



Deepwater and Arctic oil drilling

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This note outlines several examples of how previously inaccessible sources of hydrocarbons are now starting to be exploited. It covers deepwater drilling, drilling in the Arctic Circle, and potential future exploitation of methane hydrates (see also the Library note on [shale gas](#)).

It also outlines the UK regulatory regime, which is probably second only to the Norwegian system. However, as exploration moves to increasingly fragile ecosystems and difficult environments, there have been various calls for moratoria on drilling and the European Commission has proposed that it should have a role in regulating offshore activity. The Environmental Audit Committee is currently conducting an inquiry into the [protection of the Arctic](#). This will consider Arctic drilling; a recent report by Lloyd's has highlighted the potential for increased exploration in that region as sea ice retreats and oil prices rise.

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1 Background and summary

Increasingly, previously inaccessible sources of hydrocarbons are becoming attractive.

Technology has advanced, oil prices have risen, and deeper wells are being exploited. Also, the impacts of climate change are altering the Arctic environment, making the ice retreat and more areas accessible. Unconventional sources of gas such as methane hydrates that form at high depths and low temperatures, or offshore coal gasification, are being explored.

The 1988 Piper Alpha tragedy led to UK and Norwegian regulation of the North Sea being the strictest in the world. More recent tragedies such as the 2010 Deepwater Horizon explosion in the Gulf of Mexico have focussed attention on regulation by other states, and on environmental safeguards in fragile environments and increasingly inaccessible locations. During 2011, the British company Cairn Energy received approval from the Greenland government to drill up to four exploration wells off Greenland, within the Arctic Circle.

Coastal states have exclusive mineral rights on their continental shelves, but where countries are adjacent and have complex coastlines, the boundary line is not always clear. Several Arctic states are currently collating data to submit claims for territorial rights to sea bed, ten years after they ratified the UN Law of the Sea (UNCLOS).

In April 2012 Lloyd's of London and Chatham House produced the report [Arctic Opening: Opportunity and Risk in the High North](#).¹ This predicts that the Arctic is likely to attract significant investment over the coming decade, of \$100 billion or more, driven by oil and gas, mining and the shipping industries.

The European Commission has recently suggested that it should have a role in regulating offshore activity, with a Commissioner calling for an EU moratorium on deepwater drilling, and several NGOs have suggested a moratorium on deep-sea and/or Arctic drilling.

The Environmental Audit Committee is currently conducting an inquiry into the [protection of the Arctic](#).² This will include considering Arctic drilling.

2 Control of oil exploration and production in the UK

Coastal states have exclusive mineral rights on their continental shelves. Therefore UK regulation of the oil and gas industry (outlined on the [DECC oil and gas portal](#)³) applies only to drilling onshore or on the UK continental shelf (UKCS). It does not extend, for instance, to the UK determining drilling activity in the Arctic (see also below).

Under the Petroleum Act 1998, DECC regulates offshore activity by issuing seaward production licences of different lengths. These generally have an 'exploration' term up-front, leading to later 'appraisal and development' and then 'production' terms, if oil is found. Licences tend to be offered within yearly rounds, and DECC has so far run a series of 26 offshore licensing rounds. The 27th offshore round was [announced](#) in February 2012.

¹ Lloyd's and Chatham House, "Arctic Opening; Opportunity and Risk in the High North" April 2012

² <http://www.parliament.uk/business/committees/committees-a-z/commons-select/environmental-audit-committee/news/new-inquiry---protecting-the-arctic/>

³ <http://og.decc.gov.uk/en/olgs/cms/licences/licences.aspx>

As well as holding the necessary licence, all drilling operations are subject to notification to the Health and Safety Executive (HSE) which regulates offshore safety. The environment agencies and statutory conservation bodies also have a role. Specific controls include (this list is not exhaustive):⁴

