Written evidence from the Department for Energy Security and Net Zero (DESNZ) (MET0047)

1. This paper provides the Department for Energy Security and Net Zero's response to the Lord's ECC Methane Inquiry's Call for Evidence

2. DESNZ has provided detailed responses to questions 1 to 15, and 25 to 27, while keeping the full response within the 3000-word limit. We understand that DEFRA are providing detailed responses to questions 16 – 24 in a separate return.

International Commitments

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

Methane was responsible for 18% of total UK greenhouse gas emissions in 1990. This share reduced to 14% in 2022 as methane emissions have fallen faster than other greenhouse gas emissions. A continued reduction in methane emissions from current levels is important in enabling the UK to meet future targets, including the 2030 Nationally Determined Contribution and Carbon Budget 6. This is alongside reductions in all other GHGs, including nitrous oxide and F-gases.

Internationally, 195 countries have committed to pursue efforts to limit global temperature increase to 1.5°C. According to the Climate and Clean Air Coalition, reducing global methane emissions by 45% by 2030 would avoid nearly 0.3 degrees of global warming by 2045, and would be consistent with keeping 1.5°C within reach.

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 Global Methane Pledge is a collective global commitment with almost 160 participants - broad international action is required to meet it.

The UK over-achieved against its first, second and third carbon budgets, and is on track to meet carbon budget 4. The UK has adopted early and ambitious measures to tackle domestic methane emissions. Between 1990 and 2022, UK methane emissions fell by 62%, one of the highest reductions of any OECD country. Key methane policies in our Carbon Budget Delivery Plan, covering the period up to 2030 that will contribute towards the Global Methane Pledge, include the introduction of methane suppressing animal feed, reducing methane leakage from the gas distribution network, and the near elimination of biodegradable municipal waste going to landfill from 2028.

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

Under the UK Climate Change Act, legally binding carbon budget targets require domestic reductions across all GHGs collectively, including methane, to keep us on track to meet net zero. Between 1990 and 2022, UK methane emissions fell by 62%, one of the highest reductions of any OECD country. Historic and future domestic action taken to reduce methane emissions under these targets will contribute towards helping to deliver the Global Methane Pledge as a collective target.

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?

The UK has a robust record on methane emissions. Between 1990-2022, UK methane emissions dropped by 62%, one of the highest reductions of any OECD country.

We are committed to taking further steps to reduce methane emissions, as outlined in our Carbon Budget Delivery Plan and Methane Memorandum. However, our early action means there are challenges with addressing remaining emissions – these will likely be more costly to abate than in some other countries where this is more low hanging fruit. We need to consider the impacts on the UK's fossil fuel, agriculture, and waste sectors and ensure commitments are deliverable working alongside industry.

5) How significant are UK methane emissions when compared to global emissions? What impact could UK efforts on reducing methane emissions have on total emissions?

According to the International Energy Agency's Global Methane Tracker, in 2023, the UK was the 28th largest emitter of methane emissions. Based on IEA estimates, the UK is responsible for around 0.7% of global methane emissions.

Methane was responsible for 14% of total UK greenhouse gas emissions in 2022, down from 18% in 1990, as methane emissions have fallen faster than other greenhouse gas emissions.

6) What is the UK doing to lead and facilitate international action on methane reduction? Could this be enhanced?

The UK led action on methane during our COP26 Presidency, including securing agreement to reduce methane emissions by 2030 in the final decision text and being one of the first countries to support the Global Methane Pledge.

Through the North Sea Transition Deal and the industry's subsequent Methane Action Plan, UK industry have committed to accelerate compliance with the World Bank's zero routine flaring initiative where possible, set a 50% methane reduction target by 2030 (against a 2018 baseline) and have adopted the Oil and Gas Climate Initiative's (OGCI) methane intensity target of 0.2% by 2025.

More recently, we have pledged £2mn to support developing countries to address their energy-related methane emissions; shared UK lessons learnt and raised awareness of measures partners can implement; and participated in the US/EU led working group on improving monitoring, measuring, reporting, and verification of greenhouse gas emissions (including methane) across the supply chain for gas.

The UK remains committed to demonstrating global leadership on methane, building on our strong domestic and international track record.

7) What lessons could the UK learn from abroad?

The UK will continue to work with international partners to drive down methane emissions and share lessons. This includes through policy and technical cooperation, such as our work with the US, EU and others on better measuring, monitoring, reporting and verification of GHG emissions across the supply chain for natural gas.

We will also continue to engage with international organisations who take a leading role in understanding key sources of methane emissions and implementing best practice globally. For example, the UK is a partner of the Climate and Clean Air Coalition and a founding member of the International Energy Agency.

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?

