



Energy and Climate Change Committee

Oral evidence: [Linking emissions trading systems](#), HC 739,
Tuesday 14 October 2014

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Written evidence from witnesses:

- [International Emissions Trading Association](#)
- [The Grantham Institute on Climate Change and the Environment](#)
- [Mineral Products Association](#)
- [SSE](#)

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Members present: Mr Tim Yeo (Chair); Dan Byles; Ian Lavery; Mr Peter Lilley; Sir Robert Smith; Graham Stringer; Dr Alan Whitehead

Questions 1-66

Witnesses: **Dirk Forrister**, President and CEO, International Emissions Trading Association, and **Dr Luca Taschini**, Senior Dahrendorf Research Fellow, Grantham Research Institute on Climate Change and the Environment, London School of Economics, **Miles Austin**, Executive Director, Climate Markets and Investment Association, **Dr Richard Leese**, Director of Energy and Climate Change, Mineral Products Association, and **Martin Pibworth**, Managing Director of Wholesale, SSE, gave evidence.

Examination of Witnesses

Witnesses: **Dirk Forrister**, President and CEO, International Emissions Trading Association, and **Dr Luca Taschini**, Senior Dahrendorf Research Fellow, Grantham Research Institute on Climate Change and the Environment, London School of Economics, gave evidence.

Q1 Chair: Good morning and welcome. We are very glad to have you both at the Committee this morning. This is our first oral evidence session on this new subject for us, but it is one, as you know,

some of us have taken a close interest in for a considerable time. I have had the benefit of hearing you, Dirk, twice I think in the last month talking about this, but my colleagues have not, so do not hesitate to repeat what you have already said to me both in New York and in Paris. Could I start with a general question? IETA has expressed support for the concept of linking emissions trading systems. Do you want to say what you mean by that?

Dirk Forrister: My association is comprised of companies that are active in emission markets around the world, so they are large covered entities as well as the service providers that help make the market work. They take a long-term view of the issue and they expect that if policymakers are serious about the levels of ambition that they are talking about—notably a 2 degree level of ambition—that is going to require such a heroic amount of change in operations that you need linked systems to do it in an economically efficient way. It really comes back to the economics of the approach.

It also has advantages for companies in thinking about how they comply. It is good not to have a different rulebook everywhere you go but, in fact, to have as much commonality in the systems as possible. That also has a feature of encouraging comparability in the systems in terms of level of effort, because two linked systems have a virtue in, in essence, ratifying the effectiveness of the other system, saying, “We think you are good enough”. That can help with things that you worry about in terms of industrial competitiveness and worrying that maybe one system is too easy and another one is too hard. A linkage discussion means a harmonisation of enough of the measures that it helps with that comparability.

There are administrative aspects, there are cost aspects and then there is that environmental aspect of helping us achieve our 2 degree goal.

Dr Taschini: I am an economist so let me give the view of what we believe the pros and cons of linking are. There are definitely economic and uneconomic benefits in linking. Let me start probably with the economic benefits that are very much related to what Dirk just mentioned.

The first one is companies will have a much broader availability of abatement options. By linking to different ETSs you can tap into other abatement options. That is good because you can reduce costs.

The second one is about markets. Two different ETSs where combined create a bigger market. As Dirk just mentioned, the larger the market, the more the price could be resilient to shocks because you have some sort of smoothing effect.

The third one could be related to the non-economic benefits, maybe the fact that by homogenising, by trying to make the different systems compatible, you are levelling the international playing field.

The last one, probably one of the most important, is related to contributing to the global co-operation in tackling climate change. If you look at what happened in the specific case of Norway and the EU ETS, by the very issue of linking with the Norwegian ETS the European Union sent a message to the other ETSs in terms of, “Yes, we are interested to link”.

However, there are also quite a few disadvantages. The major one is related to sovereignty. If you link, you lose control of your ETS. The fact that you are linking to another ETS means that you have to find a compromise. You maybe lose the full control of the other ETS and that is definitely a major issue for policymakers.

The fact that you are linking to one ETS works both ways. It is good because you have this transmission effect. The transmission effect may be good if the two systems are comparable but not identical. It could even work in the opposite direction. It could be a disadvantage if the two systems are precisely identical. They might be exposed precisely to the very same type of shocks, so that may not be something that you want to have.

Last but not least, any attempt to retain control or rectify these types of potential transmission effects means that you will impose quality constraints, quantity constraints, any type of constraint that allows you to retain some level of control, and that, of course, works precisely against the very merit of linking. So there are, again, advantages and disadvantages. On average, advantages outweigh the disadvantages, but I think that linking will be the result of a linking process, so evaluation of whether there are more cons than pros.

Q2 Chair: I understand the theory very clearly. Can we find concrete examples of where these benefits have already been achieved?

Dirk Forrister: Probably the most prominent example that is talked about these days is about California linking its system with Quebec, which is happening this year. Those are two of the largest systems in North America and have given us an example of how it might work in that context. They have developed some of the administrative architecture together in the form of a joint registry and auction platform. They also have attributes of their programmes that are slightly different in terms of what offset protocols they recognise in each system. On the whole, the systems are compatible enough that they have decided to bring them together.

In some respects, we take for granted the fact that the EU ETS is actually a linked system of national programmes and that is really the most mature example of it. If you also look in the north-eastern United States there is a programme called the Regional Greenhouse Gas Initiative; we affectionately call it RGGI. The RGGI programme is a collaborative of 10 states in the north-eastern United States that, again, functionally is a set of linked systems but it gets a little less notoriety than the California example in North America just because it has been around longer.

In all of those examples, it has helped to broaden support across the business community because it broadens that geographic horizon around what emission reduction opportunities might be valid. It has also helped to control the costs in the programmes by making the systems compatible and more economically efficient.

Q3 Chair: Apart from the loss of sovereignty referred to earlier on—which in a sense, of course, the individual countries that have gone into the EU system have already accepted, making a judgment that the benefits are greater than the downside—are there any other likely disadvantages from linking?

Dr Taschini: Decoupling, so the fact that you might have a situation where the two systems want to decouple and not be linked any more. That is a contingency you have to take into account. That definitely requires quite a lot of pre-negotiation and arrangement in terms of what would happen in case you do not want to be part of a system any longer.

Dirk Forrister: This year we have retained a research team from Harvard University to help look at linking architectures for the future. One of the things that they pointed out is that if you do it

poorly linked systems could allow the weaknesses of one system to be, in a sense, exported to the other system. That is something one should guard against. I think with most of the disadvantages there are strategies that you can undertake to guard against the eventuality of a real negative outcome, but that would be one other type of a disadvantage that you would need to design to address.

Q4 Graham Stringer: You have touched on some of these things already, but how do the existing and planned emission trading schemes differ from each other? Which of those differences are likely to cause the most problems in joining together?

Dirk Forrister: Well, as you look across the globe, there are design features in emission trading programmes that can make them operate slightly differently. I will give you an example. In the province of Alberta in Canada, which has a sizeable emission profile because of the oil developments there, their emission trading programme has a price cap where you can buy as many tonnes as you want to emit for \$15 or you can buy offsets below that price level. It would be difficult to graft that programme on to the EU ETS because it does not have that design feature. It has an absolute cap that is trading at lower than that level now, but if you imagine a future where it rises, you would see flows into Canada where people just write cheques. Now, that may be a design feature that changes in time so that it makes it more compatible, but that is the type of design feature that can prove problematic.

Similarly, in California there is both a price ceiling and a price floor. There is also a difference in the coverage of the California system. Starting next year, California's programme will include not only the direct emissions from the power sector and refineries and chemical plants but it will also include the transportation sector, which will be markedly different from the European programme in terms of its coverage. That would take a lot of thought about how to link those systems.

Then, finally, another of the challenges would be in examples of linking that we have seen thus far in Europe, for example, with Norway, or Australia. Some of it is being done via a treaty. States and regions in the United States do not have a treaty-making authority, so California cannot enter a linking treaty with the European Union. It does not have the power to do that. They have done something quite clever in their arrangement with Quebec in that they have done it through a lighter touch approach where they own a common registry together. They are shareholders in a non-profit entity that runs a joint registry and they are able to administer it that way without going the step of a treaty.

Those will be some of the design characteristics that make it challenging: can you make the programmes harmonised enough so that it is easy to bring them together?

Dr Taschini: Can I maybe echo some of the dimensions? I think there are predominantly four different complementarity dimensions. One is the level of ambitions or the stringency of the cap. One is the price dimension. The other one is the effectiveness of the offsets or eligibility of the offsets, and the last one, most important I think, is the sector coverage.

In terms of ambitiousness or differences in the stringency of a cap, you have to think that most of the time you link with a system that has a different cap stringency. That means that most of the time you have systems that have quite different price levels. With a system that has a relatively

ambitious cap level, we have an outflow of funds basically from the system that has high prices to a system that has low prices. That is something that we need to always bear in mind.

Having said that, that means that most of the time, if we look at the prices, we will probably have, when we talk about existing ETSs, ETSs that need to be comparable in price levels. Going back to the case of Quebec and Canada, they linked even before that price expectation was formed, so that is very important when you try to understand what the likelihood is of existing ETSs linking versus not yet existing ETSs linking. Sector coverage is extremely important. The more the sectors are different the better it is because we are going to have some sort of smoothing effect. Shocks that may occur to one economy may not to the other one, so the two together will be more resilient and more solid.

The last one is about eligibility offsets and that is another extremely important point. If you have an ETS that has extremely complicated MRV—monitoring, reporting and verification—standards that are not met by the other ETS, that means that you will introduce again some level of control in terms of not allowing the use of a particular type of offset. Again, that goes in exactly the opposite direction to the whole point of linking.