- The Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999 and Offshore Petroleum Activities (Conservation of Habitats) Regulations 2001 (SI 2001/1754) which have implications for the location and timing of drilling and pipeline activities, and seismic surveys
- The Offshore Chemicals Regulations 2002 (SI 2002/1355) under which use and discharge of offshore chemicals (including drilling fluids and muds) require a permit
- The Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005 which require unauthorised discharges to be reported
- Merchant Shipping (Oil Pollution, Preparedness, Response and Co-operation Convention) Regulations 1998 (SI 1998/1056) and Offshore Installations (Emergency Pollution Control) Regulations 2002 which require an approved Oil Pollution Emergency Plan in place before any drilling or development activity starts
- Licence conditions concerning the effects on fisheries and on shipping routes and special conditions attached to given blocks concerning spawning grounds or migration routes
- The Offshore Installations and Wells Regulations 1996, which require proper surveys, materials on wells, blowouts prevention equipment and trained or qualified personnel; numerous Health and Safety requirements include COSHH, and the [HSE's offshore safety division](#)⁵ inspects offshore installations and issues guidance.

2.1 Deepwater drilling

When the continental shelf conventions were first developed, one definition of the shelf was to a depth of water of 200m, reflecting the view at the time that drilling in deeper water was impractical, although the 'capacity to exploit' was also written into the definition. This allowed that exploitation would probably someday be possible beyond a 200m depth of water.⁶ Some deepwater basins on the UKCS, such as West of Shetlands, are now being explored.

The Transocean Deepwater Horizon semi-submersible mobile drilling rig was operating at the Macondo well in the Gulf of Mexico in around 1,500m of water. The [public report](#)⁷ into the disaster said that the rig had previously successfully operated in up to 3,000m of water.

The 2010 Energy and Climate Change (ECC) Committee report on [Deepwater Drilling](#)⁸ discussed different regulatory regimes. BP North Sea told the Committee that although they operated in different regulatory regimes around the world, they applied the same standards worldwide but with different specific requirements.

⁴ <http://og.decc.gov.uk/assets/og/licences/rounds/27/4247-r27-other-regulatory-issues.pdf> and http://www.oilandgasuk.co.uk/knowledgecentre/Background_Information.cfm

⁵ <http://www.hse.gov.uk/offshore/index.htm>

⁶ Luard, *The Control of the Sea Bed*, Heinemann, London 1977 pp36-39

⁷ <http://www.deepwater.com/fw/main/Public-Report-1076.html>

⁸ Energy and Climate Change - Second Report UK Deepwater Drilling - Implications of the Gulf of Mexico Oil Spill 14 December 2010
<http://www.publications.parliament.uk/pa/cm201011/cmselect/cmenergy/450/45002.htm>

The Committee acknowledged that the UK and Norway had adopted a 'gold standard of regulation' after the Cullen Inquiry into the 1988 Piper Alpha tragedy (paras 69 to 72). But the committee did say that the industry was too driven by responding to disasters, rather than anticipating worst-case scenarios and planning for high-consequence, low-probability events.

The committee felt that the UK had high offshore regulatory standards, based on flexible, goal-setting principles superior to those under which the Deepwater Horizon operated. However, it said that it was imperative that there was someone offshore with the authority to halt drilling operations at any time, without recourse to onshore management. Also:

...we feel that the absence of [new capping and containment systems capable of dealing with a sub-sea blowout] before the Macondo incident is indicative of the industry's and the regulator's flawed approach to high-consequence, low-probability events. Prevention is better than cure, and we recommend once again the Government recognise that in its regulatory regime these systems are not a substitute for fully functioning blowout preventers. (Paragraph 111)

22. There are serious doubts about the ability of oil spill response equipment to function in the harsh environment of the open Atlantic in the West of Shetland. We recommend that the Government ensures that any capping, containment and clean-up systems are designed to take full account of the harsh and challenging environment West of Shetland. (Paragraph 117)

Despite this, the Committee rejected roundly any calls for a moratorium on the UKCS, saying there was insufficient evidence of danger, and that this would damage communities, the industry, the economy and the UK's security of supply.

OSPRAG, the Oil Spill Prevention and Response Advisory Group comprising industry, trades unions and regulatory members set up after the Deepwater Horizon disaster, produced its [final report](#) in September 2011.⁹ OSPRAG said its work and review had given rise to "a high degree of confidence in the current regulatory regime and reassurance that it drives the right health, safety and environmental behaviours". It developed a new 'OSPRAG cap' for wells.

