

July 2017



THE OXFORD
INSTITUTE
FOR ENERGY
STUDIES

Methane Emissions: from blind spot to spotlight

Executive Summary

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Methane emissions can be defined as all releases of the gas – intentional or otherwise – that occur across the entire gas supply chain from exploration and production to final consumption. Releases of methane have long been seen by the industry as an unfortunate, if necessary, part of doing business. For safety reasons, unplanned gas escapes were avoided where possible, though a release to atmosphere was often the chosen option during maintenance and when dealing with minor distribution leaks. This mind-set was also evident in venting and flaring associated gas during oil production and the use of pressurised gas to operate valves and other equipment.

The economic cost of this activity was recognised but expenditure to reduce emissions often outweighed any benefit. Furthermore, many regulatory regimes included allowances for unaccounted for gas so operators could pass on the cost of emissions to consumers. The environmental impact of gas emissions was at best a minor consideration and in most cases an industry blind spot.

In wider environmental circles the impact of methane emissions – which come from a wide range of natural and anthropogenic sources – has received growing attention. Methane is a potent greenhouse gas (GHG) and whilst it degrades rapidly (it is sometimes referred to as a short-lived climate pollutant), the increased focus on shorter term environmental targets has raised its profile.

Global ambient methane levels have been rising and the coinciding growth in global gas production – and the rise of unconventional gas and hydraulic fracturing - led some to conclude that methane emissions from the natural gas industry were primarily responsible. This hypothesis received further support in 2016 when the US EPA published a major upgrade (subsequently partially reversed) in emission estimates from natural gas supply.

There has been a great deal of technical and scientific analysis of the level and impact of methane emissions. This, however, has not always led to greater consensus. At a general level, our understanding of the chemistry of the atmosphere, how this changes over time and the impact on temperature and climate is still evolving.

More specifically, whilst there is no shortage of academic studies of emissions from the oil and gas industry, these have used a wide range of estimation methods, data, and system definitions and boundaries. These approaches have resulted in a big variation in estimates of the magnitude of natural gas emissions. This state of affairs has been exacerbated by the lack of available or consistent data from the gas companies themselves. The gas industry's attempts to improve and standardise monitoring and reporting methane emissions have often resulted in arcane debates over data and impact. As a result, the hitherto, largely unchallenged, environmental credentials of natural gas as the “greenest” fossil fuel have been questioned by environmental groups and some government agencies. Even objective observers have suspected the worst, perhaps best exemplified by the Economist article of July 2016, ‘A dirty little secret’.



These issues were highlighted in Jonathan Stern's paper "The Future of Gas in Decarbonising European Energy Markets: the need for a new approach" (OIES, 2017) which flagged the risk that emissions of unburned methane in the supply chain could undermine the environmental case for gas. This paper examines the issues in more detail – primarily regarding the gas industry - but also recognising the wider context.

The key messages from the paper are:

- Whilst there are many data gaps and inconsistencies, most databases and studies support the view that the increase in global atmospheric methane in the last ten years was not a result of the increase in global gas production over this period. Many countries have reported a reduction in both the absolute and relative level of emissions from the natural gas sector. Furthermore, whilst the full chain effect of methane emissions reduces the environmental case for gas, it is still preferable to coal as a fuel for power generation.
- On the other hand, the lack of consistent and transparent data and a failure from industry players to articulate a coherent message on methane emissions has resulted in a data vacuum that has been filled by less rigorous, and in some cases self-serving, alternative conclusions. The gas industry has been increasingly active in countering this trend, both through greater efforts to reduce emission levels and in improved accuracy and transparency of data. The environmental case for gas is, however, in many policy maker's minds still likely to remain at best unclear.
- Several studies suggest that a global average emissions rate of between 1.5 - 2 per cent of sales gas across the entire supply chain is broadly correct, though some of this may be the result of oil production whilst a few estimates put the numbers much higher. Further action is required to confirm these numbers, to provide a consistent and proven database across the entire gas supply chain and for this to be reflected in government as well as industry statistics. Gas producing countries in particular, need to move quickly to ensure they are reporting updated and reliable numbers.
- Regulatory pressure on emissions control is likely to increase and companies should be prepared to meet greater reporting requirements and financial measures. At an operational level creating a "zero-emissions" mind-set remains a worthwhile objective.

The gas industry is still on a journey though the issue of methane emissions is clearly receiving much greater attention than hitherto. If the industry can build on the progress to date and deliver a clearer picture on the level of emissions and actions to address them, the arguments for gas displacing coal in power generation and oil products in transport become much stronger and the role for gas in a decarbonising economy more secure.
