HOUSE OF LORDS

Environment and Climate Change Committee

Uncorrected oral evidence: Methane

Wednesday 13 March 2024

10 am

Watch the meeting

Members present: Baroness Sheehan (The Chair); Baroness Bray of Coln; Lord Frost; Lord Giddens; Lord Grantchester; The Earl of Leicester; Lord Ravensdale; Earl Russell; Lord Trees; The Duke of Wellington; Baroness Whitaker.

Evidence Session No. 1 | Heard in Public | Questions 1 - 22

Witnesses

I: Professor Myles Allen, Head of Atmospheric, Oceanic and Planetary Physics, University of Oxford; Professor Piers Forster, Interim Chair, Climate Change Committee; Dr Fiona O'Connor; Science Fellow and Scientific Manager, Atmospheric Composition and Climate Team, Met Office; Professor Dave Reay, Co-Chair, Just Transition Commission, and Chair, Carbon Management & Education, Edinburgh University; Louise Burrows, Climate and Energy Diplomacy Lead, Beyond Oil and Gas Alliance.

Examination of witnesses

Professor Myles Allen, Professor Piers Forster, Dr Fiona O'Connor, Professor Dave Reay and Louise Burrows.

Q1 **The Chair:** Good morning and welcome to the first session of the Lords Environment and Climate Change Committee's inquiry into methane. The session today will be an overview of current climate change data, the significance of methane to the climate, the broader international context, the debate about metrics and the UK's progress on reducing methane emissions.

I would like to say a big thank you to our very distinguished panel of expert witnesses for making the time to be with us today. They are Professor Piers Forster, Dr Fiona O'Connor and Ms Louise Burrows, who are with us around the horseshoe, and online we have Professor Myles Allen and Professor Dave Reay. May I ask each of you to briefly introduce yourself when you first speak, in the interest of time?

Before we start, I remind everyone that the session is webcast live and available to view via the parliamentary website, and that a transcript of it will be made public. Witnesses will have the chance to review the transcript and may, if necessary and with the agreement of the clerks, make adjustments. Members are reminded that they should declare any relevant interests before speaking for the first time. Before asking the first question, I should say that I have no relevant declarations for this session. I refer everyone to my entry on the register of interests on the parliamentary website if they are interested.

The context to my opening question is this. The media are reporting alarming developments, such as unexpected and unexplained spikes in ocean temperatures, the possible disruption of ocean currents that stabilise our planet's weather systems and, last but not least, the stresses faced by the Thwaites glacier, sometimes termed the doomsday glacier.

Could you provide a brief overview of the current status of global warming and temperature changes, in light of data indicating that 2023 was the warmest on record?

Professor Myles Allen: The world has reached over 1.25 degrees warmer than pre-industrial temperatures, which are defined as the late 19th century by the UNFCCC, and is warming faster than ever. It is warming at about a quarter of a degree per decade, which means that it will be of the order of 10 years before we reach the 1.5 degree level that was specified as a target limit under the Government's aims to pursue efforts to limit warming to 1.5 degrees in Paris in 2015. That is the situation we are in.

Why is it warming so fast? Carbon dioxide emissions are higher than ever—those from fossil fuels and industry reached their highest level ever yesterday, having bounced back quickly following the Covid pandemic—but, very importantly, methane emissions are up and rising as well, and that is definitely contributing to the current rapid rate of global warming

that we see at the moment. A third important factor is that we believe—I should stress that this is more uncertain—that certain countries, like India and China, are succeeding in cleaning up their emissions from power stations, traffic and the like, which create aerosols that have a masking impact on the warming caused by greenhouse gases.

These three things are working together to drive the fastest human-induced warming rate that we believe we have seen so far. Piers Forster has done a grand job over the past year and a half or so of gathering all these data together, and I am sure that he can speak to his climate indicators initiative when I hand over, but that is the key point about the drivers.

I should stress that these estimates of warming levels and warming rates are based on an objective comparison of the warming that we expect from models and what we observe in observations. It is a combination of models and observations which this warming rate is derived from. These are not model-based results; you do not need to trust the models, as these results are based on a comparison of models and actual observations.

Professor Piers Forster: Professor Allen gave an excellent summary of where we have got to, but it is worth talking about what we are witnessing currently, because that 1.25 degrees is what we think is the human contribution to temperature change, but we have seen in past months these very elevated surface temperatures, which are now up about 1.5 degrees. It is quite difficult to tell where the extra 0.25 degrees has come from. We think it is really down to the peculiar pattern of winds that we have over the ocean and the El Niño conditions. We expect that to subside eventually, but it will do so only with this ongoing increase in temperature of about 0.25 degrees per decade. We are definitely currently in the situation of extremely high surface temperatures, with the associated impacts that we are experiencing in a lot of countries around the world.

Dr Fiona O'Connor: I agree totally with what Myles and Piers have already said. It is worth noting that the World Meteorological Organization, using six different international datasets, has assessed 2023 in the context of the historical record and found it to be 1.46 degrees warmer than the industrial baseline period. So there are a number of datasets all showing consistent record-breaking temperatures against the historical record. It is worth noting that the latter part of 2023 was influenced by ENSO, which Piers mentioned, and that would have contributed somewhat to the record temperatures, and those El Niño conditions have persisted through the early part of 2024.

Q2 **Lord Grantchester:** Could I quickly dive in to ask a general question that might sound a bit flippant at the end? How far is it fair to say that these levels are a tipping point? In other words, do they suggest that, once we have reached and breached them, there is no turning back? Is there some sense that actions could be taken that would be effective after these thresholds are reached, or are we all doomed?

Professor Myles Allen: I feel very strongly about this. No, we are not all doomed, because future warming is determined by future emissions. It is important to stress that this combination of human-induced warming and the natural fluctuations that Piers mentioned are not something we do not understand. The world is warming pretty much precisely as it was predicted to warm in response to rising greenhouse gas concentrations back in the 1970s, so there is no evidence that we have crossed a global tipping point and reached a point of no return. If we want to stop the warming, it is very simple: we have to reduce carbon dioxide emissions into the atmosphere to net zero and to get methane emissions on to a declining path—stop them rising, turn them around and start them declining again. If we manage to do that, we can stop the warming.

Dr Fiona O'Connor: I agree totally with what Myles said there. It is fair to say that the risk of tipping points increases with increasing temperatures. So, as he said, by controlling future emissions we can limit the extent of future change.

Professor Piers Forster: We can reduce the temperature trend from 0.25 degrees per decade to 0.1 degree within the next 10-year timeframe if we address both carbon dioxide and methane.

Q3 **Lord Ravensdale:** My interests are that I am a project director and engineer working for AtkinsRéalis, an engineering consultancy, and I am a director of Peers for the Planet.

Mine is more of a framing question to get more into the detail on methane. What is the impact of methane emissions on climate change, and how does it differ from CO_2?