Q5 Graham Stringer: This sounds all very complicated and difficult. Are there any of these problems that you think are insurmountable, that cannot be overcome?

Dr Taschini: I do believe that linking is certainly complicated, practically quite complicated, but I do not think it is impossible. I do not think they are insurmountable. There are ways to make the different ETSs, even existing ones, compatible in a way, but that becomes a political decision, especially when it comes to exchange rates.

Dirk Forrister: We tend to think about it in phases of development. At its very base level, a form of the linkage is just using common rules even before the systems come together, common accounting rules, making sure that one assesses performance in a similar fashion.

The next step up the ladder is mutual recognition of offsets. If you think about the global system that we have had in place for the last decade, it utilised a common tool of global assets created under the Clean Development Mechanism. You could see an offset that would be valid for use anywhere in Europe or it could be used in Japan or Australia or other members of the Kyoto family.

The step that we are talking about here I think is the next level, which is probably the most elegant, of linking the compliance systems themselves, which is what California and Quebec have done. In fact, an allowance issued by Quebec will be recognised for compliance in California and vice versa. I understand that they are planning to issue offsets jointly so that they do not even have a different name on them. They will be just an allowance that is good in that joint system. Perhaps that is the most elegant system that we would look to down the line. That is the way that it has worked in Europe. In the early stages, member states each had their own issuance procedure and now it has moved toward a common auction in Europe.

Q6 Graham Stringer: What lessons can be learnt from the experience of linking so far? Have there been any disasters?

Dirk Forrister: The only one that one would talk about as a disaster, maybe, is the failed attempt for Europe and Australia to link their systems.

Q7 Graham Stringer: That was a political issue, essentially.

Dirk Forrister: It was totally a political issue, exactly, and that may not be a permanent situation because, let us face it, we are early on in our global response in dealing with the climate issue so there are a lot of things that are going to happen in the coming decades. Even that one could come back on the boards in time.

Q8 Graham Stringer: There is obviously always a risk of political change. It is unlikely but the Tea Party could take over in California, which presumably would make the whole scheme and the linking with Quebec difficult. How is that risk assessed in the linking of these schemes?

Dirk Forrister: Well, I would say people involved in the linkage arrangements try to do a lot of consultation so that they build a broad base of public support for it. You may be aware that in California probably two or three years ago there was a ballot initiative to try to override the legislature and basically scuttle that law, invalidate that law. It failed miserably. It failed almost on a two to one margin, in part because it was seen by owners of facilities that lived out of state that they were trying to undo the California programme. I think it served to bolster the political support for the system. At the end of the day, it is how much broad political support there is for maintaining a system. It would be very difficult, I think, in that context for even a Tea Party candidate in California to invalidate the programme because of that aspect of public will behind it.

Dr Taschini: Technically, I think they try to prevent such a situation or a scenario where one of the two ETSs decouples and you are left with some hot potatoes in your hands by using a unified registry. It may be possible that Quebec or California decides to not be linked any longer, but the allowances that have been used are one unique unit, so there is technically no problem in doing that. It was, I think, anticipated as a possibility.

Graham Stringer: I think that has answered my questions.

Q9 Sir Robert Smith: I just wondered if the relationship between California and Quebec benefited from not being able to do a treaty and having to set up a common entity that, therefore, meant a more integrated system.

Dirk Forrister: It probably did benefit from it because they simplified the essence of the environmental components that were required. I think the future of the issue is whether there are other states or provinces that choose to graft themselves on to those programmes. We hear talk in the western part of the United States that there is an EPA regulation that is causing all of the states to think about how they will implement a climate programme on their power plants. Washington and Oregon are both in exploratory talks with California about, "Maybe it would be easier if we did this together", in part because that administrative structure already exists and it is fairly simple. You do not have to ratify a treaty; you just have to sign an MOU with WCI,

Incorporated that says that you will participate and follow their rules. I think about it as almost similar to one joining an exchange in private sector parlance, as opposed to doing bilateral arrangements. You have a rulebook and you know what your trading rules are going to be by joining that exchange, and this is a state that might consider joining that particular administrative structure.

Dr Taschini: California and Quebec benefited by the very existence of the Western Climate Initiative, so there was already a platform that facilitated the dialogue between the two jurisdictions.

Q10 Ian Lavery: There are two main approaches to the ETS linking. There is the top-down or the bottom-up. What is the best approach to linking the ETS?

Dirk Forrister: That is a very good question because there are merits for both. In some senses, the top-down type of structure is one we generally think of as associated with the Kyoto Protocol, where there was a certain amount of units issued to each participating jurisdiction and then there was some architecture at UN level that connected systems. There is a common registry for producing offsets and then there is a common conduit to national registries that was known as the transaction log where CDM credits could move from UN into member states. That was all done at UN level.

When we think about bottom-up, we are thinking more about organically produced systems that might choose to come together later, and probably the best example of that would be the EU ETS looking to link up with a Chinese or a North American ETS in time. That will happen more through bilateral arrangements between those jurisdictions or perhaps through creating some kind of a trading club that those jurisdictions choose to join, an international equivalent of what we were just describing with WCI.

I guess the work that we have been doing with this research team from Harvard indicates that maybe a hybrid approach would have some merit where there are tools available at UN level to be utilised by countries—for example, use of a registry function or monitoring and verification protocols—that could help make systems grow up in common with one another because they are using some common tools that would enable them to make that step later of joining up. I think that maybe is a way of taking the best of both worlds, but I would say that the general tenor of things right now is that we are moving into a phase that will be more bottom-up so we really do have to think about how these come together by treaty maybe.

Q11 Ian Lavery: With regard to the potential for a hybrid system, what might the benefits be on such an approach?

Dirk Forrister: Well, I think the benefits come back to the same attributes of lowering costs, achieving better economic performance and creating a system that is less prone to carbon leakage so that you do not worry about increased emissions elsewhere because the systems are hopefully developed in parallel. Those are the aims of what one could see emerge out of this hybrid type of a system. I also think, though, that you can get a lot of the advantages of it maybe on the road to a full linkage. A lot of the advantage is just in recognising a common pool of offsets, so perhaps that is the enabler for the near term. I think of formal linkages as being

something that is more medium to long term, something that we need to start work on now because we want it to happen in a few years' time, whereas common recognition of offsets is something that could happen more quickly.

Q12 Ian Lavery: Is there a role for the World Bank in facilitating the linking of the ETS?

Dirk Forrister: The World Bank is playing a very constructive role right now in helping nations that are interested in carbon pricing to set up high quality programmes. They have a programme called the Partnership for Market Readiness, where they provide technical assistance to countries like China on how to form baselines, how to build a registry, how to allocate emission responsibility, those kinds of things, how to define what types of offsets you want to use. They are helping those countries model the results, do proper economic modelling, and I think that there are 17 or 18 different countries that are working with the World Bank on various forms of carbon pricing. When you look across the developing world, it is all of the important players. It is India, China, Brazil, South Africa, Chile, Mexico, South Korea. It is all the key players that you need to get on board behind a scheme and they are meeting on a regular basis to compare notes and gain this technical assistance. The World Bank is providing that kind of technical glue in helping nurture these systems along. They will not be there to run the system in the end, that will be the responsibility of the countries, but it is probably the most constructive thing happening that I see out there in encouraging common systems to be built so that they are not all different, although I have to say each of them is nuanced to their particular circumstances.

Dr Taschini: In respect of the World Bank, at LSE we did some work for the World Bank when they were exploring what could be the best mechanisms we can use in order to promote and facilitate linking. Connected to your question about top-down/bottom-up, top-down would be the best, clearly, having just one unique market. We will not be able to have that. They were exploring what could be the best way to facilitate a bottom-up approach, and how the different ETSs speak to each other, actually network. That was the objective. We have been exploring something called the ICAR, an international carbon allowance reserve. It is a reserve like a pot of allowances and all allowances and all permits are transformed from one system to another.

During that exercise, what we also did for the World Bank was an exploratory exercise, something like a process for understanding who is your best partner. That could be used to assess the viability, the fungibility, of a linking. There is definitely a lot that the World Bank is doing in order to facilitate and stimulate the existence of a common platform, although it is connected to what we were just saying before. The different ETSs, if already existing, need some sort of mechanism to transform one unit in a particular ETS into one other unit. Having ETSs that from the very beginning are complementary in a way would massively facilitate the linking process.

Q13 Ian Lavery: How might the United Nations Framework Convention on Climate Change's proposed new market mechanism and framework for various approaches help to facilitate any potential linking?

Dirk Forrister: The discussions going on in both of those negotiating tracks are potentially very helpful, but they have been going on for a very long time. That is not new in UN negotiations—things tend to take a long time—but the original idea around the new market mechanism was that it would move away from CDM-style crediting of one project at a time, an almost

microscopic look at what is going on in individual projects, and that the new market mechanism would try to scale up the level of activity so that it is looking across a whole sector, so you are trying to get reductions across the whole power sector or cement sector or steel sector. It is a discussion that has been going on for several years and is ripening hopefully for a decision in Paris at the summit in 2015, so the end of next year. We would very much like to see that thinking come forward, but hopefully also merge into a unified system with the CDM itself: maybe merge the two negotiating tracks of what the future of the CDM is and what the new market mechanism is, mainly just to simplify the discussion because there are too many parallel things happening on similar topics. That is the new market mechanism.

The framework for various approaches is a notion that entered the negotiations about this common concept: how you bring systems together in linked arrangements for those that want to come together. Understanding the various approaches part might mean that there are some countries that do not want to link, that want to do something completely different. Venezuela, for example, will probably go with more of a command and control or tax programme rather than joining a club of nations that are collaborating on emission reductions. You need a framework that allows for action of both types to take place.