2.2 Commission proposals to oversee North Sea offshore drilling safety

In the wake of Deepwater Horizon in April 2010, the ECC committee noted¹⁰ that European Commissioner Oettinger had called in a statement of 7 July 2010 for an EU moratorium on deep water drilling. He also called for European oversight of regulators, suggesting he would "not hesitate to propose a European framework for 'controlling the controllers' if need be".

The Commission then issued a Communication in October 2010,¹¹ which looked at ways of increasing the safety of oil and gas offshore drilling.

The ECC Committee reported the Parliamentary Under-Secretary of State at DECC responding to the question of a European moratorium by saying:

⁹ Available at <http://www.oilandgasuk.co.uk/knowledgecentre/OSPRAG.cfm>

¹⁰ Energy and Climate Change - Second Report UK Deepwater Drilling - Implications of the Gulf of Mexico Oil Spill 14 December 2010
<http://www.publications.parliament.uk/pa/cm201011/cmselect/cmenergy/450/45002.htm>

¹¹ COM(2010) 560, Communication from the Commission to the European Parliament and the Council on facing the challenge of the safety of offshore oil and gas activities. See also [Commission press release, 13 October 2011](#). There was also a Commission Q&A on the safety of offshore oil and gas exploration and production on [13 October 2010, MEMO/10/486](#).

We are not aware of any current provision within EU law which would enable any EU body to require a moratorium, or on deep water drilling [...] But HMG remain of the firm view that these are matters which are properly left to individual member states.

Several witnesses told the ECC committee that they doubted the EU's ability to oversee offshore drilling given its lack of experience, and that they would want others to come up to UK standards rather than any watering down. The committee concluded that:¹²

We utterly reject calls for increased regulatory oversight from the European Commission. We recommend that EU countries without a North Sea coastline should not be involved with discussions on regulation of the offshore industry on the UK Continental Shelf.

After a [public consultation](#) in Spring 2011, several European Parliament committees gave their opinion on the Communication, "[Facing the challenge of the safety of offshore oil and gas activities](#)" in July 2011. The issue was debated in plenary on 8 September 2011.¹³

The Commission then published [draft proposals for a regulation](#)¹⁴ in October 2011, setting common EU standards for prevention and response to major accidents in offshore oil and gas explorations. Licensed operators would be required to produce a 'major hazard report', environmental risk assessment and emergency response plans to national authorities, and would be fully liable for any environmental damage caused by their activities. Within a year, Member States would have to set up 'national competent authorities' to assess and grant licences.¹⁵ The Commission's proposals would apply to the North Sea only but the EU considered itself well placed to help strengthen regimes globally.

The proposals are made under Article 192 which means they are subject to qualified majority voting and a potentially lengthy procedure. Regulations, if adopted, become immediately enforceable in Member States, unlike Directives which need to be transposed (although in practice some additional UK Regulations are sometimes needed).

In the UK the Commission's proposals were considered most recently by the European Scrutiny Committee on 14 December 2011. The [supporting document](#)¹⁶ said that the Government remains concerned by the proposals. They are largely modelled on the UK/Norwegian model, but because they are now in Regulation (not Directive) form, this would have direct effect and so might affect the administration of the UK's mature regime.

Following the successful evacuation of personnel because of the Elgin platform gas leak on 25 March 2012¹⁷, Oil & Gas UK has said:¹⁸

While Oil & Gas UK will always support proper moves to improve safety standards, the Commission's proposal to dismantle the UK's exemplary safety regime is likely to have exactly the opposite effect. Moving overall responsibility for offshore safety to the EU, which has absolutely no experience or competence in the regulation of safety in the

¹² Op. cit, para. 127

¹³ See [EP press release, 13 September 2011](#)

¹⁴ Brussels, 27.10.2011 COM(2011) 688 final Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on safety of offshore oil and gas prospection, exploration and production activities

¹⁵ *Europolitics Environment* 27 October 2011 no.821p.1 "Commission to regulate EU-wide offshore oil and gas operations"

¹⁶ Documents considered by the Committee on 14 December 2011 - European Scrutiny Committee <http://www.publications.parliament.uk/pa/cm201012/cmselect/cmeuleg/428-xliv/42803.htm>

¹⁷ Information at <http://www.elgin.total.com/elgin/home.aspx>

¹⁸ Oil and Gas UK press release <http://www.oilandgasuk.co.uk/news/news.cfm/newsid/707> 29 March 2012

offshore oil and gas industry is, in our view, totally lacking in sense or balance. Offshore oil and gas safety will not be best served by the blanket 'one size fits all' regulatory approach now being advanced by the Commission.

