



National Audit Office

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## **Report**

by the Comptroller  
and Auditor General

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**Department for Business, Energy & Industrial Strategy**

# Fracking for shale gas in England

# Summary

**1** Hydraulic fracturing (fracking) is a technique used to recover gas from shale rock. In England, this rock lies deep underground primarily in Yorkshire, the East Midlands and the North West. Fracking involves injecting a mixture of water, sand and chemicals at high pressure through a well. Typically, the well is first drilled vertically into the ground, and then horizontally. The water creates fractures in the rock and the sand lodges into the spaces to keep them open. This allows the released gas to flow out of the rocks and travel to the surface. The Department for Business, Energy & Industrial Strategy (the Department) leads government's policy for shale gas development (**Figure 1** on pages 8 and 9).

## Scope of this report

**2** Fracking for shale gas is the subject of media, public and Parliamentary interest. This report sets out the facts about the government's plans to support shale gas development in England to help Parliament consider whether taxpayers' interests are being protected effectively. It covers:

- an overview of fracking, and what activity has taken place to date (Part One);
- government's objectives (Part Two);
- managing the risks from fracking (Part Three); and
- the costs to taxpayers (Part Four).

**3** It is not the remit of the National Audit Office to examine the merits of government's policy to support shale gas development. We have not sought to determine the quality of the scientific evidence underlying the case for or against fracking and the potential risks it presents. We do not conclude on whether the Department's approach to supporting shale gas development is value for money. Our methodology is set out in Appendix One.

## Key findings

### Government's objectives

**4 The Department believes shale gas could provide the UK with greater energy security through diversifying the sources of supply.** The Committee on Climate Change (CCC) considers that gas will have a significant role in the UK's future energy mix even though the demand for gas is expected to fall between 2020 and 2035. The Department believes shale gas may help counteract the decline of domestic oil and gas production and reduce the UK's reliance on oil and gas imports. The size of its contribution is unclear as the Department does not know how much shale gas can be technically and commercially extracted. It does not expect shale gas production to lead to lower energy prices. There are limitations to comparisons with the North American experience of large-scale shale gas production given differences in geology, regulation, population density and land ownership (paragraphs 1.9, 2.2 to 2.5, 2.7 and 2.8, and Figures 5 and 6).

**5 The Department believes shale gas can support economic benefits, but it has not analysed the benefits or costs of shale gas development.** Ministers have cited reports that indicate investments of up to £33 billion and the creation of 64,500 jobs. The Department believes an analysis of the costs and benefits of supporting the industry would not be meaningful in the absence of more evidence about how much shale gas can be extracted (paragraphs 2.9 and 2.10, and Figure 7).

**6 Progress to establish the commercial viability of extracting shale gas has been slower than government expected.** Government has introduced a series of measures to help operators to determine the viability of the shale gas industry, mainly focused on supporting the planning process. However, progress has been slow to date: in 2016, Cabinet Office expected up to 20 fracked wells by mid-2020, but three wells have been fracked to date. Government attributes this slow progress in part to low public acceptance. Operators say the time to gain regulatory permits and planning permissions, coupled with the current 'traffic light system' for managing fracking-induced earthquakes (which is more stringent than other countries), is hindering the industry's development. In May 2019, ministers stated there were no plans to review this system (paragraphs 2.6, 2.16 and 3.21, and Figures 9 and 10).

**7 The Department considers it can meet its climate change objectives while developing shale gas, but it has not yet developed the necessary technology.** The Department is confident it can meet the CCC's three tests to ensure that shale gas production is compatible with the government's commitment to reducing greenhouse gas emissions. The CCC states that the development of carbon capture, usage and storage technology (CCUS) is critical to this because it would provide a way to use fossil fuels, including shale gas, in a low-carbon way. The Department held two unsuccessful competitions in 2007 and 2012 to develop and implement CCUS. In 2018, the Department set out its aim to develop the first CCUS facility in the mid-2020s (paragraphs 2.13 to 2.15 and Figure 8).

## Managing the risks from fracking

**8 Alongside greenhouse gas emissions, other risks from fracking include air pollution, groundwater contamination and earthquakes.** Any potential impacts shale gas development could have on air quality and water supplies is more likely to be felt at the local and regional level. The Environment Agency (EA) believes that with regulation, the environmental risks from fracking are low. The Oil & Gas Authority (OGA) is responsible for ensuring operators manage the risk of fracking-induced earthquakes. It requires operators to pause all fracking activity if earthquakes are equal to or greater than 0.5 magnitude on the Richter scale. The three fracking operations in the UK to date have resulted in earthquakes over 0.5 magnitude, with the most recent resulting in an earthquake of 2.9 magnitude in August 2019 (paragraphs 1.7, 3.5 to 3.20, and Figures 13 and 14).