Dr Fiona O'Connor: There are three factors that determine the impact a greenhouse gas has on climate. The first is human-caused emissions and how they have changed. The second is the fate of the greenhouse gas once it is emitted into the atmosphere, in particular how long-lived it is there. The third factor is the efficiency of that greenhouse gas in absorbing energy that would otherwise escape to space.

If we take those three factors into account, the sixth assessment report of the Intergovernmental Panel on Climate Change ranked carbon dioxide as the most important greenhouse gas, contributing 0.8 degrees to historical warming, and it ranked methane as second, contributing 0.5 degrees to historical warming.

Key differences are in relation to lifetime. A perturbation of methane in the atmosphere will last about 12 years, whereas something in the range of 15% to 40% of carbon dioxide emissions will remain in the atmosphere for up to 2,000 years, so there is quite a difference in lifetime. Methane is a much stronger absorber of energy than carbon dioxide, so although methane emissions are much smaller than carbon dioxide emissions, their impact is magnified through the fact that methane is a strong absorber.

A key point in relation to methane's lifetime arises because it is chemically reactive. In particular, methane emissions can generate ozone, which itself is a greenhouse gas that adds to the climate impact from methane. Ozone, when it is close to the surface, is also an air pollutant, so methane has an impact on climate and on air quality. Carbon dioxide does not have a direct impact on air quality in the same way.

Professor Dave Reay: I will introduce myself first. I am professor of carbon management at the University of Edinburgh and co-chair of the Just Transition Commission.

I want to reinforce Fiona's point about methane and air quality. We will talk a lot today about its role as a climate forcer, and that is crucial, but in terms of cutting emissions there is the double dividend of improving air quality and having substantial human health benefits. A key driver for the global methane pledge—we will come on to that—for the parties that have signed up to it is those direct human health benefits through air quality, as well as addressing climate change.

Dr Fiona O'Connor: I should just add that the difference in lifetime between carbon dioxide and methane means that, in the context of their impact on climate, it is the sum total of carbon dioxide emissions that matter in historical climate change, and indeed future change. With methane, because it is more short-lived, it is more about the current emission rate or, indeed, the emission rate in the very recent past. That is also key point in relation to the two greenhouse gases.

Q4 **Lord Ravensdale:** You mention that methane has contributed around 0.5 degrees centigrade to historical warming, so what climate and environmental impacts can a reduction in methane emissions achieve when we look at that overall picture?

Professor Myles Allen: The key point is that methane reductions, because of this short lifetime, result in a reduction of methane concentrations in the atmosphere and therefore, if they are fast enough, in a potential reduction in global temperatures. The kind of methane reductions that are envisaged as feasible by the Intergovernmental Panel on Climate Change's sixth assessment report would reduce global temperatures by 0.2 degrees to 0.3 degrees in the second half of this century. That is a substantial win, but it is important to put it into context: right now, carbon dioxide emissions are driving up global temperatures by about 0.2 degrees per decade.

If we could do all that the Intergovernmental Panel on Climate Change thinks we can to reduce methane emissions, we could shave 10 to 15 years of carbon dioxide-induced warming off temperatures in the second half of this century. We absolutely have to act on both, and it is very important that we do not take away the message that methane is a quick win so let us worry about carbon dioxide later.

Q5 **The Earl of Leicester:** My interests on the register include landowner

and regenerative agricultural farmer in Norfolk.

The Chair will hate me for asking this question, but it was interesting to hear what you said about how many degrees per decade that CO_2 and methane could be responsible for. I understand that another large emitter of greenhouse gases is nitrous oxide, and the real concern about nitrous oxide is that it is really good at depleting the ozone layer. How bad is that gas, and should we be looking at it as well in due course?

The Chair: If any of the witnesses has anything to add, please would you write in to the committee on nitrous oxide?

Professor Piers Forster: Yes. That is also an important greenhouse gas. It is the third most important in the atmosphere and, like carbon dioxide, it is a long-lived one—it has about a 110-year lifetime—but its historical contribution to warming is not as significant. I cannot remember the number exactly, but I think its contribution is about 0.1 degree or under. That does not mean it is not important to address it. Just as you say, it is also an important source of air pollution, so it is good to design climate policies that address all the greenhouse gases.

The Chair: If any of the other witnesses would like to write in with further information for the benefit of the committee, I would be very grateful.

Q6 **Lord Trees:** I have no particular declaration of interests, except that I am a vet and I like cows, so I get that out of the way.

We have in our papers a disturbing graph of global monthly mean atmospheric concentrations of methane, which have been rising very steeply in the last 30 years or more, despite it also degrading over that period—in contrast to the UK situation, I might add. What is the contribution to this increase of anthropogenic vis-à-vis biogenic sources? Secondly, could you say a few words about the effect of human activity on biogenic methane sources?

Professor Dave Reay: Hopefully we can talk a bit about the increase in the last decade or more, because it is a big area of research and it is quite remarkable how fast the concentration has increased. Emissions are dominated by anthropogenic sources now, which includes the lovely cows through burping, fossil fuel industry waste, rice and biomass burning—the key sources.

The interaction between those biogenic sources is key. Natural biogenic sources like wetlands and freshwater sources are the dominant source of methane emissions to the atmosphere and respond to changes of climate. So one of the biggest impacts on those natural sources of methane is human-induced climate change itself, particularly changes in precipitation; changes in rainfall are likely to be a powerful factor for tropical wetlands, as well as overall warming.

There is also some direct interaction. Land use is key. I am in Kintyre on my farm, and a key way in which we have changed methane fluxes through generations is through land drainage. That is true around the

world with wetland drainage. Reducing soil moisture levels and water tables, particularly in wetland areas, reduces methane emissions. So we have that direct interaction as well as the substantial interaction through a change in climate.

Dr Fiona O'Connor: Methane has increased substantially since the pre-industrial period, largely due to anthropogenic emissions, but there is also a natural component. Forty per cent of anthropogenic emissions is from the fossil fuel industry; about 30% is from agriculture, including rice paddies and cows; and about 20% is from waste.

In recent years, particularly 2020 and the present day, we have seen record growth in methane in the atmosphere. The isotopic signature of methane in the atmosphere gives us a clue or an insight into the emissions that are driving those changes. We see a positive trend in what we refer to as carbon-13 or the proportion of carbon in methane that is heavier than the normal carbon-12. That points to fossil fuel emissions driving the increase over the historical period.

However, since 2007, the trend in delta-13 has reversed, indicating that there appears to be an increasing contribution to the rise in methane in the atmosphere from biogenic sources. They can be natural—from wetlands, as Dave mentioned—but emissions from cows and rice paddies are also biogenic. So we cannot distinguish between anthropogenic biogenic emissions and natural biogenic emissions from the isotopic signature and by using carbon-13, but there has definitely been a shift.

Q7 **Baroness Bray of Coln:** We are partly getting on to what I was going to ask you anyway, but my question is why. We have a reasonable record on this in this country, particularly recently, but methane emissions are clearly going up globally. Is there a particular reason why, even while we are beginning to do things a bit better in this country?

