Written evidence from Professor Jan Selby (MET0040)

Introduction

[1] I am Professor of International Politics and Climate Change at the University of Leeds, with extensive experience of international climate and environmental politics. While I have not yet published specifically on methane, the majority of my research over the last two years has focused on it – and it is on the basis of this background research, plus my broader experience, that I am making this submission. Reflecting this, my remarks are thematic and somewhat exploratory, but may hopefully be of value nonetheless.

My comments are in three parts: (1) on the Global Methane Pledge and how the UK should be contributing two it; (2) on the specificity of the problems posed by methane emissions; and (3) on the scale of the uncertainties surrounding UK methane emissions.

The Global Methane Pledge

[2] The Committee's Call for Evidence notes that the UK is a signatory to the Global Methane Pledge (GMP) and implies that, under this, the UK has pledged to take actions to reduce its emissions by 30% by 2030, against 2020 levels. This is not quite correct. The GMP 30-30 target is a collective global target, and there is nothing in the GMP text which requires signatories to achieve, or even specifically work towards, this target domestically. Instead the GMP simply requires signatories to 'take comprehensive domestic actions to achieve that [global] target', as well as 'to support existing international methane emission reduction initiatives'.

[3] Though some states may interpret the GMP 30-30 target as a purely domestic target, it is more accurately and usefully approached as a *global target* which requires a combination of domestic and international actions – with the appropriate combination to vary from state to state, depending on their circumstances and capabilities. For a state such as the UK, which is a relatively small contributor to methane emissions globally (0.7%) and had already significantly reduced its methane emissions prior to 2020 (with further reductions being possible but much more difficult), supporting international action on methane should be an important part of its policy portfolio. Indeed, one could make the case that UK methane policy should focus at least as much on supporting international actions as on reducing methane emissions domestically, and that this Committee should evaluate the UK's contribution to global methane mitigation efforts on this basis.

[4] My overall assessment is that the UK is falling short on both the domestic and international fronts. *Domestically*, UK methane emissions are currently declining by just 1.5% annually, well below what would be required for a 30% reduction by 2030. And *internationally*, the UK's contribution to collective global mitigation efforts is currently exceedingly limited. Of the more than $1 billion pledged globally during 2023 for the Methane Finance Sprint (including $408 million pledged by governments), the UK's contribution was just $2.5 million. Paralleling this, whereas the US has engaged in extensive bilateral methane

diplomacy, for instance by reaching a bilateral agreement with Turkmenistan to assist it in reducing methane emissions from flaring and venting, the UK has not, to the best of my knowledge, engaged in any such methane diplomacy. And whereas the EU's 2023 methane plan includes plans for a border adjustment mechanism that, once implemented, should incentivise reduced methane emissions within its fossil fuel import supply chain (and I understand that plans for a US version of this are currently under discussion in Washington), the UK has not yet taken any steps in this direction. Indicatively, I attended numerous methane-related events at COP28 – and the UK was strikingly absent from these, barely present and barely mentioned.

Understanding methane emissions and their regulation

[5] Because methane is different from carbon dioxide in both its chemical properties and its emissions profile, it follows that it also poses somewhat different policy challenges. Most climate policy frameworks have been developed using carbon dioxide as their reference point. However, it is at least possible that some of these are not appropriate to methane, and vice versa. Below I consider this point more fully.

[6] Methane emissions are *qualitatively different* from carbon dioxide emissions in several ways. First, methane is much the more powerful greenhouse gas, with a Global Warming Potential over a 20 year timescale (GWP20) around 81 times higher than carbon dioxide. Second, however, it is short-lived, with an average atmospheric lifetime of just nine years (unlike carbon dioxide emissions which are to all extents and purposes permanent additions to the atmosphere). Third, because of this methane emissions create significant short-term opportunities as far as climate change mitigation is concerned, in that any reduction in methane emissions would quickly exert a downward pressure on atmospheric methane levels and in turn on global temperatures (whereas only net carbon dioxide removal would do this). Fourth, and again by contrast with carbon dioxide, methane is not just a pollutant but also a resource – this also presenting (in this case commercial) opportunities. Fifth, whereas carbon dioxide emissions are overwhelmingly released through combustion, methane emissions are associated with a wide diversity of activities, in many different sectors (but especially energy, agriculture, waste). As a result sixth, methane emissions have a different geography from carbon dioxide emissions: whereas the latter are spatially quite concentrated at points of combustion, methane emissions combine sites of highly concentrated emissions (especially 'super-emitter' fossil fuel production and landfill sites) together with a wider pattern of highly diffuse emissions.

[7] Methane's specific chemical properties and emissions profile have several important policy and regulatory implications. One is that the overall long-term objectives and strategies for methane emissions reduction diverge from those for carbon dioxide. Achieving net zero carbon dioxide emissions will require the substitution of fossil fuels by low-carbon energy sources, the essence of the policy challenge here being to develop mechanisms that support this process of *substitution* (i.e. that support energy transition). Achieving (and maintaining) net zero methane emissions, by contrast, will in essence require the ongoing, constant monitoring and governance of a host of sectors and activities, the essence of the methane challenge being not replacement, but *regulation*. A

transition paradigm inspired by the challenge of carbon dioxide emissions is thus probably not appropriate to the challenge of methane emissions. For example, on low-carbon energy sources (esp. solar and wind) the standard assumption is that the main policy intervention required is short- or medium-term price subsidies to make these sources price competitive during the early stages of transition; the standard assumption is that these subsidies should not be required after a transitional period. By contrast, in the case of methane emissions capture from waste, agriculture, or even some fossil fuel production, financial support may be necessary on an ongoing basis (as in the case of the UK's Renewables Obligation – the closure of which to new entrants has resulted in falling rates of methane capture), as will monitoring and management of leaks from all manner of sources (including, crucially, from fossil gas production and distribution, given the central role that it is anticipated to play as a 'transition fuel'). In this regard, methane emissions may prove to be an even longer-term climate mitigation challenge than carbon dioxide.