I think probably the most useful thing that is happening in those discussions is around the accounting and around how sales or transfers of units might take place in the future. For IETA next year in Paris, we would like to see a piece of the treaty tax or protocol tax, whatever it is, that makes clear that countries that want to engage in transfers are allowed to do so, but that some of the detail about how that works in an offsets context could be done in the new market mechanism and, in terms of the leaking arrangements, might be done in the framework for various approaches.

Anyway, these are both negotiating tracks that people spend a lot of time on. They are ripe for either a breakthrough or fizzling out and being replaced with something else, but I think it is probably the former. Between now and next year, you ought to start to see some meat on the bones about what those provisions will mean going forward.

Dr Taschini: The World Bank exercise was not just limited to ETSSs. The World Bank was looking at the entire spectrum of carbon units. They were looking at NAMAs. They were looking to sectoral approaches, CDMs, renewable obligations, everything that can be transformed into a renewable unit. Of course, the more instruments you have, the harder the exercise of transferring and creating equivalence from one to one.

Q14 Mr Lilley: This is very abstract. Can I give you a concrete example? Country A decides to reduce its emissions by 10% per annum. Country B thinks that is going to be too painful for its businesses so it is only going to reduce its emissions and its emission permits by 5% per annum. What happens when they link?

Dirk Forrister: First of all, there would have to be a decision by A and B that it is to mutual advantage to link. As Luca mentioned earlier on, the first thing they have to satisfy themselves of is that the programmes are of common enough stringency to be linkable. If you are the strong one and you think the other one is too weak, you probably are not going to do it because you do not want to get the public criticism of weakening your programme.

It is possible that what you just described, though, is a reasonable link because it depends on the level of effort required to get to those numbers. Different countries have different starting points. In the European Union context, we have seen some countries are doing more and others are doing less and it is believed to be still reasonable because they are all taking on relatively similar levels of effort.

Dr Taschini: The two different levels do not necessarily reflect in terms of different prices because a country may have a much more stringent cap but have cheaper abatement options or cover different sectors where there are cheaper abatement options. So long as they have prices at the point where they link in comparable terms, I do not think it is impossible. That is absolutely possible. Obviously, if you have two levels of ambitions that are extremely different, from the very first moment they would not even start to negotiate. That is why I think it is extremely important to have this linking process in terms of assessing who your best partner is. You cannot simply approach other countries with an ETS because they simply have an ETS.

Q15 Mr Lilley: If you have policies of equal stringency, ie they result in the same emissions price, what then are the virtues of linking?

Dr Taschini: You create a broader, bigger market. Ideally, you would like the partner to not be exactly identical to you otherwise, yes, there are advantages but they may not be that big. You want a partner that is in some respect different from you so that the bigger the market is, the more resilient you are to shocks. In a way, you just increase the liquidity of the system and you make the system more robust.

Q16 Dan Byles: You just alluded to how it is quite important to make sure you get the right partner. Do you think there is a danger that the more we see this happening in an organic way round the world at some point we will get a problem area where someone will get it badly wrong and that that could knock confidence?

Dr Taschini: Badly wrong in the design of the ETS?

Dan Byles: Yes. You have alluded a number of times to the fact that that it is really important to get the right partner. You have to think about how you separate again afterwards. It is quite possible that somewhere in the world two schemes could try to link up, could get it wrong, could choose the wrong partner—

Dr Taschini: Then they decouple?

Dan Byles: Yes. Do you think there is a danger that if that happens in a messy way it could perhaps slow down this whole process and undermine confidence in the concept of linking?

Dirk Forrister: For me, I think that is one of the reasons that you want an international agreement, even in a bottom-up world, that provides some standards. I have mentioned some of the basics. You want to make sure that units that are transferred, bought or sold are done so in a transparent fashion and an honest fashion so that there is not a prospect for double counting. That is the big worry, I think—you could have a country that both sells credits and uses the same credits and gets in a sense a free ride because of that. Getting that clarity on how the accounting treatment works sounds really boring, but the accounting treatment does matter.

Similarly, I think that is one of the virtues of having some of these tools available at UN level so that you do not have substandard systems that develop. You could imagine a future where there is a bunch of countries that get together and have junk that they are trading among one another, pretending that it is helping the global effort but it is not. For my organisation, we would hate that because we want high quality systems. We do not want something that tarnishes the brand of emissions trading by having faulty credits trading. I am hopeful that something like that would help with the quality.

Q17 Dan Byles: This comes back to the idea that even in a bottom-up, slightly more organic approach some kind of common set of standards, some kind of framework that is a top-down internationally agreed framework is still really important?

Dirk Forrister: I believe so.

Q18 Dan Byles: How optimistic are you that that might be central to discussions next year in Paris?

Dirk Forrister: Well, coming off of the UN summit in New York a couple of weeks ago where I was privileged to attend parts of it where pricing was being talked about, I felt there was a real invigorated conversation, mainly because heads of state were talking about it and CEOs were talking about it and they were singing from the same hymnal. There had been a statement that the World Bank helped to co-ordinate that 1,000 businesses signed and 73 countries signed saying that they felt like carbon pricing did need to be a part of the Paris outcome. When you look at who those signatories were, it was the European Union, it was China, it was Russia. It was big players. Unfortunately, the US did not sign but California and Massachusetts and several of the RGGI states did. I think it has a bit of wind in the sails now that it did not have before so that it is in reach.

Q19 Dan Byles: It is a realistic possibility that Paris next year could see some useful internationally agreed framework?

Dirk Forrister: I think it will give us the framework. The challenge of it is that for investment to really flow you need some of the detail around exactly how it is going to work. Some of that may happen after Paris, but the general framework should come together there.

Dr Taschini: There is certainly a momentum now. A lot of different ETSs are talking and there is a dialogue already now between Guangdong and EU ETS, exploratory obviously, but just discussing. I would not be that pessimistic even with that. Definitely the framework will facilitate the dialogue between the different ETSs, but if there are mutual benefits in terms of linking to another ETS, with or without that platform, you still can have a link. It is always a matter of: why should I link; what are the objectives; will I achieve a reduction in my cost and at the same target level; why not do that? Once you have considered the possibility of decoupling and once that is properly accounted for at the very beginning, at the very moment when you link, I do not think that is really a disadvantage.

Q20 Dan Byles: If you were on the negotiating team, what sort of key principles would you like to see in the framework that might come out of Paris? You have alluded to some.

Dirk Forrister: First and foremost, ensuring that there is authority to trade, that for those that want to engage in transfers—it is not going to be mandatory; it is only for those that want to use it—that is allowed, and that there are good accounting rules. We think it should be done in some kind of a common accounting unit. We have become accustomed to a tonne of CO₂ equivalents being that unit, but it is important that that terminology be clear and that there be a requirement for reporting what you buy and what you sell and that those should match up. There should be a system for reconciling those accounts internationally. That is the first order of things.

The nice “to have” that I think might take a little longer but we would like to see is a work plan for interested parties to take forward work on common tools at UN level. I think about those as being standardised baselines for major sectors; a common registry that is available for use. We in Europe have seen what happens if there are multiple registries and one of them gets breached. It can infect all of them. Having a good rock solid one available at international level that smaller countries could access would be a tool that would be useful. Monitoring and verification protocols so that you can assure the quality of reductions that are being made, that would be another one. Those tools may take a little while to develop, but we would like to see a work plan that establishes work on those things.

Dr Taschini: Minimum level of compatibility exactly on those aspects. The ambitions level and the caps level is really country specific or jurisdiction specific, but in terms of offsets, monitoring, reporting, verification standards, those are the minimum bare standards that you want to have compatible from the very beginning.

Q21 Dan Byles: What about enforcement and some method of comeback if somebody is not playing by the rules and governance? Should that be done at an international level or is that a local level agreement?

Dirk Forrister: I did not put it in that list of tools because I tend to think of that as being something that is going to be done more at a party level, so for the member states equivalent. That is probably where the enforcement happens. That is one of the key issues under debate for the agreement as a whole is how you will ensure that countries live up to their commitments. I think the trend in those discussions is more towards national compliance rather than the ultimate top-down of having a UN-compliant system. It is probably more through transparency, the standards of reporting and then nations stating how it is going to be binding at home.

Q22 Dan Byles: It seems that in the example you gave of California and Quebec that is essentially a commercial arrangement, isn't it? Contract law, if anything, is going to be covering that. Or is it more complex than that?

Dirk Forrister: They might not call it contract law but it looks like contract law to me because they are joining an entity that they sit on the board of. They have common governance of it, but it is established not as an international agreement but as a co-operative arrangement between states.

Q23 Dan Byles: Where is it incorporated, by the way?

Dirk Forrister: I think it is in California.

Q24 Dan Byles: If there was a legal argument, it would probably have to end up in a Californian court?

Dirk Forrister: I am not 100% certain of that. The person who runs it—it is very light administratively—sits in the state of Colorado, so go figure.

Dr Taschini: Enforcement is an extremely important aspect. When we were investigating the ICAR, the international carbon allowance reserve for the World Bank, enforcement was one of the key aspects. You have to understand how you can enforce the penalty in case you do not achieve a certain compliance. It was extremely important and, in fact, in that particular case decoupling was working in both directions. You might have a country that decides to decouple or a country that is—

Dan Byles: Thrown out?

Dr Taschini: Thrown out, exactly, because it is not enforcing the law. That is extremely important and has to be somehow again taken into account at the very point you decide to link.

