

Advice to the Welsh Government on Coalbed Methane (CBM) from the Committee on Climate Change

Under the Infrastructure Act, the Committee on Climate Change has a duty to assess the impact on meeting carbon budgets of UK production of onshore petroleum (which comprises shale gas, shale oil, conventional onshore production of oil and gas, and coalbed methane).

It is outside the scope of the Committee's legal remit to investigate other issues that have been raised in relation to the development of onshore petroleum, such as impacts on water, local noise, traffic, seismic activity and the wider environment. The Committee's advice relates solely to greenhouse gas emissions and the impact on carbon budgets.

Our first report,¹ in March 2016, focused primarily on production of shale gas, as this has considerably larger potential implications for emissions than other sources of onshore petroleum, and is the source for which the evidence base on emissions and mitigation measures is best developed.

Coalbed methane (CBM) was not analysed, due to a lack of evidence on the greenhouse gas footprint of CBM production that covers the full range of possible emissions (e.g. including methane being released from the water drained from the coal seams). In relation to CBM, our report said:

- "There is little data surrounding the sources and quantities of greenhouse gas emissions associated with CBM extraction. At the present time, the evidence is insufficient to estimate the GHG emissions from developing CBM wells in the UK."; and
- "If exploitation of CBM were proposed in any significant way for the UK then we would come back to look at it in further detail."

Our report set out three tests for exploitation of shale gas:

- **Test 1: Well development, production and decommissioning emissions must be strictly limited.** Emissions must be tightly regulated and closely monitored in order to ensure rapid action to address leaks.
 - A range of technologies and techniques to limit methane emissions should be required, including 'reduced emissions completions' (also known as 'green completions') and liquid unloading mitigation technologies (e.g. plunger lift systems) should these be needed;
 - A monitoring regime that catches potentially significant methane leaks early is essential in order to limit the impact of 'super-emitters';
 - Production should not be allowed in areas where it would entail significant CO₂ emissions resulting from the change in land use (e.g. areas with deep peat soils);
 - The regulatory regime must require proper decommissioning of wells at the end of their lives. It must also ensure that the liability for emissions at this stage rests with the producer.
- **Test 2: Consumption – gas consumption must remain in line with carbon budgets requirements.** UK unabated fossil energy consumption must be reduced over time within levels we have previously advised to be consistent with the carbon budgets. This means that UK shale gas production must displace imported gas rather than increasing domestic consumption.
- **Test 3: Accommodating shale gas production emissions within carbon budgets.** Additional production emissions from shale gas wells will need to be offset through reductions elsewhere in the UK economy, such that overall effort to reduce emissions is sufficient to meet carbon budgets.

¹ CCC (2016), *The compatibility of UK onshore petroleum production with meeting the UK's carbon budgets*. Available at <https://www.theccc.org.uk/publication/onshore-petroleum-the-compatibility-of-uk-onshore-petroleum-with-meeting-carbon-budgets/>

Given the application received by Welsh Government, a request was made to the Committee for confirmation as to whether the three tests that we set in that report also apply to CBM production. The main relevant test is the first, which relates to keeping the greenhouse gas footprint of production low. Within this test, the requirements include that:

- Technologies and techniques are employed in order that the greenhouse gas footprint of production is kept low.
- A monitoring regime is put in place that catches potentially significant emissions of methane early.

We confirm that the tests are applicable to CBM production. Given the lack of available evidence on the full greenhouse gas footprint of CBM production, it is particularly important that, should production go ahead, both of these requirements are fulfilled, and are seen to be fulfilled.

Furthermore, it would be very important to collect and publish data on the greenhouse gas footprint of production in order to enhance the evidence base. It would be valuable to undertake full 'baseline' monitoring of any proposed sites, in order to understand the level of methane concentrations that already exists before any production occurs.

We set out in the Annex the fuller advice on Test 1 from our advice on Onshore Petroleum.

Test 1: Well development, production and decommissioning emissions must be strictly limited

Left entirely unregulated, the emissions footprint of shale gas production could be substantial. Any significant level of exploitation of UK resources in this way would be inconsistent with carbon budgets. However, the current proposals from Government and regulatory bodies include action to regulate emissions and there are technologies and techniques that are known to limit greenhouse gas emissions from shale gas production. Experience and data from the US provide estimates of the costs and effectiveness of many of these measures.

The UK regulatory regime has the potential to be world-leading but this is not yet assured. Some technologies and techniques are likely to be required by the Environment Agency as a condition of the production licence. However, the precise nature of these standards needs to be clarified and must meet the tests set out above, before production could begin. These standards should apply not just to the well pad but to all associated infrastructure prior to the gas being injected into the grid or put to use.

US experience also indicates that an important contributor to methane emissions has been so-called 'super-emitters': large methane leaks left unchecked for extended periods of time. As a consequence, a small number of wells have been found to contribute disproportionately to emissions. Limiting emissions therefore requires that the monitoring regime catches the super-emitters quickly and significantly limits the quantity of methane released to the atmosphere, alongside the technologies to limit known sources of emissions.

The minimum set of techniques and technologies required to limit emissions can do so at a cost comparable to the cost of reducing emissions elsewhere in the economy, consistent with the requirements of carbon budgets. As evidence improves, it is likely to be cost-effective and necessary to require the inclusion of further emissions reduction measures.