Professor Piers Forster: The big reason for the increase globally still comes from the continuing fossil fuel industry and agriculture. However, within the past 10-year timeframe, we have been able to use our satellite data and other things to track where that comes from. We also see big sources of methane coming from sub-Saharan Africa and the Amazon. Just as Dave said, these are caused by the very high surface temperatures and rainfall in those parts of the world. That is a response to climate change. There is still work to do there. It would be good for the committee to push on this need for good satellite data. Part of the methane pledge is to do that and to try to understand all the sources of methane. Once you can identify them, you will have options to control them.

Louise Burrows: Good morning, everyone. I am part of the Beyond Oil and Gas Alliance, but I am here in my former capacity as leader on methane in the COP unit. I just wanted to make that caveat.

There is a quick point I want to add on this. Another reason why we have seen a significant increase in methane emissions over the last 10 years or

so is the shale gas boom in the US. That was a major trigger, with fracking and a leaky shale gas system in the US. That was one of the main contributors from an anthropogenic side.

Baroness Bray of Coln: Would you say that lessons have been learned from that?

Louise Burrows: There are still lessons to learn in having better regulations for industry, especially new industry, to make sure that production is clean from the start. That said, we have to make sure that new production coming online is clean but that we are cleaning up old production at the same time, and phasing it out in the long term.

Q8 **The Duke of Wellington:** I declare my agricultural interests as in the register.

Professor Reay, did I understand you correctly that draining wetlands reduces methane emissions? Am I right in thinking that it also increases carbon emissions? I would like a small clarification on that.

Dr O'Connor, presumably there is a compensating factor for the increase in methane from animals. Is it right that the number of wild ruminants is decreasing while the number of farmed ruminants is increasing? Is that correct, and what is the effect of those two contrary indicators?

Professor Dave Reay: I am glad to clarify. Wetland drainage is particularly important for the UK and our peatlands in Scotland, Wales and northern England. When you drain them, as we have for many generations now, you tend to reduce methane, but then you have a huge penalty in carbon dioxide emission. One of our key areas of focus for climate action in the UK and globally is rewetting and protecting those wetlands. You get a bit of a methane penalty as part of that, but the benefits in terms of reduced CO_2 emissions—reduced carbon loss—massively outweigh the methane penalty.

Dr Fiona O'Connor: In response to your question, I do not know the balance between wild and managed animals.

Professor Piers Forster: Perhaps I can briefly comment on that. There are an awful lot more domestic ruminants on the earth than wild ones. Perhaps there will be a change, but it is the domestic ones that dominate the whole equation.

Professor Myles Allen: I will put a number on that. The mass of domestic livestock is 60% of the mass of mammal livestock on the planet, and wild mammals are 4%. So it is an elephant and a mouse, so to speak, as far as methane emissions are concerned.

Q9 **The Earl of Leicester:** I think we are all aware of the metric used to measure methane at the moment: GWP100. What is GWP*, and how does that differ from the standard metric? Should we be using it?

Professor Piers Forster: Whatever metric you use to quantify methane and greenhouse gas emissions, it does not affect what you do with it. We

still have to reduce our emissions of methane and, however you quantify that, that will not change.

The IPCC report gave a number of different metrics, and it did not make a particular recommendation, but there is an agreed international reporting emission metric of GWP 100 under the UNFCCC. The Climate Change Act is worded to specify that the greenhouse gas target for this country should be based on that internationally agreed way of counting.

On GWP*, if you ask anyone in the scientific community, the preferred way of doing it is to have two separate targets—one for methane and one for carbon dioxide—and then to calculate the surface temperature change contribution from your mitigation policy. The short lifetime causes big problems for GWP100, so it does not work particularly well for these short-lived pollutants. GWP* tries to get around that, and it is more representative of the surface temperature change contribution. It was invented by Professor Myles Allen. He is a fantastic colleague but also incredibly intelligent. He is almost too intelligent, because it is a complex thing to calculate; you have to put into the equation how the methane changes over time, which makes it quite a different beast to some of the other ones.

Q10 **The Earl of Leicester:** It looks like Professor Allen is raring to go with a riposte. Is there a chance or a hope that GWP* will be used by Governments to measure methane in due course and that the world will agree that?

Professor Myles Allen: Eventually, we will have to measure the warming impact of our emissions, because we have a global warming target of well below 2 degrees—we are pursuing efforts to 1.5 degrees—so we need to know the warming impact of our emissions. The crucial point about GWP100, or expressing short-lived climate pollutants like methane as a carbon dioxide equivalent using GWP100, is that you end up with something that does not reflect their warming impact.

This was nicely summarised in Piers' chapter of the recent Intergovernmental Panel on Climate Change report, with the statement that expressing methane emissions as a carbon dioxide equivalent using GWP100 overstates the warming impact of a constant source of methane by a factor of three to four and understates the impact of any new methane source by a factor of four to five. So if you want to know the warming impact of your emissions, you need to know how much is in the form of short-lived pollutants, like methane, and how much is in the form of cumulative pollutants, like carbon dioxide and nitrous oxide.

Piers and I totally agree on the science, but the only thing I want to argue with in what he said is that I do not think it is very complicated. That sentence in the IPCC report tells you what you need to do. You can measure emissions and report them using GWP100 if you want to—that is fine—but if you want to work out their warming impact, you just have to divide a constant source of methane by a factor of three to four and multiply any new source of methane by a factor of four to five. That will

give you something that we call warming-equivalent emissions, because it gives, within uncertainties due to the climate response, the same warming response: that the amount of carbon dioxide emitted over that same period would give you the same amount of warming.

It is important to stress that, ever since that 2016 paper, which Piers co-authored, we have all kind of agreed on the science here. There is still debate about how to use this science in policy, but we understand pretty well how methane emissions affect temperature. As Piers mentioned, the entire climate community agrees on reporting cumulative and short-lived pollutants separately. If you do not do that, you cannot work out the impact of your emissions on global temperature.

I would go one step further and say that, when you have that information, you could report the warming impact of your emissions on global temperature as an additional number to the UNFCCC—not to replace CO_2-equivalent emissions with GWP100, but as an additional number. That is highly relevant, of course, because countries need to know how they are contributing to global warming if we are going to stop it.

The Earl of Leicester: Are you saying that there is a real chance that methane emissions, as currently measured by GWP100, are overstated?

Professor Myles Allen: Globally, they are going up sufficiently fast that their impact is actually understated. Again, there is agreement on the global picture: if emissions of methane go up faster than 1% per year, the conventional GWP100 understates their warming impact. If they go up more slowly than that, it overstates them.

Q11 **Lord Giddens:** Thank you for your very interesting responses so far. What are the benefits and limitations of international standard metrics for quantifying methane? Do other countries use different or additional metrics if they are not in that system?