Q25 Sir Robert Smith: Quite a few of the submissions have said that for the EU ETS to link there needs to be reform or, as some have said, urgent reform. Do you agree there needs to be reform and, if so, what sort of reform is necessary?

Dirk Forrister: Yes, IETA agrees with that. We have tried to be a constructive participant in the debates in Brussels around how best to do that and with many key member states. One key thing that needs to happen is for there to be a clear target for 2030 and one that ideally moves the emissions trading programme more into the central role. It has some complication with the twin policies around it on efficiency and renewables. I think in the proposals that the Commission has made you see the carbon pricing element coming a little more to the forefront, which we think is a good thing.

There is, though, a problem of the immediate circumstance of the market being awash in allowances, mainly due to the economic crisis but also because some of the complementary policies were not well designed and continue to bring subsidised tonnes into the system, if you will. We have done a lot of work on the concept of a market stability reserve, which is a hot topic in Brussels right now. I think of it as being the allowance equivalent of a strategic petroleum reserve. It would be a reserve where excess credits are kept aside and brought to market in times when you are fearful about price spikes because the supplies are getting too tight. Conversely, you would withhold credits from auction in times when you felt like the market had plenty of liquidity and plenty of allowances in circulation.

There are questions about exactly how you set the balance around when you would bring the credits to market or when you would withhold them from the auction, but in concept we think that it is a useful way of dealing with the current situation.

Q26 Sir Robert Smith: Is the concept getting much traction?

Dirk Forrister: I think it is. It has a way to go yet, but as we surveyed our members we had a number of options that we looked at. Some people would have preferred another approach, like some on the left side might like to cancel a large chunk of allowances; some on the other side might like to do nothing; others might like to see some kind of a price floor established. This idea came out as everybody's second choice as an alternative that might meet everyone's needs most efficiently.

Dr Taschini: We did quite a lot of research on the MSR. Indeed, the European Commission gave us a grant to study precisely the MSR, the market stability reserve. It works in exactly the way Dirk described. We maybe are not completely in line with what the European Commission is suggesting in terms of the injection and withholding quantities but, connected to the discussion about linking, the MSR does exactly what a linkage system wants to do. The whole point of the MSR is to make the system resilient to shocks and the existence of an MSR will make the system resilient to those shocks in those systems where the EU ETS is linked. In the very same fashion the MSR makes the system resilient to the shocks in Europe. It will definitely be a tool used for linking.

Q27 Sir Robert Smith: Our own Department of Energy and Climate Change has stated it is pushing for EU ETS reform. As observers of the system, do you think that it has done enough and what else could it do?

Dirk Forrister: It has done a lot to provide strategic vision for where things need to go. I think the challenge to these ideas right now is the eastern part of Europe has some scepticism about it and is nervous about it and could use some reassurance, so continued outreach to places that are having concerns raised would be helpful.

Dr Taschini: A very thorough analysis. DECC released or is about to release a report on the different mechanisms and a sensitivity analysis of the MSR, so quite complex and comprehensive.

Q28 Sir Robert Smith: I think you mentioned it earlier. If you do go down the road of an emission trading scheme, can you use any other levers? If you have settled on emission trading, is it not by definition going to set your emissions? If you use any other levers it is going to alter how you reach that target, but you are not going to go below the target by introducing other levers?

Dirk Forrister: Most of the systems that we have seen emerge have had complementary policies, but they can sometimes obscure the carbon price from truly shining through. Ultimately, my organisation—and this probably would not be a surprise with a title like we have—would like to see it emerge as the central policy so that the others can fall away in time. There may be other reasons that you want to have a renewable policy, for example, for energy security and

diversification purposes, that kind of thing, I fully acknowledge that, but if climate change is your concern, then over time it really should emerge as the preeminent policy.

I have also seen the downside of having too much complementary policy because my own analysis is that that is part of why the legislation failed in Washington a few years ago: it was laden with so many other extra doses of policy that you had a 1,400-page Bill that no one understood. You could not really explain to the average voter why you needed that many layers of protection to achieve the central goal that you had. I think that was one of the mistakes of it.

Dr Taschini: The whole point of the MSR is precisely adjusting that quota. Once you set the quota, you are absolutely right, if you stay below the quota, mission accomplished; if you go above the quota, you have to pay some penalties. The way the MSR has been envisioned takes into account those contingencies where you were not able to predict for whatever reasons and then basically adjust the quota. By doing that, of course, you would ensure the optimality of the system.

Q29 Sir Robert Smith: Presumably, you have to have fairly strict rules for the market to have—

Dr Taschini: Absolutely. They have to be strict rules. It has to be a rule-based mechanism otherwise you can game the system.

Q30 Chair: Notwithstanding your interest in the greater use of emissions trading as the central and conceivably eventually the only instrument for addressing climate change, as an observer do you detect any movement towards that in the general climate change negotiations that are taking place and the contributions of individual countries or the EU? Is there a greater acceptance of the possibility of using emissions trading to the eventual exclusion of other policies?

Dirk Forrister: For me, and having worked on this issue for more years than I care to admit, I would say the biggest change that has happened to the benefit of emissions trading as a tool is China's acceptance of it. I would never have been able to predict 10 years ago that sitting in front of you today you would have seven operating pilot programmes in China. One of them, Guangdong, which was mentioned, is essentially as large as Germany. That is a big province in China. They have an emissions trading programme, and if you talk to Chinese officials they are pretty clear that they are headed towards a national emissions trading system. Again, I would not have thought that possible 10 years ago.

The whole reason it is possible is because they have seen the success that Europe has had in bringing together the political constituencies to get a system operational and they had the experience of offsets in the CDM. Again, when I talk to Chinese officials, they point to that and say, "If we had not had a good experience on the CDM, if we had not learned how this tool works, we would never be looking at a national programme". But they are and I think it is serious.

I do still think it is a live theme in the US as well. It is coming more from state-level responses to a federal goal, but that is likely to produce some additional trading markets at the state or regional level in the US.

For me, those are the three big jurisdictions that really matter emissions-wise on how we deal with this problem. Others can be added later, but if you get North America, Europe and China all

moving in the direction of emissions trading, those are the guys that you need to have in a system to make it meaningful.

Dr Taschini: I would just mention there is a clear momentum. You have different states and jurisdictions, Brazil, Mexico, Chile, discussing the opportunity to have an ETS. Chile is actually going for a carbon tax, but they were taking into account the possibility of an ETS. South Africa decided to go for a carbon tax but again exploring the possibility of an ETS. Attending conferences in China, what is interesting is that China was looking and is still looking at Europe as best practice learning, but if you go to conferences or workshops in Asia you have Vietnam, Hong Kong and Thailand looking at China as a good example of how to design an ETS in the Asian context. That is quite interesting. There is clearly momentum.

Chair: Well, as you know, this Committee is going to China next week to explore some of these issues.

Q31 Ian Lavery: Talking about the importance of China's ETS schemes—and you touched on it very briefly there—how do you think the pilot schemes are progressing in China?

Dirk Forrister: It is still early days. They are, in my mind, still going through some growing pains because the most important thing was to get the essential system set up so that the entities knew that they were covered and how much of an emission responsibility they would have. The hard part really has not begun of tightening the targets over time. Right now, they are operating but with low liquidity so there is not a whole lot of trading going on. I think that will change in time, but there is a reason for it. Part of it is that the length of most of the pilots is three years, so you do not have very much visibility of the future of how long your obligation is going to last. If you make extra reductions and bank them, will they be useful later on? That is a bit of a challenge.

A second is—and I think you will hear this when you visit there—there is less experience in China with futures markets across many commodities. It is not just a carbon thing, but as you look at other commodities, they trade more on a spot basis rather than on a forward or futures basis. That has also contributed to the low amount of liquidity. For example, I have been in workshops with a Chinese company that will say, “Why should I buy more than I need right now? Why shouldn't I just wait until the end of the compliance year so that I know how many tonnes I need to buy? Why shouldn't I just wait?” Of course, the reason is if everybody does that, you know what happens to the price, it spikes because everybody is coming to market at the same time. Most companies in Europe have taken the averaging approach of buying little bits over a long period of time. That is growing pains to me in China because they have not experienced that. You can see in their graphs that there have been some spikes around compliance deadlines. I think they will learn that and I also think that there is a regulatory reason for it in that the regulatory agencies that govern trading have not yet clarified whether futures are going to be allowed in China. Everybody is thinking more in a spot context.

You have this convergence of things. The last one that I will mention is just starting to change. I think it is Shenzhen that recently opened up to more participants in the system, including foreign participants, but they have not typically allowed what we would call market makers—so that would be like a bank—to enter the system to be a buyer and a seller every day. By not having financial intermediaries, that has reduced the liquidity because you only have a market when someone wants to buy and there is also someone who wants to sell that day. In China, that does

not necessarily exist on a very grand scale every day. Again, this is really early days and I am amazed at how far it has come in just the year and a half since I first went there to talk to people about the first one going live. It is really moving on a fast pace.

Q32 Ian Lavery: Do you think they are favouring a national ETS or do you think they are favouring the linking up of the pilot schemes?

Dirk Forrister: It is a very hot question now—the direction the national Government will go. Will it scrap the ETSs and replace it with something grander or will it expand them, link them together, add some more? In theory, we should learn about this in the next five-year plan next year, but again the Chinese experts that I have talked to point to the signals that they have seen in official policy pronouncements that make clear to them the direction that it is headed. They know that it is going national ETS. Just how it moves from here to there is the question.