3 Arctic exploration

The Lloyd's/Chatham House report on [Arctic Opening: Opportunity and Risk in the High North](#)¹⁹ notes the strong and unambiguous downward trend in the extent of September Arctic sea ice. Increasing accessibility, along with improving technology and rising commodity prices are favouring the exploitation of Arctic hydrocarbon reserves. A box on page 25 of the report outlines current likely projects by country.

The report also outlines the potential, and the risks, of developing the Arctic. While risks can be mitigated, they cannot be eliminated entirely. The report says:

The Arctic is a complex risk environment. Many of the operational risks to Arctic economic development – particularly oil and gas developments and shipping – amplify one another: remoteness, cold and, in winter, darkness.

At the same time, the resilience of the Arctic's ecosystems in terms of withstanding risk events is weak, and political sensitivity to a disaster is high. Worst-case scenarios may be worse in the Arctic because the ability to manage evolving situations is limited by environmental conditions and the lack of appropriate infrastructure.

3.1 NGO calls for a moratorium on Arctic drilling

The 2011 drilling in the Arctic Circle by Cairn Energy was 200km offshore of Nuuk, Greenland, and therefore subject to the agreement of the Greenland government.

Cairn received approval from the Greenland government to drill up to four wells in 2011²⁰. The Greenland Government's regulatory requirements are shown on its [website](#)²¹ and include

- Meeting Norwegian North Sea rules (see above; these are among the most strict)
- Experience of operating in the North Sea
- Approved health and safety report from the British or Norwegian authorities
- Shut down procedures, e.g. remote-control shut down if contact has been lost
- The use of two drilling rigs for safety reasons and backup, in a remote area
- Ice-handling requirements and stopping drilling before the ice advances

Some of the additional conditions agreed between the Greenland government and Cairn, such as using drilling exploration vessels that do not require anchoring, financial contributions to Greenland's environmental research and an 'impact benefit agreement' are given in a Cairn [press briefing](#).²²

¹⁹ Lloyd's and Chatham House, "Arctic Opening; Opportunity and Risk in the High North" April 2012 http://www.lloyds.com/~media/Files/News%20and%20Insight/360%20Risk%20Insight/Arctic_Risk_Report_20120412.pdf

²⁰ Cairn Media backgrounder: Cairn and Greenland, undated

²¹ http://uk.nanoq.gl/sitecore/content/Websites/uk,-d-nanoq/Emner/News/News_from_Government/2011/08/hoeje_sikkerhedskrav.aspx

²² Media Backgrounder: Cairn and Greenland, Cairn Energy, undated [http://www.cairnenergy.com/uploadedFiles/Media_and_News/Factsheets_and_Key_Biographies/Factsheets/Media%20Backgrounder%20-%20Cairn%20and%20Greenland\(1\).pdf](http://www.cairnenergy.com/uploadedFiles/Media_and_News/Factsheets_and_Key_Biographies/Factsheets/Media%20Backgrounder%20-%20Cairn%20and%20Greenland(1).pdf)

The Greenland Government's website also includes a link to the [Exploration Drilling 2011 Oil Spill Prevention and Contingency Plan](#)²³ agreed between Cairn and Greenland.