[8] Second, there exist significant policy *trade-offs* between methane and carbon dioxide emissions reduction, arising both from methane's much shorter atmospheric lifetime, and from the fact that the methane combustion produces carbon dioxide emissions. Different temporal metrics (especially GWP20 versus the IPCC standard GWP100) produce very different measures of the warming impact of methane, relative to carbon dioxide. Equally, a policy which prioritised keeping average global warming within 1.5C, or even 2C, above pre-industrial levels, or which sought to minimise warming over, say, the next 10 or 20 years, would place much greater stress on methane abatement than one that employed a 100 year time horizon. This is not only a theoretical point: the Biden administration's recent decision to freeze approval of new LNG facilities was premised on concerns about the short-term impact of methane leaks from the fossil gas supply chain, and was opposed by those who view short-term warming impact (and GWP20) as an inappropriate measure for climate change policymaking.

[9] Third, there are far larger *uncertainties* associated with methane compared to carbon dioxide emissions. Carbon dioxide emissions can be estimated to quite a high degree of accuracy by measuring fuel use. The measurement of methane emissions, by contrast, requires the monitoring of a wide range of sectors and sources, and (given that direct measurement can only be undertaken here and there) the extensive use of models and conversion factors to estimate emissions. Conversion factors are approximations, which may be more or less accurate within specific contexts (and may also be wrong, or out of date). Moreover, specific emission sites and sources may be unknown, under-reported or intentionally ignored by facilities owners/managers, with these gaps in turn being reflected in national methane emission inventories (a problem that does not apply to nearly the same degree in relation to carbon dioxide). It is because of these endemic uncertainties that there exist such large discrepancies between bottom-up and top-down assessments of methane emissions, with the latter (aided, increasingly, by satellite measurements) providing much the more accurate assessment. National inventories of methane emissions, developed using bottom up methods, typically significantly understate actual national methane emissions, as studies have repeatedly shown. The IEA estimates, for instance, that global energy sector methane emissions are 70% higher than those reported by states to the UNFCCC.

[10] These points on the distinctive challenges posed by methane are only provisional, but suggest a clear case for methane to be treated separately within climate policy frameworks, instead of being subsumed under metrics of 'carbon dioxide equivalence'. In addition, the above suggests the need for more attention to be paid to the significant uncertainties that exist in methane emissions data, and for significant improvements to be made to national methane inventories; to the need for greater policy sensitivity to temporal and other methane-carbon dioxide emission trade-offs; and also to the need for policy coordination and alignment across the different sectors and sources of methane emissions. All of these are currently lacking in UK methane policy. More broadly, it deserves noting that methane-specific policies are globally both highly uneven and thinly developed, and that there is very little clear evidence as yet of the effectiveness of different methane policies.

Uncertainties in UK methane emissions

[11] For reasons of space, I will expand briefly on only one of these points here – the question of uncertainties and possible under-reporting in the UK's national methane inventory. For while the UK's inventory follows standard IPCC guidelines, and uses accepted conversion factors, there is an emerging body of evidence that suggests that certain of these guidelines and conversion factors may be misleading, in the UK and elsewhere.

[12] UK national inventory data suggests an 86% decline in *fugitive emissions* from fossil fuels since 1993. However, some recent research suggests that UK fugitive emissions may be significantly greater than this. One recent study of upstream oil and gas emissions in the UK in 2019 concludes that these were likely more than 5 times higher than the official inventory figure. Another recent study of an active gas leak in the UK and its subsequent reporting also casts doubt on the adequacy of fugitive emissions inventory data. Fugitive emissions data is currently aggregated from self-reported data from individual utilities companies, using an industry-wide model – and it is more than possible that neither the self-reported data nor the model is accurate. More broadly, while there exists significant uncertainty and disagreement over the scale of fugitive emissions from oil and gas supply chains, central estimates are in the range of 2-3%, implying much higher levels of fugitive emissions than allowed for in UK (or other national) inventories. If correct, this would suggest both that UK fossil fuel methane emissions are significantly higher than stated in the national inventory, and that the decline in these emissions has been less pronounced.

[13] Evidence from *other sectors* also poses questions about the adequacy of official UK methane emissions data, more broadly. Evidence relating to slurry suggests that slurry pit-related methane emissions may be at much as five times higher than in UK inventory data, and that slurry may thus constitute a much more significant source of UK agricultural emissions than typically thought. The widespread existence of illegal landfills, and collapse in waste monitoring since 2010, opens the possibility that official landfill data may also be inaccurate. In turn, these examples open the possibility that UK methane emissions as a whole may be considerably higher than official data suggests.

[14] I claim no specific expertise on the technicalities of emissions monitoring or modelling in any of these sectors, so my remarks here should be treated with caution. However, the combination of a) extensive global evidence of significant under-reporting in national methane inventories, which is becoming increasingly clear as a result of improved top-down (especially satellite monitoring) methods, and b) emerging evidence relating to some UK sectors specifically (and there may be other such evidence of which I am not yet aware), suggests at the very least that there are questions to be asked about the adequacy of UK methane emissions data. Given the importance of accurate data to both policymaking and policy evaluation, this suggests that there may be urgent need for further work on, and regulation of, UK national methane emissions data.