Dr Taschini: We have three different projects at LSE, two with Shanghai, one precisely about the futures market. We helped them to make the point they need futures and they will have futures, apparently. We have been talking to the CSRC in China. Another one is about capital market oversight. In an ETS like Guangdong you have 900 entities, a sufficiently large number of entities so you will maybe not have market power, but in the situation of the Shanghai ETS you do have market power. You have one particular company that owns 40% of the allowances out of 192 entities. That is another analysis we have been doing for them.

Now we have two other ongoing projects with Guangdong. The first one, interestingly enough, was best practice of a market stability reserve. They wanted to incorporate something like that into their system precisely because they want to adjust the quota, the quantity. Although it is an intensity-based system, still they wanted to play around with the quota.

The second one is a project that will start soon. They would like to make the point that Guangdong could be linked to Shenzhen. We are starting to use this linking partner process to understand what the benefits and the cons are of linking the two systems.

My view is that obviously there is a clear interest in a single ETS. We could have a common platform and different ETSs that will be integrated. I am not sure that the national DRC will favour the existence of different pilot schemes, so maybe they will just scrap everything and constitute and construct a new nationwide ETS.

Q33 Ian Lavery: It is very interesting you say that. What potential is there for the China ETS pilots and, in particular, the Guangdong pilot to link with the EU ETS?

Dr Taschini: There are, I think, two major barriers for the linkage. The first one is related to the fact that we do have an absolute target; they have an intensity target. It is not insurmountable; we can deal with that. We can construct mechanisms that can take account of that.

The second one is related to the horizon that Dirk just mentioned. They have a three-year horizon. A maximum five-year horizon is something that will be rolled over, and we have 2030, 2040, 2050. We are really talking about phase 4, potentially phase 5. The timing, again, is another barrier.

There are potentials in terms of sector coverage. It is very interesting what sectors are covered by Guangdong. They already have an auction system. In fact, Guangdong I would say is the system that most resembles the EU ETS except the time horizon and the intensity target. They are already exploring that. In fact, I know that the FCO is sponsoring some research with colleagues at Birmingham University about that.

Dirk Forrister: The other question mark about it is what the Chinese national Government would think about that. Would they make provision for it? This is an area perhaps of international treaty making that we do not understand well yet and we all may need to learn about this in the coming years. What happens with sub-national systems that are interested in linking into an international market? Do you have to have a treaty or could we take a lesson from what California and Quebec have done and say that it can be done through a different kind of administrative arrangement without requiring a formal treaty? In that example, the guardian of the treaty-making authority of the United States is the State Department. What would they need in terms of their comfort level in an international arrangement to enable states that want to connect with others across borders? I am sure there are probably some areas of international commerce where that has been done, where state-level connections have been made with other nations, but this aspect could come into play with that Guangdong example. If China wanted it to happen, I am sure they could find a way to make provision for that to happen, but my judgment is it would only happen if the national Government was okay with it.

Q34 Ian Lavery: Finally, how important are China's ETSs to the potential for a future global ETS scheme?

Dirk Forrister: Again, I think in emissions terms when you look at the list of the top emitters on the planet, it is really the top 15 or so that matter in terms of making the emission reductions necessary to keep the planet safe because that is where the emissions are. China being the largest now, it is pretty much if they do not go forward with it, then I am not sure that the contributions from others would ultimately be meaningful. I view China as an essential, just like I think ultimately it is essential for the US to be in a comparable system. Those are things that hopefully we will see unfold over the coming years.

Another set of very key players, Brazil and Indonesia, especially on the forestry front, are going to be very important. Russia is still a very large player in terms of emissions. That is going to be important. South Korea and Japan are still very important and we are seeing an emissions trading programme under design right now in South Korea that will go live next year. That is another important example. We do not tend to talk about it as much as China because it is not quite as big, but in terms of setting the tone for Asia's response it is also quite important. To me, China is essential for the future.

Q35 Graham Stringer: Mr Forrister, one of the things you said earlier was that emissions trading essentially was the way to reduce carbon going into the atmosphere. What I had not understood was what Dr Taschini said, that the Chinese emission trading schemes are based on intensity. Intensity has nothing to do with the absolute amount of carbon going in; it is just the rate of production. How can you marry those two things together, or does China have to change its scheme to the kind of scheme Europe and the States have?

Dirk Forrister: This is one of the main topics that we are looking to learn more from China on in what they put forward in their target next year. The leader that they sent to New York talked about a peak year for emissions, which implies an absolute level that it would peak at and then begin to decline. I think that has set a lot of people to thinking about what that might imply for the type of target that China puts forward. But you are right; the atmosphere views it in absolutes. A carbon intensity target can be translated into an absolute number and maybe that is one way of doing it but—

Q36 Graham Stringer: But it is a rate or an efficiency production of carbon, isn't it?

Dirk Forrister: That is right.

Graham Stringer: If you have more plants becoming more efficient, you can still produce a lot more carbon but have improved your intensity.

Dirk Forrister: I think that is right. Again, you can multiply the numbers and come up with an absolute number out of it, but that has been the initial step that China has taken. I have to say it is not only China. I mentioned the Alberta system, which continues to hum along out there and produce some emission reductions off of their business as usual target, but it still is a rate-based performance approach. It is not quite getting the same level of ambition as an absolute system would.

Q37 Chair: It seems to be quite a key point this, really, and undoubtedly there was some significance in the fact that the Chinese representative in New York was willing to say there was an absolute target. We have been waiting to hear that publicly I think for some time. Therefore, we may be on the threshold of a new era. Just on this point that Graham has raised, in practice it would be very difficult, if not impossible, to have complete linkage between a system that was based on an absolute target and one that was based on an intensity target.

Dr Taschini: If by complete you mean one to one, you are absolutely right. Usually, what happens with an intensity target is that you have an ex post allocation of allowances. At the end of the year, you collect the information about how many tonnes of pollutant you have emitted and then you are allocated ex post the allowances. There you have a quantity now; you have an absolute quantity that you can compare. That means that you have some ratio, some exchange that will change through time. That, of course, makes the whole linking quite a challenge because you have to agree on that mechanism or on that exchange rate, yes, absolutely.

Q38 Sir Robert Smith: Apart from Alberta, are most others on actual absolute emissions or are there others intensity based?

Dirk Forrister: I think that is a preeminent example. Not another one is coming to mind now that is done on an intensity basis other than the examples in China. China is the big one.

Q39 Sir Robert Smith: You mentioned earlier the importance of the brand in terms of emissions. This is a whole market that requires confidence in the political direction of countries and, as it gets

bigger, in the treaties linking those countries together. Do you see the market being able to judge the political risks involved?

Dirk Forrister: Well, the market definitely seeks out clarity on what policy is and that is what drives investment. Frankly, that is what is not driving investment now—there is not enough clarity about the future in a lot of places.

Going back to that Alberta example for a moment, it presents a pretty interesting case study just because it has been in operation longer than the other systems in North America. For a while it was scoffed at because it had a buyout price at CAD\$15. Well, at CAD\$15 when the EU was trading in the €20 range, yes, it looked like a weak system, but these days it does not look so weak. In fact, the way that programme is designed, you have a baseline and anything above the baseline you either pay the fee into a technology fund that the Government invests in long-term solutions or you buy Alberta offsets.

What it has not done, though, is it has not given a level of confidence across Canada and across the United States that Alberta is living up to its fair share of global levels, even though it is doing some significant things. There is an industry there that has made this go forward, but there are already discussions about what is the next phase going to be; should that buyout price be significantly higher; should the benchmark for setting that baseline be tightened up so that it is not just on a par with what others are doing globally but it is showing some leadership? I think that is driven in part by the products that they are trying to sell from Alberta to the United States and to Europe; is that seen as being supported by a strong climate policy or not? It is definitely forcing a rethink right now. Maybe that is the kind of thing that we need more places in the future to think about—the aspect of showing some leadership and assuring that you are in the top class rather than the laggards.

Chair: Good, okay. I think we have come to the end of it. We have another panel also to question later on. Thank you very much indeed for your time and for coming in.

Examination of Witnesses

Witnesses: **Miles Austin**, Executive Director, Climate Markets and Investment Association, **Dr Richard Leese**, Director of Energy and Climate Change, Mineral Products Association, and **Martin Pibworth**, Managing Director of Wholesale, SSE, gave evidence.

Q40 Chair: Good morning. Thank you very much for waiting and for coming in. Would you like to very briefly introduce yourselves so we are absolutely clear who you are?

Martin Pibworth: Thank you, Chairman. I am Martin Pibworth. I am the Managing Director of Wholesale for SSE. That means I am responsible for all the energy trading activity within SSE alongside degeneration operations, and indeed the generation developments that we are currently doing.

Dr Leese: I am Richard Leese, Director of Energy and Climate Change at the Mineral Products Association. We are the trade association that looks after the interests of the aggregates, asphalts, cement, concrete, lime, silica sand, mortar, concrete industries.

Miles Austin: I am Miles Austin, the Executive Director of the Climate Markets and Investment Association, which is a trade association for companies that invest in greenhouse gas mitigation or otherwise help facilitate it, so financials, law firms, consultancies and so on. Crucially none of our members have any emissions and we are a democratic association. We were specifically set up to promote the progressive business voice that would like to see hard targets implemented, specifically at the beginning of the EU ETS but now we are spreading out more globally.

Q41 Chair: Thank you very much. What do you think the main benefits of linking ETSs would be, if any?

Martin Pibworth: May I start with that? Can I go back and give a little bit of perspective about how SSE perceives the EU emissions trading system. At its inception it was there to obviously ensure compliance, and be an investable instrument. There is no question it is also there as a pioneering market for perhaps other regions in the world to imitate. In that sense there were good societal reasons, good political and economic reasons, behind this introduction. Where we are today is that we are discussing China developing its own emissions trading schemes. I listened carefully to Dirk and he made it very clear that would have been a surprise to him 18 months ago. So in that sense you could say that the inception of the EU ETS, and its behaviour over the last nine years, has done its job in terms of corraling international opinion around a goal I suspect we will share.