**9 Regulators will need to respond and build capacity quickly if operators begin producing shale gas at scale.** Shale gas operators must apply for environmental permits and comply with the regulatory regime in place for conventional oil and gas, as well as three additional requirements. The OGA, the Health and Safety Executive (HSE), and EA, have so far focused on the exploratory stage and mainly rely on a system of statutory self-reporting by the operator, which presents risks. Should the industry move into production quickly, EA, the lead regulator, is confident it can respond at pace. At the end of a well's operational life, HSE must be satisfied that the well has been decommissioned safely. EA must be satisfied that there are no ongoing environmental risks before it allows an operator to surrender its environmental permit. Following this, there is no requirement on any public body or the operator to monitor the well for any leakages or emissions (paragraphs 3.2 to 3.4, 3.6, and Figures 1, 11 and 12).

**10 Public support for shale gas development is low and has fallen over time.** The Department's public attitudes survey shows the opposition to shale gas has increased from 21% to 40% between 2013 and 2019. Public concern has centred on the risks to the environment and public health; from fracking-induced earthquakes; and the adequacy of the environmental regulations in place. Local authorities we interviewed said the strength of public opposition for shale gas planning applications was unprecedented. One local authority received around 36,000 responses to the public consultations for planning applications to frack shale gas wells (paragraphs 1.8 and 4.5, and Figure 4).

## The costs to taxpayers

**11 The Department does not know the full costs of supporting shale gas development to date or the future public investment that may be required.**

Costs have been borne by government departments, regulators, local authorities and other local bodies. We have identified known costs of at least £32.7 million since 2011. This includes £13.4 million spent by three local police forces on managing protests around shale gas sites. It does not include the cost of appeals, judicial reviews, or the time and expenses of public servants. Because of the uncertainty over how much shale gas can be extracted, the Department has not estimated how much public investment will be required to support the production of shale gas at scale (paragraphs 4.2 to 4.9 and Figure 16).

**12 The Department recognises its responsibility for decommissioning offshore oil and gas infrastructure, but not for onshore wells, including shale gas wells.**

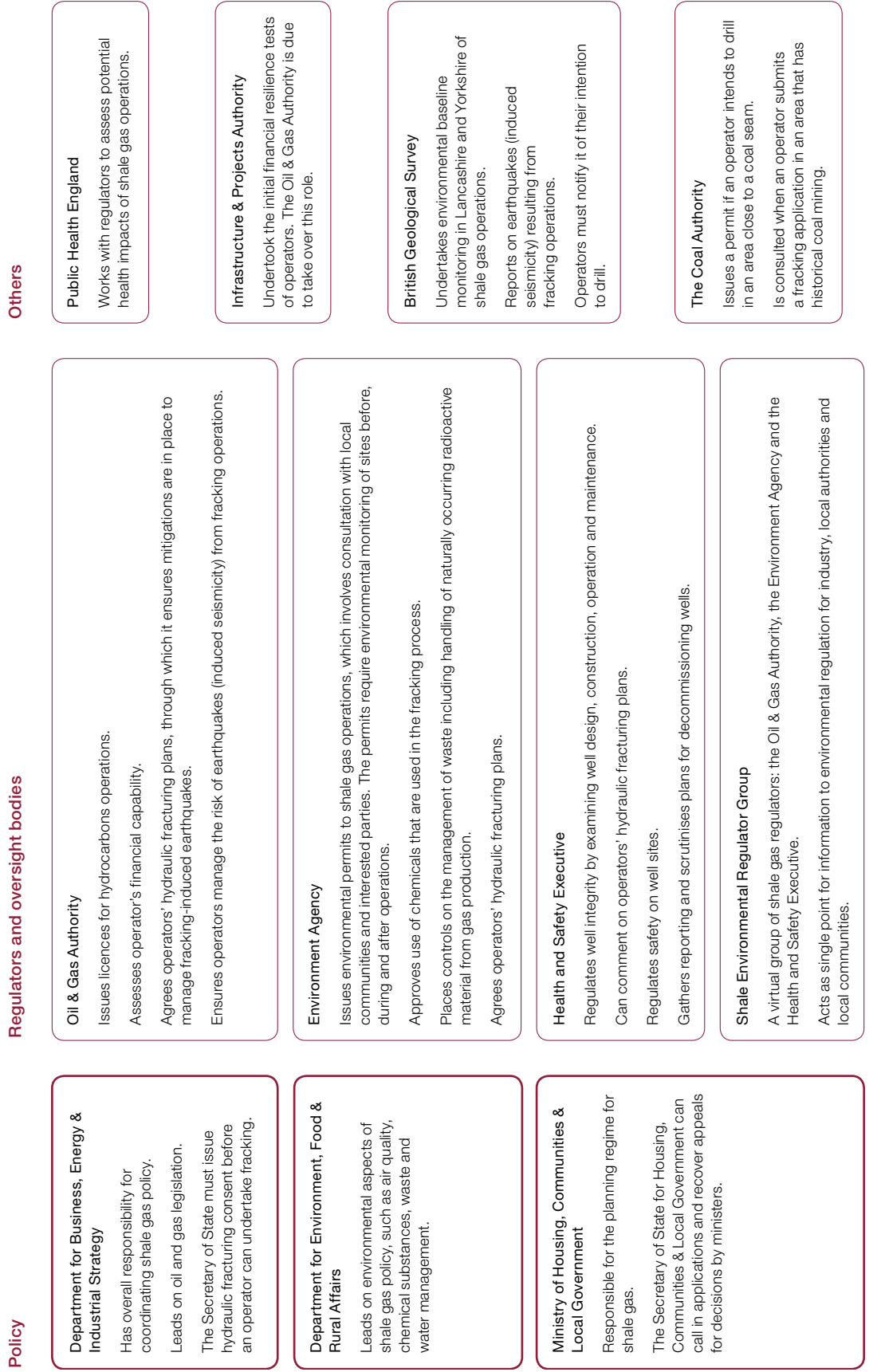
In January 2019, we reported that government is ultimately liable for the total costs of decommissioning offshore infrastructure that operators cannot decommission. The Department discloses this risk in its financial accounts. In contrast, there is no equivalent legislation that establishes government liability for decommissioning onshore wells. In March 2019, the Committee of Public Accounts (the Committee) set out its concerns about the Department's arrangements for ensuring the cost of decommissioning shale gas wells does not fall to taxpayers (paragraphs 4.12 and 4.13).