The UK's methane emissions are estimated annually in the Greenhouse Gas Inventory (GHGI) report, which is submitted to the United Nations Framework Convention on Climate Change (UNFCCC) for their annual review. The estimates are developed in line with internationally recognised standards and published as national statistics.

In addition, the UK also monitors and verifies its greenhouse gas emissions, including methane, using a network of sensors across the country. The UK is one of only four countries currently reporting the validation of methane emissions based on measurements. The UK's Inventory estimates for methane have

demonstrated very strong alignment with these independent measurements since 2012.

The UK undertakes an annual programme of improvements to the Inventory, from a dedicated budget. All improvements are approved by the National Inventory Steering Committee and are designed to improve the transparency, accuracy, consistency, comparability and completeness of the Inventory.

9) What progress is being made on methane monitoring and data collection in the UK using technologies such as satellite data and drones?

The UK Space Agency (UKSA) through Satellite Application Catapult in partnership with GHGSat provides high resolution satellite estimates of methane emissions from specific locations. These satellite data can pinpoint key sources of methane emissions.

In addition, UK academics undertake mobile measurements to understand methane leakage across the UK. These techniques are being developed with the aim of better understand methane leakage but due to low background concentrations, these approaches are currently only suited to detecting large leaks.

The National Physical Laboratory (NPL) is leading a consortium delivering the Greenhouse Gas Emissions Measurement and Modelling Advancement (GEMMA) Programme. GEMMA aims to improve the UK's GHG direct measurement and modelling system and includes a specific mission to establish a capability to attribute measured methane to certain sector activities. This will greatly enhance verification of methane emissions in certain sectors.

10) Are there significant methane leakages in the UK, and if so where do they usually occur?

Methane leakage can occur in any sector that handles or generates methane. If significant leaks are detectable by satellite and so based on current satellite evidence, we do not understand these to be widespread.

The Environment Agency (EA) has a supervisory regime for fugitive ("leaking") methane at major permitted sites, which must have Leak Detection and Repair (LDAR) programmes to detect and minimise methane leakage.

EA has also initiated the use of Methane Imaging cameras to check on site releases. The cameras are used during site visits at a full range of permitted sites to record any substantive methane signals.

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

The Intergovernmental Panel on Climate Change highlights that the choice of GHG emissions metric depends on the purpose of the analysis, and all metrics have limitations and uncertainties, given that they simplify the complexity of the physical climate system and its response to past and future GHG emissions.

GWP100, a measure of the radiative forcing of a gas over 100 years relative to the radiative forcing of CO2, is the metric agreed by the UN Framework Convention on Climate Change (UNFCCC) for reporting GHG emissions internationally, and consequently is also used for the UK's Carbon Budgets.

UK Methane Emissions and Sectors

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

Between 1990 and 2022, UK methane emissions reduced by 62% (or 94 MtCO2e). The largest reductions have been in the waste sector (down 53 MtCO2e or 76%) mostly from landfill reductions and in the fuel supply sector (down 34 MtCO2e or 88%) mostly from reduced coal mining and reduced leakage from the gas distribution network.

In 2022, the largest sources of methane emissions ordered by magnitude were agriculture (mostly livestock), waste (mostly landfill), the land use sector (mostly peatlands), and fuel supply (leakage from gas distribution).

We have made significant strides in reducing methane emissions from the oil and gas sector – between 1990-2022, these emissions fell by 70%. In 2022, upstream oil and gas contributed less than 2% (1.4%) of total UK territorial methane emissions.

13) Which sectors are most promising for achieving further methane emissions reductions? And which are likely to be at least relative cost?

Across these sources, the largest historic progress in methane reduction has been made in the waste and fuel supply sectors. This progress has been achieved through implementing some low relative cost but high impact measures.

Of current methane emissions, most remain in the agriculture and waste sectors in complex and challenging to abate areas.

Within agriculture, cost effective opportunities do exist and are being taken forward, like productivity gains and the introduction of methane suppressing feed products.

For waste, continuing to reduce biodegradable municipal waste to landfill and efficiency measures provides cost effective scope to build on historic progress in reducing waste emissions. On top of this, current efforts are also focused on reducing emissions from wastewater treatment and the biological treatment of waste, in addition to reducing waste arisings altogether, moving towards a more circular economy. Whilst anaerobic digestion (AD) reduces emissions by reducing landfill, there are opportunities to reduce fugitive methane missions from the AD process, which are being explored through research.

Methane reductions in upstream oil and gas are already planned to include ending routine flaring/venting by 2030 and any acceleration is likely to be costly to achieve. Methane emissions from upstream oil and gas are relatively small at ~1.7% of total UK methane emissions.

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

As per Q13, remaining emissions are complex to abate with limited options remaining to quickly reduce methane emissions in a low cost manner.