Where we see things right now is that the EU ETS, as it currently stands, has various flaws. That is obviously most illustrated in the fact of its fairly low price track over the last two to three years and we know the reasons behind the price weakness. Macroeconomic weakness, international credit importing, technological change, LCPD, and so on, including energy efficiency, obviously should not be left out either.

What we feel is for the EU ETS to remain as a credible solution that leads the world into the sort of things that you were talking about in the last session and ultimately linkages, it needs some urgent reform and we are obviously very clear in our response on that matter.

We are not, at SSE, experts on global linkages. We are a UK and Irish player but we are very keen to see the EU ETS get strengthened to continue the trend of corraling international opinion around this as the optimal solution tackling the climate change issue that we face.

Dr Leese: In terms of benefits of linking, there are some, but we have to acknowledge that linking is the sub-optimal approach. The optimal approach is clearly a global agreement on climate change with comparable efforts for nations and manufacturing industries within those nations. While linking has some benefits to build capacity, that slower approach is definitely sub-optimal. However, it can help to minimise the abatement cost and assist with tackling a global problem in more of a global situation than currently we have now with the EU trying to do the lion's share of the work.

But linking has some potential distractions in developing that global agreement. We could get distracted down a linking approach and take our eye off the real game, which is a fully functioning global agreement with comparable efforts for nations.

Miles Austin: I am going to restrict myself to the potential benefits of linking. There are two key concepts that help to make market mechanisms a good idea over the various competing policies. Those are liquidity and depth. Liquidity and depth of the market essentially ensure that your ongoing allowance price is reflecting the ongoing abatement price within your cap and trade scheme, something the EU ETS arguably is not doing at the moment.

When you increase the number of participants you increase both the liquidity and depth of the market and you increase its ability to reflect the ongoing abatement price and increase the range of options of abatement that overall the scheme has. Those are the two key benefits to linking.

Q42 Chair: Do you see an advantage from London's point of view, given that it is a leader in carbon trading historically? Would that position be strengthened if we managed to link the EU ETS to other systems?

Miles Austin: It depends on the system and it depends on the nature of the linking. During the discussions around the federal cap and trade scheme that Dirk alluded to, there was a lot of discussion around whether or not there should be a transatlantic link. There you had two schemes with very different levels of ambition that, in all fairness, were unlinkable in that state. At that point the European Commission was off the record/on the record talking about wanting a €30 minimum price during phase 3 of the EU ETS and the US, in the discussion, got very nervous over anything that was above \$20.

So you had one scheme that wanted a minimum price that was up here and another scheme that wanted a maximum price that was down here. How would you link those or why would you want to link those? It was politically unfeasible. If they had had similar levels of ambition and similar prices, then it would have made a lot of sense.

Q43 Chair: Would the interests of the UK, looking at our competitive position and the growth of our economy, and so on, be threatened in any way if the EU ETS were to link? You just described what was clearly an incompatible relationship, but there might be others that are more compatible. Was there any circumstance into which that could impact negatively on the British economy?

Dr Leese: Absolutely, particularly for the manufacturing industry. The power generators stand very little chance of being exported to the Far East. My members in the cement industry particularly are threatened from imports from places like Turkey and North Africa, nations we have not talked about in the previous session very much.

We absolutely have the risk of carbon leakage with a linked system, which is not compatible. The previous session highlighted towards the end very much the differences that there can be between these link schemes, particularly the intensity target versus an absolute cap. We need an absolute cap to be compatible and without that we would see a manufacturing industry exported and products imported into the UK.

Q44 Chair: But is not what your members would think threatens them—we might debate whether it does or not but let us accept that they might think that for the time being—a rising price above all?

Dr Leese: Yes, some people want ETS to be an emissions reduction mechanism and others want a high price.

Q45 Chair: Those two are not incompatible, are they? Tighter caps will lead possibly to a higher price.

Dr Leese: Yes, but also it could lead to offshoring manufacturing and the higher price camp would suggest the power generators will pass the cost on. The manufacturing industries cannot pass the cost on because they are threatened by imports and that is where the two views are incompatible.

Martin Pibworth: Maybe there is a risk. I would hate to disagree with my fellow panellist, but I do not think that is the reality yet. Obviously in the UK we are not only subject to an EU ETS price but we are subject to a carbon support mechanism tax as well, so that is realistically priced into our economy right now. I would probably also postulate that the fact that we have that support mechanism in the UK is a response to the relative flaws in the EU ETS. So you equate a potential of economic inefficiency because you end up with a proliferation of taxes, schemes, levies, and so on, that do not look holistic in their entirety.

So I would go back to my first point that for me we should be concentrating perhaps on EU ETS reform before we get into the complexity of global linkages. We are facing an immature market. There as a former trader I can tell you who has traded on the basis of notional value based on political intervention rather than realistic cost of carbon in the economy. That needs to be resolved to give the trading market confidence and the people who invest against that price signal, confidence to do so.

Q46 Chair: So you are saying reform has to come before any attempt to link?

Martin Pibworth: Absolutely. I wrote various things down in the last session but I was struck by what Mr Forrister said about the EU original design. He made the point that complementary mechanisms were not well designed and that caused issues on international credit flows. I also noted various other opinions about the complicated and difficult nature of this—that was a phrase I heard in respect of doing linkages. We are not in a place in the EU market itself—we are in a robust mature place with a mechanism that is accepted by all. So we were very clear in our response that we would call for urgent reform. We would call for market stability reserve to be pulled in earlier in 2017 ideally to try to correct some of the flaws we see in that market, give it confidence and then use that as the basis to link in other markets going forward, to create the effects that Miles talked about in terms of increased liquidity and basis for trading.

Q47 Sir Robert Smith: I just think I should remind the Committee of my entry in the Register of Members' Interests to do with oil and gas industry and in particular a shareholding in Shell, which obviously relates to emissions. On the reforms needed of the EU ETS, do you think the Department of Energy and Climate Change are doing a good job?

Martin Pibworth: Clearly this is a very complicated issue, which requires consensus across Europe. DECC have done various things that have been very good and credible for the market in general. We would probably like them to match the German Government's position in calling for the MSR to be introduced in 2017, but we accept that a Government has to be relatively careful and considerate about what it is doing before making those sort of proclamations but we think the UK Government has taken a constructive approach over the last nine or 10 years on this and we would like them to use their influence around the European Union to create further gains in this space.

Generally I understand why DECC would be reasonably careful on this, given its complexity, but they have done things that look very strong and credible.

Q48 Sir Robert Smith: So is that shared?

Dr Leese: No, the UK vision issued in July by DECC was very high level and lacking in detail. What we do not have from DECC is a clear vision about what they feel the post-2020 EU ETS should look like. We know some of the high level signals, they want to cancel some of the surplus allowances and while that might have a very short impact on the EUA price it could have disastrous effects on the manufacturing industry.

I much prefer other proposals that have been discussed at the moment, such as allocation supply reserve, which is to take those surplus allowances and put them in a reserve that will help to offset the problems with a descending trajectory, a much more stringent trajectory, a capped trajectory, that will prevent manufacturing industry getting the allowances that it needs to protect it against carbon leakage. At the moment we have a mechanism, the cross-sectoral correction factor within the EU ETS. Once the calculation has been made for free allocation to prevent the manufacturing industry going overseas there is then a slice taken off that, and it is an increasing slice out to 2020, it is called a cross-sectoral correction factor. So you are immediately reducing the amount of allowances that the vulnerable companies need to equalise the unequal situation that we have, which is the regional EU ETS compared to a global problem.

Miles Austin: On this particular issue DECC has done a very good job. The perception of hesitancy that is maybe put forward by some of the public pronouncements is not necessarily coming from DECC but maybe other parts of the Government who may not be very far away from where we are right now.

It would be good to see the UK coming out in support of the German position or something that is even more ambitious. Very clear pronouncement to put the back-loaded allowances into the reserve would be good. One of the key issues with the current MSR proposal, which we fully support—primarily because it is not price based, it is a volume based measure, and it is rule based as well, so it is automatic, so everyone has good foresight on what is going to happen when—is there is a very good methodology that has been put forward for calculating what the oversupply of allowances is. But it then says, “Okay, let us withdraw 12% per year”, which made no sense at all initially but—a back of the envelope calculation—if you take in 2020 what the Commission believes the oversupply will be and then withdraw 12% per year until 2030, then we will be roughly where we need to be, which means we are looking at having a system that has not been effectively reset for 15 years, which is not reeking of high ambition and we could do a lot more there and withdraw a lot more than 12% per year.

Two other issues: one issue is the hedging buffer that has been put in place for power companies. In 2020 I believe the proposed amount is 400 million tonnes per year. I do not fully understand the calculations of how that was reached, and I do not want to say that that is a good figure or a bad figure. But if we are then, over the next decade, decarbonising the power industry I do not understand why we then need 400 million tonnes as a hedging buffer in 2030. It should be lower. Otherwise we are simply sending a signal that we do not expect you to do anything, which is again not the signal that should be being sent.

