, low-priced, decarbonised energy to plan to do these things. That makes sense.

Lee Adcock: I have not seen anything—Ana, correct me if you have seen anything—that suggests that hydrogen from one source or another would work differently in, say, a DRI production facility. At that point, hydrogen is hydrogen and it does not really matter which route it has come from.

Q105 **Clive Lewis:** It is just the investment that goes into it?

Lee Adcock: Indeed, yes.

Q106 **Clive Lewis:** Are you all enthused by the recent Government energy security strategy to provide reassurance that you are going to have those stable, decarbonised energy sources? I do not know if you saw the report. Did it fill you with confidence and make you feel you could better plan for the future? What is your view from an overarching perspective?

Ana Musat: The commitment to look at the planning issue was very important because we can set targets and say we are going to bring more renewables to grid. However, we need to have the right transmission infrastructure and we need to make sure it does not take in excess of 10 years to connect some of the projects that have been approved to the grid, which has been the case so far, and we have seen even longer delays. Therefore the commitment to look at planning is very important.

There was also something in there about looking at the energy national policy statements. Basically what we need now is a blueprint for what the network will look like, a holistic network design, to make sure that the way we build and the network costs are minimised. We do not always have to create separate onshore connections for each project. The more we think holistically, the better it is and the lower the costs for building the transmission will be. Obviously the transmission costs are a significant part of industrial electricity prices, so the more we can minimise them the better.

Lee Adcock: It is difficult for us when we look at that. On the one hand it is great, and our low-carbon road map does assume a decarbonised grid over what is now 13 years through to 2035. The problem for us in the short term is price disparity, so we would have wanted to see more on that. We welcome the long-term vision. We just hope there is more to come, particularly on price disparity.

Q107 **Clive Lewis:** There is volatility and you think there needs to be more support and more commitment from Government to make sure you have

the stable supplies you need?

Lee Adcock: Yes, specifically in terms of operating now and giving the right signals for adoption of electric arc furnaces, something to address that price disparity between ourselves and predominantly France and Germany.

Antonia Grey: From our point of view, it is good news. However, right now we are very much focused on getting the large majority of sites connected to the grid so that they are off diesel.

Q108 **Dr Matthew Offord:** What further steps can the Government take to develop market demand for green steel within the UK? That is particularly for the Aldersgate Group.

Ana Musat: We have mentioned issues like product standards. There has been a consultation on creating demand for low-carbon products. Product standards was one of the things looked at as part of that.

It is very important to look at product standards and, Antonia, you mentioned eco-design regulations. Learning some of the lessons of what has worked and what has not is very important, as is not necessarily starting with mandatory ones from the beginning, because obviously we are never going to get the regulation right from the start. Creating a road map to say, "This is the timeline we are thinking of for making these mandatory," would be very important.

When we design product standards, it is easier initially to look at the carbon content but we need to look at lifecycle emissions and the environmental and social impact as well. Responsible Steel is already looking at developing some of those standards and is about to get industry sign-off on the final standards very soon. Learning from what has been happening in those industry discussions is very important.

I mentioned procurement as well. Public procurement is a very important side of it. Government have already announced an intention to scrutinise suppliers for big infrastructure projects to make sure they have credible climate targets if they are to tender for some of these projects. That is very good, and strengthening those public procurement mandates is very important.

The onus is also on businesses, so private procurement is equally important. Some of these big companies that are customers of steel producers have huge purchasing power. Therefore making sure they are also getting behind this is key.

We have mentioned SteelZero, where you already have big companies like construction, for example, and automotive signed up and committed to purchase 100% clean steel by 2050. However, we now need some regulation to move some of the laggards along as well.

Q109 **Dr Matthew Offord:** Turning to the other two members of the panel,

what is your opinion of the industrial energy transformation fund? Do you believe it will be beneficial to the decarbonisation of the industry?

Antonia Grey: I think it is very beneficial. For some of the smaller companies to get the funding that is on offer is absolutely vital, particularly as we transition to electrify all the plant and equipment and the site. Going forward with phase 2 and phase 3 is key.

Lee Adcock: I think we have all said that IETF is good for all those reasons, to help things move forward. The clean steel fund is also very important. It is just a level of ambition. We talked about some of the numbers earlier, we are looking at billions to transform steelmaking in the UK and similar in other European countries. We see a disparity between the level of funding in the clean steel fund and the IETF compared with some of the other funding streams that seem to be there for some of the European producers. Spain, France and Canada are the three examples we have talked about. It is good, we just hope it would be more ambitious.

Q110 **Dr Matthew Offord:** Turning particularly to the skills that are needed for the development of the workforce, mainly to install and maintain the future green technologies, has your industry the capacity to achieve that and what would you like to see from the Government to promote more of that development?

Lee Adcock: It is fair to say that at the moment, let alone in the future, there is a skills shortage. Especially in Scunthorpe we struggle with engineering skills and some of our technical skills. We take on apprentices, we train in-house and have our own programmes, which is good. However, it is a concern, especially as we look to the late 2020s and that ramping up. We have talked about CCS, electrification, use of hydrogen, lots of new fuels, lots of new equipment and lots of new ways of working. We will need the right trained, experienced and qualified engineers and technical people to support that rollout. That is an issue for us.

British Steel will do what it can in terms of developing our own skilled people, but as a nation there is a shortage of engineering skills. Anything we can do to work with the Government to sort that out would be good.

Chair: Thank you very much indeed. That concludes our session. I would like to thank our witnesses Ana Musat, Lee Adcock and Antonia Grey, and members of the Committee, for joining us. I also thank Caitlin Lewis for producing the brief, as this is her first inquiry with us this year.