Written evidence from Professor Mathew Williams (MET0021)

Overview

- What is the impact of methane on climate change and warming, and how does it differ from other greenhouse gases?

Methane is an important GHG, responsible for significant warming. But methane differs from CO_2 and N_2O in being a short-lived gas. If human-driven methane emissions could be reduced to zero, then the climate effects of anthropogenic methane would be eliminated in a few years as the methane is naturally degraded in the atmosphere. CO_2 and N_2O climate effects will persist for hundreds of years after their net emissions are reduced to zero.

- What are the main benefits of delivering methane reduction targets?

Methane target delivery will be vital for achieving the goals of the Paris Agreement and avoiding dangerous climate change. Even though it is a short-lived gas, our need to avoid dangerous climate change in the next 20-30 years means CH4 emissions must be reduced strongly now and into the future.

- What trade-offs are there, if any, in tackling methane vs. CO2 or other greenhouse gases?

CO_2, CH_4 and N_2O emissions all need to be reduced to avoid dangerous climate change. Focus and effort is required across all three gases.

Methane emissions will be reduced directly by cutting fossil fuel production as methane is emitted in their production. So there are strong synergistic effects for CH_4 of cutting fossil CO_2 emissions.

1. International commitments

1) What role could methane emissions reduction play in meeting the UK's domestic and international climate change targets?

Methane emissions are significant in the UK, and now are dominated by agriculture. Reductions in methane are vital for meeting the Paris Agreement.

2) What is your assessment of the Global Methane Pledge: is the UK on track to meet it? If not, how could this be accelerated?

The UK will be challenged to meet the GMP due to the difficulty in reducing methane emissions from ruminant livestock. Acceleration is challenging as the only definite method to cut agriculture CH_4 emissions strongly is to reduce

national herd size, but this is politically unpalatable and could simply offshore CH_4 emissions.

3) What are the implications of the separate Global Methane Pledge for overall UK efforts to reduce greenhouse gas emissions?

There is no antagonism between GMP and other UNFCCC commitments in my view.

4) Given UK progress in methane reduction in recent years (with notable reductions before 2020) what are the cost/ benefit implications of meeting the pledge?

Livestock CH_4 emissions reductions will be challenging for all GMP countries with livestock sectors. The cost of meeting the pledge will be significant around aligning with sustainability of rural communities and the farming sector, supporting their efforts to reduce CH_4 emissions. There are risks that national CH_4 emissions reduction efforts lead to off-shoring livestock production. For instance if the UK meets the GMP by cutting livestock numbers, demand in the UK for meat may lead to increased livestock numbers in tropical countries, with potentially disastrous effects on biodiversity and rising CO_2 emissions due to enhanced land use change (forest clearance) in those countries.

7) What lessons could the UK learn from abroad?

New Zealand has set separate targets for methane, rather than for CO_2 equivalents. The advantage of this approach is to clarify that CH_4 is a different type of GHG, with different approaches for management and emissions reductions. The disadvantage is to complicate the narrative towards a single 'net zero' approach.

2. Data, measurement and monitoring

8) What is the status of methane accounting, monitoring and reporting in the UK at present and how does it compare internationally? Is UK accounting and reporting considered to be accurate and robust? What improvements, if any, are possible and what benefits would these deliver?

In Scotland a new tall tower ('SOAR' Scottish Observatory for Atmospheric Research (SOAR) — Invergowrie (IVG) (ed.ac.uk)) for monitoring GHGs including methane is nearing completion. This tower will fill an important gap in current monitoring for the northern UK.

11) What are the advantages and disadvantages of available metrics used to report and compare methane emissions including GWP100 and GWP*?

These metrics are problematic as there is no scientifically robust method to compare CH_4 with CO_2 GHG effects. These gases are fundamentally different in their lifetime and action. We use GWP etc for simplification and political agreement, but we should be cautious about the accuracy of the approach. For now we should use GWP100 as the agreed approach for international reporting. GWP* has serious problems around sensitivity and fairness, and should be avoided.

3. UK Methane emissions and sectors

12) What progress has the UK made on reducing methane emissions and where is there room for improvement?

The livestock sector is our major challenge for CH_4. There are potential technologies, but there are no clear quick wins for progress.

14) Are there sources that could be mitigated quickly and easily in the short term, and which would take longer or be more complex?

Livestock methane emissions, from ruminants, are the most complex to reduce in my view.

4. Agriculture

16) Are there emerging technologies, such as methane suppressant feed products or approaches to slurry management, that could aid with methane emissions reduction in agriculture? What impact could they deliver?

There are a variety of approaches, from breeding, feeds, supplements, improved animal health, shortening calving intervals, that could help. A Scottish Government report can be found here which includes relevant methane options:

Reducing emissions from agriculture – the role of new farm technologies - gov.scot (www.gov.scot)

18) What other policy tools, frameworks or incentives could be employed in agriculture to drive methane reduction?

A report for Scottish Government on 'Processing farming waste through anaerobic digestion' can be found here

Processing farming waste through anaerobic digestion | Climate XChange

19) How can efforts to mitigate methane emissions in agriculture be integrated into broader approaches to facilitate and incentivise climate and nature-friendly farming practices?

A reduction in livestock numbers in the UK could have positive effects for climate and nature. Methane emissions would be reduced directly. N_2O emissions would decline with reduced application of fertiliser for animal feed production. Further, reductions in grazing pressure and resultant soil trampling would benefit nature, particularly in upland areas with organic soils. A linked reduction in imported feed from e.g. the tropics could reduce pressure on nature and climate in these countries.

For UK livestock reduction to be climate- and nature-positive globally, the reduction would have to be linked to a change in UK diets away from meat – otherwise there could leakage, leading to increased meat production abroad to meet UK imports, leading to continued CH_4 emissions, higher CO_2 emissions and damage to forests and nature abroad. The overseas damage and emissions could outweigh UK benefits and GHG emissions reductions.

20) How can efforts to reduce methane reduction be balanced against other important considerations in the agricultural sector, including food security?

Rural livelihoods and a just transition are key issues in Scotland – changes to farming practice need to have support from the farming and rural communities. A reduction in UK livestock numbers will threaten rural economies and social structures. Advice and support would be required to transition rural economies to other opportunities linked to climate and nature.