Professor Piers Forster: That fits nicely with the last question. Myles articulated incredibly well the issues with GWP100. If you have a constant source of emissions, it overstates the effect on surface temperature. If you have declining emissions, it understates it. That is correct. Under the UNFCCC protocol, countries have to report in GWP100, but if they want to they can also report in other ways. Brazil is the only country that is taking advantage of that currently. It also reported emissions in GTP100, which measures change in surface temperature in a 100-year timeframe and reduces the contribution of methane emissions quite substantially. I hope that is helpful.

Professor Dave Reay: A key thing in relation to the benefits is the pragmatism of all the nations and parties to the UN convention on climate change. They have very different capacities to measure their emissions of whatever greenhouse houses, including methane, and so to report them. Having that comparability and ease is a benefit. We still do not know exactly what emissions are happening and where. Fiona alluded earlier to

the big improvements that are coming through, such as the satellite monitoring of methane emissions. Those will really help but we still have large areas of the planet where we cannot say for sure what the emissions are.

So there are some benefits to the current system—even with its flaws in relation to methane and GWP100, which we have discussed—in its consistent approach to reporting and capacity, which is basically the set of workbooks that you go through when you do your national reporting for emissions. The UK has played a really important role for years now, and should continue to do so, in helping other nations to improve their monitoring and reporting and to have a discussion about GWP. Even the basic measurement of how many tonnes of methane are emitted from a sector in a nation is a fundamental thing that we need to improve.

Professor Myles Allen: I totally agree with what has been said but, again, I go back to the simplicity point. I stress that warming-equivalent emissions, whether calculated by the CGWP devised by Bill Collins in Reading, GWP* or whatever, are very straightforward to calculate from GWP100 emissions. It is not something new and alternative. It is just an additional piece of information that you can calculate given your GWP100 emissions—provided, of course, that those GWP100 emissions are reported as short-lived and long-lived gases separately. We have pretty much universal agreement that this additional information is helpful simply for countries, sectors and industries to know the impact of their decisions on global temperatures.

I want to highlight one point that Professor Forster made, as well as the points that I have made. Expressing methane emissions as GWP100 understates the benefits of methane reductions. So there is a danger that if we persist in only looking at carbon dioxide-equivalent emissions—I stress "only looking at", not "looking at"; I am not suggesting replacing it—we may fail to realise quite how beneficial methane reductions will be for global temperatures over the next couple of decades.

This is why we think that countries should strongly consider reporting this auxiliary information on impact on global temperature, which is expressed in terms of warming-equivalent emissions. As I say, they will have to do so one day, because you cannot land an aeroplane with a faulty altimeter. The point is that if we are to land this plane, we will need to know what our actions are doing to global temperatures. The pilot of the plane needs to know what his or her actions do to the altitude of the aeroplane. In bringing this thing in to land, we will have to know what our decisions mean for global temperature. You could use GWP* or a climate model to calculate it—I do not feel particularly strongly either way—but we will need to know about that warming impact.

Lord Giddens: What is the position of Russia? Obviously, it is highly deviant and a huge country.

Professor Piers Forster: Russia is the second or third biggest emitter of methane after China. Its methane emissions tend to depend on its gas

production, so not importing its gas would be a very good way to address those emissions. If it did not have a market, we would be able to influence its gas production. The same goes for other countries.

Q12 **Lord Frost:** I have just one interest to state. I am a trustee of the Global Warming Policy Foundation.

We are moving the conversation on slightly to look at the international and domestic frameworks within which policy is made here. I want to ask a prior question, though, before you answer. What is the UK's share of global methane emissions, and has that changed materially in recent years? With that in mind, what are the international and domestic targets to which the UK is now committed in this area? Which of them require a reduction in methane emissions, and to what extent?

Louise Burrows: I do not know where the UK ranks compared to other countries at the moment—perhaps other colleagues could come in on that—but, historically, the UK has made great strides in reducing methane emissions. As you will all be aware, we have reduced those emissions by roughly 62% since 1990 levels, which is pretty substantial. We were in the top 30 major emitters retrospectively, but I am pretty sure that we have fallen off that list. That being said, we are a historical cause of climate change. Our international leadership on methane and carbon dioxide generally is still really important, so future action and what we do will be critical.

Of the international and domestic targets that we have signed up to, we do not have any legally binding targets on methane reduction per se, but we are part of voluntary agreements and requirements in the international space to reduce emissions. We have been discussing the global methane pledge, which, as you are aware, is the key political pledge at the moment on reducing collective global methane emissions by 30% by 2030. Of course, the UK was a founding signatory to that and played a key role in its launch. It is the main international agreement that we are part of.

There is also language in the G7—the UK is a G7 member, of course—that echoes the agreement, as in the global methane pledge, that we need to work collectively to reduce those emissions by the same target. We are also a party to the UNFCCC process, and we now have language in the COP process, which is significant, on the need to take urgent and accelerated action on methane. It is not a target as such, but there are a bunch of agreements and impetus in the international space for us to take action.

We are also part of the World Bank's Zero Routine Flaring scheme, which is a commitment to end our routine flaring and venting by 2030, which we endorse. Again, it is voluntary, but we act in very good faith on these types of commitments. The UK is also a member of the Global Methane Initiative, the Climate and Clean Air Coalition, and the International Methane Emissions Observatory. These are a bunch of coalitions working together to increase peer learning, knowledge sharing and the science

and reporting on methane emissions. They act as key drivers, putting the right pressures on the UK and other partners to act on methane.

Piers may know more about the domestic piece than I do. We do not have any legally binding targets for methane, but we are held to our carbon budgets and our net-zero strategy to reduce our carbon emissions by 68% by 2030. As part of that, we have a strategy for how to reduce methane emissions across energy, waste and agriculture, but, again, those commitments are not binding. A lot of work is being done to reduce venting and flaring in the North Sea, but we think that it can go further. There is work to bring about greater efficiencies in our agriculture system, such as changing food additives for cows, and work to think about the elimination of biodegradable waste in landfills.

So there are things in place, but we are lacking a clear forward plan for some of the very structural commitments that we need across those three sectors in the UK.

Professor Dave Reay: That was a brilliantly comprehensive answer from Louise. On the specific question, 0.7% is the International Energy Agency's number for the UK's contribution to global methane emissions. I flag that the IEA's latest methane tracker is out today. That should be useful reading for the committee as it goes through this inquiry. It shows what is happening globally and flags that the fossil fuel industry is not cutting its emissions in line with its global commitments or with what is required. It is nowhere near what is required for the Paris climate goal. That tracker is a really good source.

The other thing to flag on our progress is that, from 1990 to now, the UK stands out as a success story on our reduced territorial methane emissions. The reduction has been well over 60%, which is ahead of most other developed nations' around the world. However, you could argue that our recent progress, over the last decade, has not been as ambitious as it could have been. The IEA analysis highlights actions that we could take; North Sea oil and gas is a specific one. The IEA flags actions with zero net cost that would reduce emissions by an extra 36%. It flags a few potential areas where we could further cut emissions.