In terms of action targeting the largest emitting areas:

- Implementing action to address waste emissions is occurring now, for example to achieve a near elimination biodegradable waste to landfill from 2028, being achieved through action including consistent collections, a deposit return scheme and extended producer responsibility scheme for packaging. Without action, biodegradable waste sent to landfill today slowly breaks down anaerobically, emitting methane for many years afterwards.

- For agriculture, efficiency measures and emerging technologies such as methane suppressants are actively being investigated by government to fully understand the role these may have in delivering emissions savings over the medium term. Further reductions are likely to be challenging and longer term.

- For fuel supply, significant action has already been taken with limited low cost but high abatement options remaining. We have also committed to support existing upstream oil and gas assets to achieve zero routine flaring and venting targets by 2030 at the latest. However, accelerating existing routine flaring and venting targets is not considered workable (please see Question 27).

15) To what extent is there existing regulation in each emitting sector to mitigate methane emissions, and how well is this working?

To note: we are expecting Defra to add to the DESNZ response below in relation to their sectors when they submit their return.

For upstream oil and gas, the North Sea Transition Authority (NSTA) already expects methane emissions to be as low as possible, and for all new developments to be developed on the basis of zero routine flaring and venting.

In the UK, the Coal Authority manages the effects of past coal mining and has a network of mine water and mine gas monitoring points. The majority of former coal mines are now fully flooded and no longer pose a methane emission risk. In the more recently closed coal mining areas mine water levels are still recovering and these are being monitored. Where high levels of methane in abandoned coal mines are known, these are licenced by the NSTA for gas extraction and use. This is carefully controlled to ensure safe extraction and use.

Downstream Oil Sector refineries and terminals need to report their VOC (Volatile Organic Compounds) emissions, which includes methane, and these are subject to regulation by the Environment Agency. There has been significant progress in reducing these emissions: oil terminals and refineries emitted only 0.013 MTCO2e in 2022 compared to 0.286 MTCO2e in 1990.

Agriculture

DESNZ is not responding to questions 16 – 21, as these are DEFRA led areas.

Waste and Waste Management

DESNZ is not providing detailed responses to questions 21 – 24, as these are DEFRA led areas, but has one comment in relation to question 21:

21) What further progress could be made in the waste and waste management sector on reducing methane emissions? Are there interventions and/or technologies that could bring emissions down?

DESNZ is scoping potential research to understand current and emerging technologies and interventions for fugitive methane leakage prevention from AD sites.

Fossil Fuels

25) Are there further methane reductions that could be made in the UK fossil fuels sector (e.g., oil, gas or other fossil fuels), or at a faster pace?

In 2020, the UK Government committed to the World Bank's 'Zero Routine Flaring by 2030' initiative. UK industry have committed further to accelerate compliance with this initiative where possible, setting a 50% methane reduction target by 2030 (against a 2018 baseline) and adopting a methane intensity target of 0.2% by 2025. Operators are performing well in this space, with an

estimated methane intensity of just 0.15% in 2022. In March 2024, the North Sea Transition Authority published its OGA Plan, with requirement for operators to take action to reduce flaring and venting, including zero routine flaring and venting for all developments by 2030, and to monitor and reduce fugitive methane emissions.

Additionally, the ETS Authority recently announced that expanding UK ETS coverage to the upstream sector could provide an additional driver for methane emission reduction. The Authority are reviewing this policy and will consult in due course.

Downstream oil methane emissions are typically small and mixed with more hydrocarbons (VOCs). Terminals and refineries have implemented extensive emission reduction programmes. DEFRA and the EA regulate these VOC emissions.

26) How can we ensure that reducing methane emissions in the oil and gas sector are not at the expense of reducing CO_2 emissions?

In its recent OGA Plan, the NSTA set out a range of decarbonisation requirements for upstream oil and gas operators. This includes a range of requirements on methane emission reduction, including from flaring, venting and fugitive emissions, but also sets out requirements for low carbon power and asset electrification – a key approach for reducing CO_2 emissions. The NSTA therefore highlights the need for action across the board on production decarbonisation.

Downstream oil refineries and terminals have limited capex availability. Both CO_2 and VOC reduction programs compete for available capex, with neither generating revenue. Tightening requirements for CO_2 and VOC emissions simultaneously and forcing sites to make investments can render the sites financially non-viable.

27) What impact would bringing forward the ban on flaring and venting have on both emissions and the industry?

As set out in the response to Question 25, the UK Government committed in 2020 to the World Bank's 'Zero Routine Flaring by 2030' initiative, and UK industry have subsequently committed further through the North Sea Transition Deal and industry's subsequent Methane Action Plan.