The other slight cause for hesitancy is the MSR itself. The Commission believes in various pronouncements that by 2020 we will have a surplus of about 2.2 billion EUAs, so let us assume that over the course of phase 4 we do put those into the reserve. We will then be sitting with a reserve of 2.2 billion EUAs, which if we achieve what was supposed to be the minimum price of phase 3, which was €30 a tonne—quick back of the envelope calculation—would be worth something like €60 billion. Someone will want to put their finger in that and use it for something that it was not intended for. We have seen this happen before and it will drive down the price and undermine the system. So there should be some kind of limit either to the size of the reserve or the lifespan of EUAs when they go into the reserve because otherwise we are going to end up with a very large cookie jar that someone will want to raid.

Dr Leese: The problem with the MSR is it is a market intervention and that makes the EU ETS less attractive for other countries to link to because if somebody can meddle in the system then they will do. That makes it unattractive.

Q49 Sir Robert Smith: If it is rules based, so as a market player you can make your own assumptions when those triggers will work, is that not less damaging?

Dr Leese: The problem with it being rules based is it affects all of the operators in the system including those that are vulnerable to carbon leakage. If there is a problem with the volume in the system then take the volume from those companies that are not vulnerable to carbon leakage, the power generators, not those that have been designated as vulnerable to carbon leakage. I cannot see that other manufacturing nations would want to link to a system whereby their manufacturing industries would see less allowances compared to others.

Martin Pibworth: I would probably ask, who wants to link to a carbon price that is basically only nominal? What does that do for society and what does that do for tackling the issue we are discussing here? From an SSE perspective we would welcome an MSR, we see it as key to have a credible carbon price that is robust. I take on board and probably agree with a lot of what Miles has also said there. We would like a more strident execution of that.

We believe that without that you are going to have a carbon market that just drifts along aimlessly for many years and does not achieve what it set out to achieve, which is ultimately the economic allocation and efficient allocation of emissions and abatement of those where necessary to meet the overall targets.

Q50 Sir Robert Smith: You probably agree with the previous panel that other interventions—if you do have an emission trading system—in the market do not affect the overall emissions because you have that cap on the market through the trading system.

Martin Pibworth: This is probably a secondary response to your earlier question, if I may, about the Department of Energy and Climate Change. One of the results of a flawed EU ETS in our view is the carbon support mechanism introduction into the UK. When you are an investor looking at carbon markets and looking to try to price in investment appraisals for the long term to have an instrument in there, which is subject to Exchequer change, and much as I accept that it has been stabilised and frozen until the end of the decade, our investments are over a much longer period of time. That for me is a direct result of a market that is flawed and a Government intervention to correct that.

Clearly there are lots of extraneous factors going on in the carbon market that will affect total supply and demand and ultimately price. But to respond to some of the points that are made, we are concerned that without resolving this issue we will have a proliferation of policies in very different nation states that will ultimately lead to a fragmentation of carbon markets and indeed electricity markets across Europe rather than the other way round. We all want to support the most economic and efficient structure of those commodities.

Miles Austin: It depends how purist you want to be about it. Just to reflect the objection, which I have heard before, that we should not intervene in the market, the EU ETS is itself a market intervention by its very nature and it is intervening to correct what has been described as the greatest market failure of our time. So the idea that when we designed that we got it right first time and would never need to come back and correct it, I strongly disagree with because we have never managed to design anything that we have not come and redesigned later on.

The strength of the MSR is that it is rules based, that it reacts to volume and that it is predictable. To clarify why it is important that it reacts to volume and not price, the key form of abatement that was anticipated for the EU ETS in the early stages was basically coal to gas switching in the power generating sector. The cost of doing that is dictated by the difference between coal and gas, which varies a lot. So you can have the same amount of abatement being carried out in one year where the coal/gas differential is X, costing more or less, dependent on what the spread between the two is in the next year. You have to decide what volume you want to reduce and not at what price it is.

In terms of parallel policies, one of the things with the new MSR design is that it compensates for those as well. There is an argument that the current renewable energy subsidies, particularly in Germany, have undermined the EU ETS and that some of the work that has been done around energy efficiency has similarly undermined the EU ETS. The MSR would compensate for those. If those do create a longer position than we want within the EU ETS the MSR will Hoover that up, so it would allow you to carry on having complementary policies and maintaining at the same time the EU ETS as a central plank of climate policy in Europe.

Q51 Dan Byles: Notwithstanding the idea that linking ETS schemes might be the sub-optimal solution versus a global scheme, and notwithstanding some of the criticisms we have seen perhaps trying to link before repairing the EU ETS, and so on, if we accept that the goal to try linking ETS schemes around the world is a beneficial outcome, what do you think the best approach would be? You heard the discussion we had earlier about top-down versus bottom-up, and about some of the tensions and some of the links between those. Do you have any views on that?

Miles Austin: We had at the very beginning of the EU ETS the linking directive that linked the clean development mechanism of the Kyoto Protocol to the EU ETS. CERs were and still are a common global currency, and you create a fuzzy link via them. The current CER price is extremely

low due to a very large extent to a policy reversal on the part of Europe where in phase 2 of the European ETS it was possible to import 270 million tonnes per year of CERs and ERUs, in phase 3 it is 70 million tonnes per year, and in phase 4 the current proposal on the desk is zero.

The working assumption of a lot of the investors that went into the CDM was that the demand for CERs would increase as ambition increased. You asked earlier if there was an example of linking going wrong. I think that was a very strong example of linking going wrong because it has created billions of dollars of stranded assets of both developed and developing country money locked up in the CDM.

Q52 Dan Byles: Does that mean you think there is more of an argument for having at least a top-down framework to try to prevent problems like that, if we have a common approach?

Miles Austin: Having a top-down framework is definitely the preferred option for everyone. The political situation is that I think that is quite unlikely to happen. You might have some form of role for the UNFCCC to act as a hub to say, “Okay, we think that these credits, allowances, or whatever they are, meet certain commonly agreed environmental criteria”, but beyond that I cannot see something like the Kyoto architecture being recreated.

Then you get to the point where you have these disparate emissions trading schemes, and I agree with the earlier comment that you should not link a system that has hard caps versus intensity based caps. That is an absolute no-go. But if you had systems that had similar architecture but had very different price points at that moment in time you might want to look at some kind of fuzzy linking again. The World Bank has been doing some work on this via an initiative called the Globally Networked Carbon Markets where you would place a small amount of the allowances from a given trading system into an international reserve. It would act a bit like a closed currency. So you do not have full linking but you have a small amount being traded against each other at probably quite different price points.

Q53 Dan Byles: It needs to have an exchange rate between the two that can fluctuate.

Miles Austin: Exactly. But what experience tends to tell us with closed currencies is that over time the national currency value begins to approach and converge towards the value of the international trading currency, so what you would end up doing is moving the price points of the different trading systems slowly over time towards each other, at which point you could then go for a full link.

Q54 Dan Byles: So that would be beneficial?

Miles Austin: That would be beneficial at that point. But just to link trading schemes simply to link them is not a good idea. There needs to be certain fundamental conditions that have been met.

Q55 Dan Byles: It is a long game?

Miles Austin: It is. It is a game of patience, yes.

Dr Leese: I think we are in a situation where we are going to have both. We have top-down negotiation with the UNFCCC and we have a series of schemes operating that probably will not want to change very much, so they are going to have to get shoehorned together in some way. I would prefer a top-down system. The bottom-up system is going to be slow, it is going to be cumbersome, there are going to be compatibility issues, and that is why we put in our written evidence that we need some kind of compatibility checklist so that within the global framework these individual schemes can be checked against one another for compatibility.

We certainly need that from an environmental perspective. We need that global action. We have to look at Paris to deliver something real in terms of a strategic framework for ETSs. They have to be capped systems. We heard this morning about the different carbon pricing, the different intensity versus cap systems, which are not compatible. The problem with a bottom-up system is that while we wait for that transition, that convergence of EUA price or carbon price, what happens to vulnerable industries? That is my fear—in that transition period it might be deemed that we have some kind of agreement or link or some kind of compatible system, but it is not compatible, it is not levelising the cost of cement manufacturing in the UK versus one in Egypt, versus one in China or whatever. That is going to be the real important element.

Q56 Dan Byles: So you lock in a disparity or a problem early on and the damage will be done before you end up with equalised—

Dr Leese: And you get a slow drip feed of industry. It might not be the falling off a cliff but you get a slow drip feed or lack of investment in the UK as we start importing more and more.

Q57 Dan Byles: Dr Leese, I take it you disagree with the European Commission who suggested that the risk of carbon leakage has been decreasing as a result of the economic crisis and a declining carbon price?

Dr Leese: The recession has put a number of allowances in the system and that was the way it was designed. The Commission when they designed ETS did not want to look at some kind of ex post adjustment. Now with the MSR proposal they are looking at some kind of adjustment to the market. There is an acceptance there that the ETS needs some evolution, it does need some change. It does not need a radical change. It needs to develop.

The level of protection necessary for individual operators is different. The amount of allowances in the system should be considered. Certainly I have some members who have a different compliance situation than other operators because of their investment time horizon, that kind of thing. It is not as simplistic as saying, there are a lot of allowances in the system, therefore everybody is okay. that is not the case at all.

We have to remember that some of those allowances in the system were genuinely earned as well. My industry has invested in biomass fuels. We have gone from zero to 18% biomass fuels in probably a couple of decades. Some of those allowances are earned. You cannot go cancelling what has been genuinely earned by investment and hard work.

Q58 Dan Byles: Martin, do you have a view on this top-down versus bottom-up?

Martin Pibworth: I have to declare my complete inexpertise on this, although I would say that I listened very carefully to Mr Forrister's description of the hybrid approach and that seemed to make the best logical sense to me so I have nothing more to add. My colleagues are better placed to inform you.

Q59 Ian Lavery: Looking at the COP 21 in Paris next year, how might a global agreement to tackle climate change possibly improve the prospects of linking emission trading systems?