In that context, methane is a powerful climate forcer. As Myles was saying, if we cut it rapidly, we will get some rapid benefits. There are also benefits to air quality. As was stated, we have a nationally determined contribution—our NDC commitment—of a 68% emissions reduction and methane as part of that. If we do not go further on methane, particularly when it is cost effective, we will have to go much further with other emissions in the UK. For emissions cuts in any nation, no stone can be left overturned. Methane represents a real opportunity in many sectors, but oil and gas is certainly one that the IEA has flagged where we can go further.

Q13 **Lord Frost:** It seems to me that 0.7% represents quite a small number. Do you agree that significant further methane reductions from the UK will have almost no impact on the global numbers—as a matter of maths, not

of moral persuasion or political leadership? As a matter of actual numbers, it seems that it would have almost no effect.

Professor Dave Reay: The 0.7% is a small number, but look at CO_2 emissions around the world: no nation is responsible for the majority of emissions. Every nation could look at another and go, "It's not our problem". As we know with climate action, every nation has to play its part. We are in the good position of having cut our emissions, but we are in the particularly good position of having a highly skilled workforce, in the oil and gas industry but also across agriculture, to further cut emissions. The "world-leading" tag to which I hope we aspire in climate action means that we should continue leading the way to cut emissions and take that 0.7% even lower.

Professor Myles Allen: I would point out that the UK's population is 0.7% of the global population, so it is not a small number per head of population. It is also important to stress that this is our consumption emissions; we import a lot of goods—red meat, for example—the production of which is associated with methane emissions. I do not have the number for the actual impact of UK consumption on global methane emissions, but it would almost certainly exceed that 0.7% significantly, because our economy is a net importer of goods and a net exporter of services.

I will add one point about potential influence here or how the UK could matter. I have observed, for example at COP meetings, that many countries, even UK decision-makers, are not aware of the warming impact of increases in methane emissions or the benefits of reductions in methane emissions because of this metric problem. Simply by reporting the warming impact of our actions and emissions to the UNFCCC, the UK could set an example of transparency to the world, which could help other countries. In many cases, their methane emissions are rising and causing disproportionately large amounts of warming. It would help other countries to appreciate the risks and benefits, and it could have far more impact than our emissions alone. That would help all countries, sectors and industries to understand the implications of their decisions.

Q14 **The Duke of Wellington:** I understood Professor Reay to say that we can reduce methane emissions from the oil and gas sector by 36%, at minimal cost. Could you elaborate on that a little, so that we understand what it is necessary to do to achieve that rather substantial decrease?

Professor Dave Reay: The IEA methane tracker has the detail, but the key interventions it flags that have a negative or net-zero cost are things like instrumentation. It currently uses pressurised gas, so natural gas methane. It then vents it as part of its natural usage. That could be replaced with compressed-air systems, which would in essence reduce venting. That is a key part of the IEA's recommendations or assessments of the marginal abatement cost curve for methane in the North Sea. That was a key one, but there is a list of these in the report for every country that it covers, showing what will cost money but also things that are negative or zero net cost.

Q15 **Earl Russell:** Good morning. Thank you for your evidence so far. It has been fascinating. I want to move on and look at the global methane pledge, which obviously aims to reduce methane emissions by at least 30% by 2030. I want to ask you about its progress and where you see it going. At the moment, 156 countries are signed up to it; they equate to roughly 50% of global emissions. As we have heard already from Lord Giddens, big emitters such as Russia, China and India are not signed up at present, and only 50 countries have methane action pledges in place. What is the impact of the countries that are missing from that regime? What do you feel could be done to bring them on board and strengthen that global regime?

Louise Burrows: When the global methane pledge was launched at COP 26, it was a watershed, historical moment. It was the first time in recent history that a COP had platformed this issue, and it pushed methane up the international climate agenda. I reference that because, in that sense, it has been a real success: methane has remained part of the international climate agenda for the past three years when nobody apart from my lovely colleagues here was talking about it three or four years ago. Now, it has really taken hold and there is unprecedented momentum behind it. As I said previously, we are now seeing methane being referenced in G7 texts and COP texts. It is quite unusual to have these voluntary sectoral initiatives, which are fantastic, while getting language in COP texts and negotiations at the same time. There is usually a time lag between one and the other. That is key.

As you noted, the pledge started with 120 countries. We are now at 155 or 156, which is significant. Nine or 10 of them are in the top 15 major methane emitters, so it is not to be sniffed at. Some 86 of those countries have now come forward with national methane action plans, which is real progress. Through this, we are also seeing substantial finance being shifted into methane. It is still very slow and lagging, but we are starting to see it move.

In line with the pledge, several countries have taken steps to reduce flaring and leaks. We are seeing key policies coming out of the United States, for example, with its new methane fee. Canada has announced new rules on oil and gas methane to eliminate routine flaring by the end of 2030. We are seeing Nigeria, a major methane emitter, set targets to reduce its methane emissions by 61% by 2031, which is significant. It has also just committed to quarterly leak detection and repair inspections.

Even though it is not a member of the pledge, China has even come up with its own national methane action plan—at least, it has said that it will incorporate methane into its next climate plan, which is significant. The EU has just agreed its first-ever rules on reducing methane emissions and will have an import standard, which will be in place by 2030. We are also seeing Argentina, Ecuador, Brazil and the stans start to take action on this. I want to give you the picture that it has been a success.

The language that we got in COP 28 on transitioning away from fossil fuels was great, and I am cautiously optimistic about that, but now we need to focus on moving from political commitments to practical action. This is where the methane pledge is critical in moving forward and asking, "What will countries' national plans and implementation look like?" That is where the hard work on what we need to see is.

The methane pledge has climate champions, or country champions. The UK should be one; there is no reason why it should not be. It has also started to adopt various working plans across different sectors, such as on waste and energy. There is a real drive to focus efforts on reducing emissions, first and foremost, and energy is critical. The pledge is also starting to develop better peer-learning capabilities. That needs to be developed better. We need to ask, "How do you get countries around the table?" There are annual ministerials, but that needs to increase. It also needs to have better working-level meetings.

The evidence is showing that, even from an emissions perspective, the pledge is having an impact. The IEA numbers show that emissions from large leaks detected by satellite fell by almost 10% last year, as compared to 2021. Obviously, we cannot place that directly on the pledge, but some of the numbers are starting to shift slowly. I will stop there. I do not know whether the others have any thoughts.

Professor Piers Forster: You gave a comprehensive answer. This goes back to the point made by Professor Allen: we have a key opportunity in the UK to set an example. First, we want the Government to report what their methane emissions are really doing and not just represent them as a CO_2 equivalent. If they are split up, we can work out the warming contribution, as Myles said. That kind of monitoring opportunity is the first thing that we need to do far better than we are doing at the moment.

The next thing—again, we discussed this earlier—is that we have an opportunity to try to affect what is happening in other countries through border adjustments and carbon and methane import taxes, which are a key way to support these methane actions in countries like China and India. There are key opportunities with that, too, which is what I would like to see our country do.