**13 The Department says landowners may be liable for decommissioning costs if an operator is unable to fund them, but these arrangements are unclear and untested.**

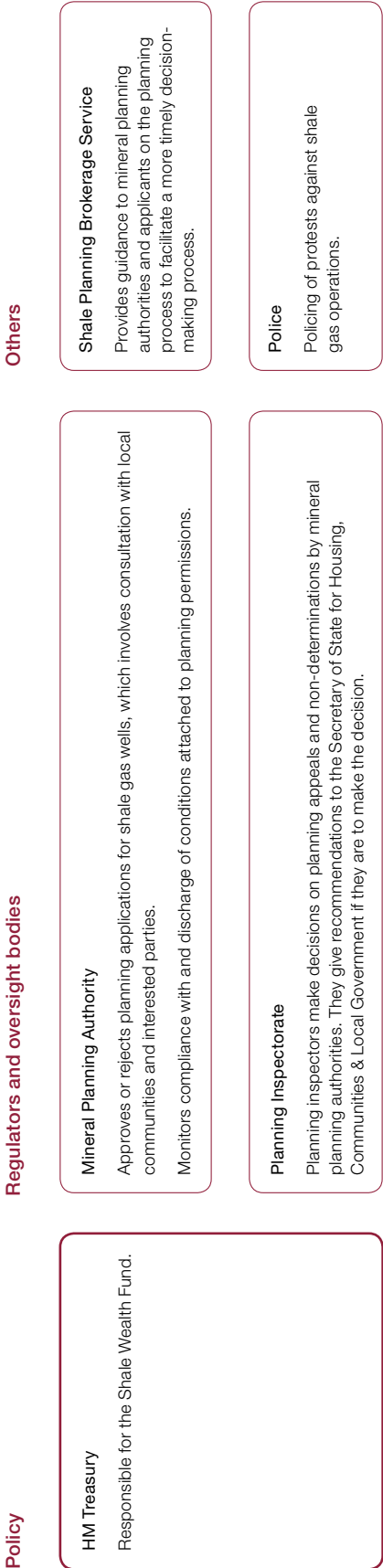
In May 2019, the Department wrote to the Committee and asserted that, for an abandoned well with no current operator, EA had the ability to pursue former operators for the cost of damages under the Environmental Liability Directive, and to pursue landowners under the Environmental Damage Regulations. It noted, however, that these measures were "relatively untested". In October 2019, EA told us it has since considered the extent of these powers and determined that it is unable to use them to pursue insolvent operators or landowners, contradicting the advice given by the Department to the Committee. The EA may be able to pursue landowners under other statutory powers, but these would have limitations and are untested in the oil and gas sector. The Department could not tell us what would happen should the landowner be unable to meet decommissioning costs (paragraphs 4.15 and 4.16).

**Figure 1** Roles and responsibilities for shale gas development (including fracking)

Multiple organisations have responsibilities for policy and oversight of shale gas



**Figure 1 continued**  
 Roles and responsibilities for shale gas development (including fracking)



**Notes**

- 1 A hydraulic fracturing plan sets out an operator's approach to controlling and monitoring fracking and mitigating the risks of earthquakes (induced seismicity).
- 2 A mineral planning authority is a county council (in two-tier authority), a unitary authority or a national park authority.

Source: National Audit Office analysis