Dr Leese: I think the UNFCCC process has been slightly broken for a while. It has not delivered in the earlier COPs what we hoped it would do. Therefore we are making small steps towards an agreement. I have a fear that that agreement will be so high level and so lacking in detail that it will give the appearance of an agreement that will lead to changes for EU ETS operators, because the EU ETS directive says that, if you have an international agreement, you do not need free allocation of allowances. Unfortunately, it is that simplistic with the directive right now.

What we need is to make sure that, in going from an international agreement to a change in the free issuance of allowances to manufacturing industry vulnerable sectors, we have some kind of check to make sure that the international agreement is delivering a comparable effort.

Miles Austin: I think the hub idea that Dirk alluded to, the hybrid, is probably the absolute best thing that we could hope to get out of Paris. Given that the Paris agreement does not come into effect until 2020 we have five years to do design work and if we were presented an all-singing, all-dancing architecture in Paris it would be quite flawed. So it would be good if there was some kind of commitment to develop what Dirk was outlining over the next five years and to dot the i's and cross the t's, but I do not think there is sufficient time in the time frame we are in to come up with something that will be fully functional in a way that will be helpful.

More broadly on Paris, Copenhagen was the last time that the UNFCCC went gung-ho and tried to get a top-down agreement and it ended in abject failure to be fair. The current negotiating process has taken those lessons on board and is not trying to get a top-down agreement because it is simply politically impossible for the US to ratify a treaty through Congress because they do not have the votes to do it. Whereas something that is bottom-up can be implemented in a completely different manner that does not require ratification of an international treaty. If we lose the US then we lose China.

If you were starting from scratch and all other things being equal, you would want top-down but the political reality in the world is at the moment that bottom-up is basically the only thing that is on the table if you want China and the US on board.

Q60 Ian Lavery: What are the specific agreements you would like to see reached in Paris that could help to facilitate the future linking to the ETS?

Miles Austin: The key thing would be ambitious targets. They are no longer called pledges, I think they are called nationally determined contributions now—because we needed another acronym—and everyone is going to put those on the table up to, I think, March next year.

What would be very good is if we have an iterative process to look at those collectively in the context of what the science is telling us the global carbon budget is because I almost guarantee

there will be a mismatch and there will be a gap between the two. If we tighten those up then you will get to the point where you will have ambitious caps being put into place and ambitious global emissions limits being agreed and at that point you can start to talk about a thriving global market, which the UN could help to facilitate.

Martin Pibworth: Again, this is not an area of expertise for me, but it would strike me that the best chance of getting the sort of agreements that Miles outlines there in terms of ambitious caps is if the EU itself has taken some fairly strongly, courageous and robust steps in the interim. So as we go towards something like Paris it feels that the EU will be in a stronger position to try to corral international opinion if it has indeed fixed its own flaws and its own market first.

Q61 Ian Lavery: What role do you think the UK and the EU should play pushing for a global agreement?

Martin Pibworth: Again, this is not a field of expertise for me but I refer back to the inception of the EU ETS. There was a sense of leadership and direction between the international community on the design. We talked about €20 to €30 carbon pricing to encourage correct behaviours in decarbonisation and renewable investments. That has clearly been derailed principally because of the recessionary impacts that other colleagues have explained but other extraneous factors as well, so for the EU to encourage the international community to follow its original lead strikes me as obvious. The EU should be looking to fix those flaws now to reset that totem for others to follow.

Miles Austin: Just to follow up on that. Europe has a goal of 20% by 2020 currently. According to some sources we have hit about 18% already so that means for the rest of this decade we are doing 2%. The developed countries who were encouraged to take on targets of their own have noticed that and they are not impressed with the level of ambition that Europe is currently showing. So we have gone from being a fairly strong leader to a bloc that is viewed as doing 2%. That is not helping our position.

There was some early conversation about the framework for various approaches to a new market mechanism. The only proposal currently for a new market mechanism is the European one. To my mind it is not a market mechanism, it is a non-market mechanism. What it does is, it says, for instance, to China, "Okay, your steel sector has an intensity of this. We think it should have an intensity of this. If you beat that target then we will give the Chinese state some credits that they can then sell to other states to meet their compliance obligations". How the Chinese could do that is entirely down to them. It could be a tax, it could be a technology standard. It could be simply closing down an old plant or it could be a market base mechanism, but there is no stipulation that that is the case. What you would create is a group of states being credited that would then sell to other states, so you would have bulk buying over very small periods of time, which is not creating a market at all, in any sense of the word. It would not create the liquidity and depth and generate the benefits, the prime rationale for having a market in the first place.

The EU is being a little bit more flexible on that but they have been very hard line since Poznan, when they initially proposed this idea, and they have had zero uptake from any of the developing countries who would be hosting this thing. So some more flexibility there would be very useful.

Dr Leese: What we need to think about, in terms of the ambitious pledges, is that not all of that ambitious pledge needs to fall on the EU ETS sector. It does not necessarily have to fall on one factory. I think we have about 45% of the emissions coverage in the EU ETS, so a pledge in Paris could mean a greater ambition for the sectors of the economy, and we should recognise the manufacturing industry has done the lion's share of early action.

Another point I do not think we should forget is the investment time horizons we mentioned earlier. On the implementation of the Paris agreement in 2020, just five years after a Paris COP, my industry works on a 40-year investment time horizon. We need a long-term signal but we also need a signal that gives the protection in the short term to help us transition to that low carbon economy.

Q62 Ian Lavery: If there is not a deal struck in Paris does this endanger in any way the future of the EU ETS?

Miles Austin: I cannot see an outcome where that would be the case, no.

Dr Leese: The problem is with a continued isolated system we are just putting pressure on vulnerable sectors within the EU. We absolutely must come out of Paris with something that starts to equalise the unequal situation that we have.

Martin Pibworth: I agree with Miles. I cannot foresee any danger to the EU ETS per se.

Miles Austin: Particularly as we are not as isolated as Dirk mentioned. The Chinese are taking action. There is a number. It is not just Quebec in Canada. There are also other provinces within Canada that are looking at action. There is RGGI in the north-east of the US. AB 32 in California has the ability to pull in other states and there is some interest around that. The Mexicans are looking at implementing a scheme. The South Koreans are looking at implementing a scheme. We have a scheme in New Zealand. The Australians designed their scheme, implemented it, and have now pulled the plug on it for now. Basically you have a situation where you have a lot of cap and trade schemes springing up globally—Kazakhstan as well also have one—so even in the absence of an overarching agreement from Paris you have a lot of action taking place anyway, which you could at some point down the road begin to look at linking.

Q63 Chair: Given the ambition that some of these schemes have and the capacity of some of the countries involved to act perhaps more quickly than 28 European countries trying to reach agreement, is there a risk that by the 2020s the EU just might have been completely overtaken? It might be a laggard. It has failed to reform itself. It has a very low carbon price, all these allowances floating around, Poland vetoed everything else we want to try to do, we might be left behind.

Miles Austin: If we do not get the MSR in place then the EU ETS will become internationally irrelevant.

Martin Pibworth: Absolutely. Miles described how the initiative is seen as a progressive world-leading pioneering mechanism and his description that the developing world was looking at the EU bloc now and seeing a fairly limited ambition going forward is quite striking. Of course it appears to us that the pace of change elsewhere is outstripping the requirements in the EU, so I would absolutely agree with Miles that the MSR is critical to this to rebase expectation, the ambition and direction of the scheme.

Q64 Chair: At an early date?

Martin Pibworth: 2017 would be our target.

Q65 Chair: Just on the point, Dr Leese, you made about your industry being concerned about changes that are brought in possibly on a five-year time horizon, clearly we all understand the challenges of industries that have very long investment cycles, but nevertheless, is it not the case that presumably the participants in the industry are looking ahead quite a long way because their decisions are taken for such a long period? Are you saying that they envisage there will not be some form of carbon pricing emerging worldwide in the 2020s?

Dr Leese: My members are involved in the emission trading scheme. We have a greenhouse gas strategy out to 2050 to demonstrate our commitment in terms of where we see the industry going. The cement industry globally has a greenhouse gas roadmap to 2050 and was the first sector to do that.

I do not think we are avoiding our environmental obligations at all. We have taken considerable early action. Carbon price is very much a part of doing business in the cement sector. Energy costs are about 40% of the sector's GVA so it is very much in the DNA of cement manufacturing right now.

Yes, we see that carbon pricing is not going to go away. What we are concerned about is the unequal fractured approach that is taking place right now and the consequences of doing that over an accelerated timeline.

Q66 Chair: But from what we have heard—and we may not accept all of it—it seems to me overwhelmingly likely that pretty well the whole of the developed world will be covered by some form of carbon pricing in a relatively short time frame, so I am not sure why you would be so anxious about implementation of a Paris agreement, if any, in 2020. It would seem to be a reckless approach to the business in that industry if it did not factor into its assumptions significant rises in carbon price, whether by taxation or emissions trading in a relatively short time frame.

Dr Leese: But it depends on whether those efforts in the other nations are comparable and whether those carbon prices are the same carbon prices because it only takes a very small shift in carbon prices for a CO₂ intensive sector like cement to shift manufacturing overseas. We have done some work with Boston Consulting Group who said that a relatively modest EUA price at €24 could wipe out clinker production, which is the energy intensive intermediate in cement, in the UK.

Interestingly, as the Australian cement industry saw the carbon pricing coming in their direction they now have no clinker production in Australia. They are totally reliant upon China.

Chair: Thank you very much for your help this morning. Very useful session for us. Alan, sorry, you just came back in time for the conclusion. Thank you for coming in.