Dr Fiona O'Connor: Sorry. I did not introduce myself at the beginning. I am from the Met Office, which, as you know, is an executive agency of the Department for Science, Innovation and Technology.

I just want to add something on monitoring UK emissions. The Met Office has long-standing experience of doing UK greenhouse gas emission verification through the use of observations from the atmosphere and inverse modelling, and of doing that in comparison with the national inventory. Those comparisons are published annually in the national inventory report. The estimate of UK emissions from the verification does match the national inventory, at least for the most recent period. The Met

Office has a role to play there in supporting the UK Government in monitoring progress towards the reduction of emissions.

Q16 **Baroness Whitaker:** Good morning. We have not had much information about the proportion of methane emissions that result from domestic consumption, which Professor Allen mentioned. Could he, perhaps jointly with somebody else, write to us about the quantity, the proportion and, if possible, the main sources? That would be helpful to the committee, I think.

Professor Piers Forster: I would be happy to answer, but would you like it in writing?

The Chair: Yes. We would like a range of views, so if anyone else from the panel would like to contribute, that would be appreciated.

Q17 **Lord Trees:** With regard to the UK example, we have reduced methane very substantially, as has been said. Given what Professor Allen said, it has actually contributed to global cooling by a tiny amount. Do we have that statistic? That is a reality of the UK contribution, is it not? It disappears because of the nature of the contributions in total from the UK, but would it be fair to say that we have made a tiny contribution to global cooling after negative global warming in that respect?

Professor Piers Forster: Yes, the 63% reduction in emissions since 1990—from getting past coal and preventing biodegradable waste going to landfill—will contribute to a small global cooling. But, at the same time as doing that, we have continued to emit a lot of carbon dioxide and other greenhouse gases, which has completely countered that. This is why it is important to quantify the temperature response to these different contributions, as Myles said.

Louise Burrows: I echo what Piers said. We have to look at it relative to carbon dioxide as well. Do not underestimate the greater impact that the UK's leadership on this has in engaging other countries to go further. That is difficult to quantify, but it has to be taken into account. Even though we are moving forward, we need to continue to do that.

As we are focusing on methane emissions, I caveat all this by saying that, building on what Professor Allen said, this is not a get out of jail free card to continue producing oil, gas or other means. We also have to clean up as we embark on the transition of phasing out. I do not know the exact numbers, but I wanted to make a point on the international leadership piece of this and the impact we can have on other countries.

Professor Myles Allen: On reductions in methane emissions contributing to global cooling, we need to be careful that we understand what is going on here. In effect, you are undoing the effect of past methane-induced warming. We can reduce global temperatures by reducing our methane emissions from the levels they were at in the 1980s and 1990s, because they were ridiculously high then. Some committee members may remember that bungalows exploded due to

methane leaking out of landfill sites in the 1980s—there was certainly one incident in which this happened.

Our methane emissions were utterly out of control. We have brought them down, and a lot of that was fixing landfill. That is an achievement, but, as we pointed out, they are now down to 0.7% of the global amount—our fraction of the global population—so we should by no means pat ourselves on the back and say, "Job done". Given the fact that we have caused a disproportionate amount of warming in the past, we should not satisfy ourselves with being just as good as the global average. We need to be much better than the global average, which is where we should aim for.

Earl Russell: Thank you for your previous answers to me. I might come back to some of those points in a later question. For me, it is about not numbers but about what the UK has done to help to create an international norm on these issues. That is extremely powerful, and I want to come back to how the UK can build on that to help strengthen the global regime.

Lord Frost: The numbers are important, all the same. I spent most of my life as a diplomat, and I am very familiar with the concepts of international influence, moral suasion and so on. However, I notice that on a couple of occasions when we have asked questions, most recently with Lord Trees, that they have been about numbers, and part of the answers has been, "We have to do this for wider influence reasons". That may or may not be true—it is a political judgment to do with our commitments—but it is still important to know the numbers. I did not hear Professor Allen disagreeing with Lord Trees; I just heard him saying, "Well, it was a very high starting point".

Professor Myles Allen: It is important to understand that "contributing to global cooling" means that you are undoing the impact of past warming. It is important to look at the UK's contribution to temperature since the 19th century and not just cherry-pick a particular period since 1990 that makes us look good. After all, the Paris Agreement is about total warming since the 19th century, not contributions to warming rates. It is important to understand your contributions to warming rates, because those determine how you contribute to total warming, but in the end we need to focus on that overall contribution to total warming. There, the UK continues to have a disproportionately large impact on global temperatures, thanks to our history.

Q18 **Lord Grantchester:** I declare my interests: I have a dairy farm and have been involved up the supply chain.

On the back of this little conversation about making up for past emissions and how we might look to the future, it seems relevant to mention the international aspects of what degree of risk—with what outcome and what impact—we need to be aware of for methane releases consequential upon warming, especially the oceans warming, permafrost disappearing and glaciers reducing. How to apportion these—who can do what where—

seems to be rather nebulous, and the huge area of the ocean can have an impact.

I highlight that and ask for any quick thoughts about whether COP is still the best forum in which to raise those issues, and about what kind of resources could be most used to combat these future challenges that, with increasing rises in temperatures, could explode exponentially with these more global impacts.

Professor Dave Reay: We touched on this with the tipping point. The crucial thing is to limit warming so that the risk of those major feedbacks from things like methane clathrates et cetera is limited. The key point there, in terms of our role as the UK, is our scientific and research community; this point runs across our potential and our responsibility, as a nation that has led the way on developing expertise in monitoring methane, on the metrics that Myles and Piers have talked about, and on cutting emissions on the ground. We have skills in the oil and gas industry, and in agriculture we have a huge amount of expertise in good livestock husbandry, which brings down methane emissions. The same is true of many of sectors, such as waste management: we have a lot to offer to help other nations cut their emissions.

Q19 **Baroness Whitaker:** Thank you for the illuminating pictures of the domestic scene, but, as you all said, this is an important international problem. I know we must do our best to control domestic methane emissions, but there is the permafrost melting and this big emission in Pakistan. How effectively does the UK address these wider international problems through the various fora?

Professor Piers Forster: It could certainly do more on the methane pledge. We signed up to it in the COP 26 agreement, but we have not done much about it since then. The Government currently do not report on that methane pledge, and it is not a legally binding target in any way for this country. We signed the pledge but are not having a conversation in government about how to deliver on it, so we could do that.

Aside from that, there is stopping the methane from the tropical wetlands and potentially from permafrost. We can try to mitigate those effects of climate change only by working with other countries, particularly on trying to keep all emissions down. To get to these kind of net-zero targets, we should reduce our methane emissions as fast as possible everywhere. Border adjustments and the very good kind of monitoring that Dave, Fiona and Louise have talked about are all things we have to do to try to change that direction.

