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CLIMATE CHANGE

SUMMARY PROOF

by

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EXPERIENCE

My name is Professor Kevin Anderson. I have examined issues around energy and climate change within the Tyndall Centre (the UK's leading interdisciplinary and academic climate change research centre) since 2001. Prior to moving to academia in the mid-1990s I worked for a decade as an engineer, principally in the petrochemical industry.

I am the co-author on a range of reports appraising the climate change and environmental impacts of shale gas, and have undertaken a quantitative assessment of the 'exported' emissions embodied in coal displaced, in part, by shale gas in the USA. In 2017 I was the lead author on a report into Natural Gas and Climate Change; based on this I subsequently engaged widely across the EU member states and the Commission, advising on how the Paris Agreement placed major constraints on gas use and development within the EU. This work has led on to my providing advice to the Commission on their provisional proposals for an EU carbon budget framework.

Over many years I provided scientific evidence to the Welsh Government's 'climate change commission' (CCCW), that subsequently has been used to inform the commission's guidance to the Welsh Government. In addition to this formal role, I periodically give written and oral evidence to the Environmental Audit Committee and the Energy and Climate Change Committee, and provide *ad hoc* advice to BEIS, DEFRA, the UK Committee on Climate Change (CCC), and the EU Commission and Parliament. I regularly am asked to present at the annual Party conferences, give seminars to "All-Party Groups" and engage across a breadth of industry stakeholders, NGOs and wider civil society groups.

I was commissioned by the European Parliament Petitions Committee to review the 'low carbon' credentials of unconventional natural gas and have acted as a peer reviewer for the Department of Energy and Climate Change report on the same topic. I am regularly asked to present on the implications of shale gas for climate change targets and obligations to various Parliamentary groups and Political Parties, through to the Scottish and Irish Governments, the European Commission and large financial institutions.

Over the past two years I have held the Zennström professorship at Uppsala University (Sweden). My role there has required me to engage extensively with the development of carbon budgets and climate policies for Sweden's Läns and Kommuner (local and regional governments) as well as in the drafting of Sweden's 2018 Climate Change Law (national legislation).

I attended both weeks of the Paris COP21 event as a scientific 'observer', presenting at a range of formal side events and engaging widely with other scientists, policy makers and media. This has continued through to, and includes, COP24 from 3-14 December 2018.

SUMMARY

1. My evidence is on the specific and broader implications of climate change impacts of this development. I draw three headline conclusions and address other important matters, including shale gas as high carbon energy; CCC and IPCC reports; disaggregation of emissions; fugitive emissions; energy security and the carbon impact of the proposed development.

2. **Firstly,** IGas have not calculated the greenhouse gas ("GHG") impact of their own proposal and they confirmed in correspondence they do not have GHG emission figures. In light of UK Government's rising concern over issues of climate change, that IGas are proposing fossil fuel exploration without even knowing what its GHG impact will be is imprudent, at best. But when considered alongside the express conclusion of the Climate Change Committee ("CCC") that "*it should not be taken as a given that emissions from exploration will be low, especially for any extended well tests"*, IGas's failure to assess its own GHG impact is negligent, all the more so for a company operating in an industry so reliant on robust analysis, measurement and compliance.

3. **Secondly,** the 2018 IPCC Report considered what is required to limit global warming to 1.5°C and to 2°C and how to limit the "overshoot" of those reduction targets. The IPCC is recognised by the UK Government as the international authority on climate change. It carries out its work with the help of thousands of

climate scientists from around the world, including from the UK, with the MET Office's Hadley Centre being one of the principal sources of scientific input to the IPCC's Working Group 1 (on climate science).

4. The IPCC concluded that, in order to achieve a limit of 1.5°C with limited overshoot requires rapid and far reaching transitions in energy and other systems, much more rapidly than had previously been required. A deep reduction in emissions of methane is required and global CO_2 emissions must begin declining immediately if we are to have a chance of achieving a 1.5°C with limited overshoot.

5. The IPCC Report sets out very clearly that the human impacts of 2°C warming are far more serious than those of 1.5°C warming. Importantly, the IPCC Report notes that whilst emissions from the pre-industrial period to the present will persist for a very long time, they alone are unlikely to cause global warming of 1.5°C. This reinforces the requirement for early action, with the IPCC Report emphasising how immediate and far-reaching steps need to be taken to limit current and future emissions.

6. **Thirdly,** the UK's Paris 1.5°C commitment, informed by the 2018 IPCC 1.5°C Special Report, puts such tight and deepening constraints on the UK's available carbon budget that new hydrocarbon developments are difficult to reconcile with the UK's contribution to limiting warming to 1.5°C. The 2015 CCC Report shows that they are not compatible with the UK's climate targets (even at 2°C) until the three tests are met. None of the tests have been met and it looks highly unlikely that meeting the third test is possible, with the CCC concluding that the UK is set to miss both its fourth and fifth carbon budgets.

7. **Shale Gas as a High Carbon Energy**. This development is not "low carbon". Fossil fuels are by their nature high carbon energy sources with natural gas comprising 75% carbon by mass, and consequently emit large quantities of carbon dioxide once combusted.

8. **Disaggregation of emissions**. DECC has produced a nationally consistent set of carbon dioxide emissions estimates at Local Authority level, which it clearly considers are an appropriate metric to use. These allow Local Authorities to track

their GHG emissions trends over time, to measure progress against any targets they have and to take steps to reduce those emissions. This approach supports local authorities, such as Cheshire West and Chester, being aware of the level of emissions within their geographical area and taking steps to reduce those emissions.

9. **Fugitive emissions** are significant and increasingly affecting the atmosphere. A current scientific paper suggests that, “shale gas production in North America over the past decade may be the single largest cause for the global increase in atmospheric methane”. Its conclusions have major implications for any evidence-based development of UK shale gas.

10. **Energy security and supply** can be improved through energy efficiency and service improvements combined with related policies which are very significant and far more cost effective than simply increasing energy supply. Shale gas also does not provide medium to long term energy security. Shale gas development in the UK is probably the most publicly contested source of energy, which adds to ‘insecurity’ of supply.

11. **Carbon Impact of the Proposed Development.** This development will cause GHG emissions during its construction, operation and decommissioning, including fugitive emissions, cold venting, flaring, ancillary plant, transport and restoration.

12. From a near-term emissions perspective, it would be unwise to proceed with the exploratory proposal as its unknown level of emissions would reduce still further the small 2°C carbon budget (and even smaller 1.5°C carbon budget) available to the remainder of the UK generally or Cheshire West and Chester more specifically.

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