Louise Burrows: I agree with Piers. In terms of the UK's international standing on methane, yes, we played a critical role in the launch of the pledge, but since then our international presence on this is lacking. The pledge asks countries to produce national methane action plans. The UK has not done that.

The pledge asks for more financial contributions towards methane initiatives. We gave £2.5 million to the methane sprint announced at COP

28, which was a Biden/US-led initiative, but, compared to other G7 countries, that was very small; France and Germany contributed around £20 million to £21 million towards it. So there is definitely a kind of financial offer on that. We could offer other countries a lot more technical support capacity building on how to reduce methane emissions.

In terms of our international presence in the initiatives that I mentioned—the Climate and Clean Air Coalition, the International Methane Emissions Observatory and the Global Methane Initiative—my understanding is that we do not really attend those meetings. We do not have a dedicated person who can represent the UK on those issues, and we should address that. I have a bunch of other recommendations on what else the UK should be doing internationally, but I do not want to get ahead of the questions, so let me know if you want me to talk to that.

Professor Myles Allen: There is one thing that the UK could do at no cost to the UK and which would be tremendously beneficent: report the warming impact of our emissions, because that would allow sectors in the UK and the UK as a whole to know what the impact of our decisions is. As Professor Forster and I have frequently stressed, this is not difficult to do. We know exactly how to do this.

To focus the minds of the members of the committee who mentioned that they have dairy or veterinary interests, the head of Meat & Livestock Australia recently said in public that it should stick with GWP100, basically because it would conceal the impact—he did not use the word conceal—of the herd increases that it was planning over the next couple of decades, which would be understated by this metric.

We should be out there making sure that everybody understands the warming impact of their decisions. If another country like Australia is going to increase its herd size to take advantage of new export opportunities, the impact of that decision on global temperatures needs to be crystal clear. This is something we can do at no cost to the UK, simply by setting an example of transparency by reporting the warming impact of our emissions to the UNFCCC.

Earl Russell: This is just my point of view, but one way in which this committee's report could work quite well is by looking at what practical steps the UK could take not only to meet its requirements but to be a global leader. That is about monitoring, reporting and satellite data, and I wonder whether we could take written submissions on that.

Baroness Whitaker: These are very helpful points about what we should do. I think it would be helpful for us to know a bit more about what we are doing. We do not speak in concert with the European Union anymore, but of course we do diplomacy and we form alliances. It is important for us to know how effectively we are really behaving internationally. Apart from what impact we could have, what impact are we having?

Lord Trees: I totally agree with Professor Allen's last remarks. I would

just point out that in the UK we have reduced the size of our cattle herd by 30% in the last 40 years and maintained productivity, so we have made a reasonable contribution. But I totally agree that we should represent that as warming potential, or a lack of it.

Louise Burrows: Unfortunately, what we are doing is not as much as we were doing when we had the COP 26 presidency, so it is genuinely quite hard to give an answer. We championed methane in G7 negotiations and in the UNFCCC negotiations at COPs to get language on action, but ultimately our international presence on this issue is lacking. We do a lot of work on carbon dioxide and in championing climate leadership, but when it comes to specific areas of methane, the UK could definitely step up and leverage its record on this in the international space.

Q20 **Lord Trees:** To some extent, this question may have been answered. Which sectors have made the most progress and can further reductions be made easily and at low cost? Maybe some of that has been addressed already.

Professor Piers Forster: We have made the most progress in the oil and gas sector. We did make good progress on landfill, but that progress is not happening currently, so the IPCC would like the "no biodegradable waste to land use" plan to come in earlier. The Government propose 2028 for that, but we think it could happen next year. We would like to see more recycling. The devolved Administrations are doing a better job than England at that, so we have opportunities to do a better job there.

We would also like to see more on things like livestock breeding and feed supplements. We are not installing the same anaerobic digesters as we were, so we would like to see more progress on that as well. We think that the North Sea transition arrangement could be much tougher on gas flaring and venting there. There are opportunities, and a lot of them would be cost effective.

Louise Burrows: I agree that tackling methane emissions from the oil and gas sector would be the most effective and cost-effective first step. Yes, bringing forward the ban on routine venting and flaring from 2030 to "as soon as possible" would be a fantastic first step. If we captured that methane, it can be used to power homes and make a profit. Of course, it would also be helpful for the climate, so that is critical. The UK should be following in the steps of the US and introducing a methane fee—a fee on the emissions of the intensity of oil and gas that is just wasted into the atmosphere.

The US has led on that type of regulation, and it is quite easy for us not to copy completely but to take that and put it into our context, as a way to incentivise producers and operators to reduce their methane emissions, while getting finance that can be used for climate measures elsewhere.

The UK should also be following in the footsteps of the EU in having its own import standards on methane. Even with our own production, we will

always be a net importer of oil and gas. Yes, we import a lot from Norway, which is very clean, but we could input those import standards on other countries. Is there a space for the UK to work with the EU, Japan, Korea and other major importers of fossil fuels to come up with an international set of requirements of what import standards should look like? That is critical.

As I said before, the UK should come up with a national methane action plan that addresses waste, energy and agriculture. We should really be releasing this by the end of this year, by COP. That would be fantastic.

To echo what Piers was saying, a ban on biodegradable waste going into landfill should take place immediately. A plan for agriculture on feed additives for cows, better slurry management and what have you would be very welcome.

Q21 **The Duke of Wellington:** I am not going to ask the set question, because you have covered it in various ways. I will direct this question to Professor Allen and Professor Reay. We have heard from Lord Trees that ruminant livestock numbers in the UK have come down considerably in recent years. Professor Allen referred to them being partially replaced by increasing imports of red meat and to the increase in numbers from Australia over the next 10 or 20 years. Is it therefore not the case that any benefit to methane emissions that we have garnered from reducing livestock numbers in the UK will be nullified by increased methane emissions in Australia and other countries from which we are likely to import more in the future?

Professor Myles Allen: I will defer to Professor Reay in a minute, but we need to be clear, particularly when it comes to agriculture and diet, that we should act on both sides of the coin. Acting simply on supply and ignoring demand for methane-generating food products does not help the planet, as a whole, if we replace domestic production with imports from other parts of the world.

By the way, I should have stressed that I was using Meat & Livestock Australia position to illustrate how hiding behind metrics is dangerous, and potentially dangerous to the UK's sovereign interests. That is why greater transparency is needed. That transparency will also help us to understand which livestock sectors and production practices around the world are causing the most global warming. We can help farming sectors and those parts of the world to change and adapt those practices to reduce their impact on the planet.

I emphasise that one of the side benefits of a focus on the warming impact is that it makes the conversation with the agricultural sector substantially easier. It makes it clear that some continued livestock production is consistent with a stable global temperature. Unlike carbon dioxide, we do not need to reduce livestock methane emissions to net zero to stop global warming. That is something that many farmers would find reassuring, as we do not need to eliminate them.

On the other hand, there is a general perception that livestock methane is the difficult one and is therefore best ignored. The result is that livestock methane is going up rapidly, which is the last thing we want. By greater transparency and clarity with our farmers about what we are asking them to do and what the destination is, we can make much more progress.

Professor Dave Reay: I will add to what Myles said. Our methane intensity and production of ruminant meat and dairy in the UK is the benchmark for the lowest in the world. We are on a par with our European neighbours but are much lower than many other nations. That comes back to Piers' point about accounting for that in our imports, and not just offshoring our emissions or potentially increasing them.

On mitigation in the sector, we need to look at both sides of the equation, as Myles said. The meat and dairy consumption in our diet is, on average, higher than it should be to meet our climate target. That is part of the equation, but there are things we can do in our production systems to cut methane emissions further, depending on the circumstances.

Feed additives have been mentioned. They have potential, but there is a cost to that. Farmers need to be compensated for that extra cost to make methane reductions, and it does not work everywhere. For upland sheep, as we have here, it is much harder to get the right dose than it might be for a dairy herd. We have talked about livestock health and breeding, which are crucial, and we have a good track record. In Scotland, there is real potential for the calving interval to reduce methane emissions from livestock production. There is a big range. Part of the reform of rural and agricultural support across the four nations of the UK must speak to that range and how, often, the smaller producers can be best helped to increase efficiency and so cut emissions.

Overall, the agriculture sector is the big source of emissions globally. It will require this combination of technology and understanding the realities of markets, border adjustments et cetera. It comes back again to capacity building, which has been mentioned several times. Our agriculture sector in the UK has a lot of great capacity. Making sure that that is shared through things like the global methane pledge is an important way for us to have a magnifying effect on cutting emissions.

Professor Myles Allen: I am sorry. This is very belated. I realised that I had written in capitals at the top of my pad: "INTRODUCE YOURSELF". The questions have been so interesting that I have consistently failed to do so. As well as mentioning that I am a professor at the University of Oxford, I should also mention that my research group has benefited from funding from Hilton Food Group, Beef + Lamb New Zealand, and the National Farmers' Union. None of our research has been affected by this; we conduct our research independently, but clearly these institutions are interested in the impact of livestock on global temperatures.

Q22 **The Chair:** Thank you for doing that. It is very important to have that on the record. In the remaining time that we have, we will concentrate on

UK emissions. I will put two questions together. First, what progress has the UK made towards the commitments set out in the pledge? Secondly, the Climate Change Committee stated that the UK's action on methane is insufficient. Why is this the case, and what assessment have you made of the barriers to achieving a significant reduction in methane? This is the core of our inquiry, so we really want to concentrate on an answer from everybody on this.

Professor Piers Forster: The methane pledge calls for a 30% reduction between 2020 and 2030. We will have reduced our methane before then—it is in the data that we talked about before—but we are currently reducing methane by only about 1.5% annually. We think we will have to increase that to about 4% annually if we are to meet the pledge. As I have already articulated, one thing that we think we can do in the oil and gas, waste and agricultural sectors is bring forward the biodegradable waste ban and the venting ban from 2030 to 2025. We can really hit those kinds of targets.

Dr Fiona O'Connor: I have nothing to add to what Piers said, other than that the Met Office is capable of verifying UK methane emissions and tracking progress. Currently, the estimate of the decline in UK methane emissions is consistent with the national inventory. That work can continue to support the efforts to reduce methane emissions from the UK.

Louise Burrows: I think we have covered this, but to echo what I said before, the UK's recent reductions in methane emissions have slowed substantially, so more work needs to be done. As I mentioned, focusing on the oil and gas sector first and foremost is key. Yes, it makes up the smallest part of emissions, but it is the easiest and most cost-effective place to start.

As I said, bringing forward the ban on routine venting and flaring, having a methane fee and having a methane border adjustment mechanism as an import standard would be great. Mandating quarterly leak detection and repair services for the industry—for example, bringing this in in a Bill and making it a legal mandate—is also critical for accountability.

As I said before, having a methane action plan that covers all sectors by the end of this year would be a real step forward. It would also give us an opportunity to consult not just industry, farmers and the energy and waste industries but CSOs, academics and think tanks—all the right groups—in order to make sure that the plan is comprehensive.

The UK could be doing a lot more internationally in this space. Part of it is about the UK getting its own house in order and building in dedicated capacity internally within the UK diplomatic machine, whether it is two full-time individuals working in DESNZ, the Cabinet Office or the Foreign Office. Working on methane is critical. We just do not have that internal capacity. We did not have it when I was in government and it is still not there, I believe.

Having an internal co-ordination mechanism on what we are doing on methane domestically, in order for us then to have representation and leverage it in the international space, is critical. Making methane a priority as part of our international climate diplomacy should be part of that methane action plan. It would give us a mandate to be present at some of the international alliances that we are a part of, which I have mentioned before, and to champion this issue at key climate moments such as in bilaterals.

We need to have a clear offer on methane internationally. As I said before, a capacity-building technical assistance programme would be great. We have a lot of knowledge to share on how we have achieved our world-leading emissions reductions. We should be making that a priority. With that, we will also need to have a finance offer. As with all climate issues, a finance offer will be required.

Professor Dave Reay: I say, "Hear, hear", to Louise. That was spot on. We just need to walk the walk on methane. We are part of the global methane pledge. As a nation, we need to state what that means to us and whether we will align with the 30% cut by 2030—or, indeed, whether we will go for more or less. That needs to be set out. The fundamental is a methane action plan across all these sources of emissions saying how we are going to meet that target. We do not have that at the moment, but we really need it, because the benefits will be huge and, if we do not take action, the costs will also be huge. We need a methane action plan as soon as possible.

Professor Myles Allen: I totally agree with what has been said. I would just like to emphasise, on behalf of the environmentally responsible farmers of Britain—I do not get to meet the other ones—that many of them would love this committee to recommend that the benefits of the actions they are taking, particularly in reducing methane emissions, be recognised in our national accounts. That could be done simply by accounting for the warming impact of these actions rather than just reporting their impact on these farmers' GWP100 CO_2-equivalent emissions.

The National Farmers' Union has called for the adoption of warming-equivalent emissions as a standard auxiliary metric—not a replacement—so that the benefits of the actions that farmers are taking in reducing their methane emissions are clear in the national accounts and in our international reporting. As I stressed earlier, this is a zero-cost action that would massively increase transparency in what we are doing and make it clear to our farmers just how much they are helping, or could help, in the effort to alleviate our impact on global temperatures.

Louise Burrows: Over the next year or so, we will have an opportunity. Countries have to update their nationally determined contributions by next February, so there is an opportunity for the UK to decide to have a methane sectoral target as part of its NDC—that would be fantastic; Canada and Nigeria have this already—and for it to use that in order to

encourage other countries to do the same. I just want to make that point in terms of a lever that we have coming up.

The Chair: Excellent. Thank you so much to all our expert witnesses for sharing your expertise with such clarity.