Greenpeace has been highly [critical](#) of this plan,²⁴ highlighting the difficulties it outlines in cleaning up any spill in the winter months and given the area's geography and temperatures. It has called for a moratorium on drilling. Greenpeace have published an internal [FCO memo on Arctic drilling](#)²⁵ obtained through an FOI request, which provides a good background and also acknowledges the difficulties in cleaning up spills in low temperature remote regions;

Considerable challenges remain. The most significant of these is environmental - and the possibility of a second Gulf of Mexico type event. The impact of such a spill in the Arctic would be proportionally higher due to the lower temperatures and (in winter) lack of sunlight that will inhibit oil-eating bacteria (which played a large role in cleaning up the Macondo spill). The Arctic ecosystem is particularly vulnerable, and emergency responses would be slower and harder than in the Gulf of Mexico due to the area's remoteness and the difficulty of operating in sub-zero temperatures. A situation compounded by the response lag resulting from the vast distances between points of habitation and at certain times, winter ice. Following its spill, the US has suspended plans to issue further exploration licences in its Arctic waters. WWF and Greenpeace have both called for a moratorium on Arctic exploration until these issues are resolved.

3.2 Ability of the UK Government to influence Arctic drilling

Just as the ECC committee and UK Government reject oversight by the EU on the UKCS, it is the Government's view that the UK has no jurisdiction in Arctic waters, as another Greenpeace-obtained [FCO memo](#) says.

The Government has made this clear in parliamentary answers:²⁶

Charles Hendry: The UK has no regulatory jurisdiction in any part of Arctic waters. Decisions on licensing and exploration activities in Arctic waters are the responsibility of the relevant governments.

That is not to say that the UK has no interest in what happens within the Arctic Circle, we are observers in the Arctic Council which has recently set up a taskforce to look at a binding agreement on oil pollution preparedness and response and we have indicated a willingness to contribute to the work of that group.

Other PQs have confirmed that the UK Government has had no discussions at EU level or with other countries including the US on drilling in the Arctic²⁷ and nor has it plans to press for any agreement to limit resource production on a geographical basis. Charles Hendry, the Minister of State for Energy, has reiterated:²⁸

²³ http://uk.nanoq.gl/sitecore/content/Websites/uk,-d-nanoq/Emner/News/News_from_Government/2011/08/-/media/981EC2BD18474A028F11DEF6A20B0D31.a shx

²⁴ <http://www.greenpeace.org.uk/blog/climate/verdict-cairns-oil-spill-plan-outlandish-simplistic-inadequate-20110831>

²⁵ <http://www.greenpeace.org.uk/sites/files/gpuk/20110523112247050.pdf>

²⁶ HC Deb 18 July 2011 c685w

²⁷ HC Deb 12 July 2011 c295w and 11 July 2011 c157w

²⁸ HC Deb 30 June 2011 c915w

Well-supplied oil and gas markets from a diverse range of suppliers are an important foundation for global growth and for the UK's prosperity. It is the sovereign right of every nation to decide whether to produce resources within its jurisdiction, and we would not press for any agreement to limit this on a geographical basis. We would expect all oil and gas drilling, wherever carried out, to be properly regulated and licensed and carried out in a safe and environmentally responsible manner.

A similar view was taken in 2002 by the former Government concerning drilling in the Arctic by the Americans,²⁹ when the then Minister Denis MacShane said that *"it is not for this Government to dictate what the US does inside its own boundaries"*.

3.3 Governance of Arctic oil and gas exploration

The Arctic Council is an intergovernmental forum with eight member states: Canada, Denmark (including Greenland and the Faroe Islands), Finland, Iceland, Norway, the Russian Federation, Sweden and the US.³⁰ The Council was established in 1996 to 'foster international co-operation on environmental protection and sustainable development in the Arctic'. It has a number of working groups including the [Emergency Prevention, Preparedness and Response Working Group \(EPPR\)](#). It maintains liaison with the oil industry with the aim of enhancing oil spill prevention and preparedness. The UK is a permanent observer.

The Lloyd's report³¹ describes the Arctic as 'a stable region with considerable mutual trust between states'. While claims to land mass are well settled, some maritime borders are more disputed. All of the Arctic states apart from the US have ratified the UN Law of the Sea (UNCLOS) under which states have an exclusive economic zone of 200 nautical miles offshore and further rights over the 'extended continental shelf' for up to 350 miles. UNLCOS provides a framework for agreeing rights to minerals etc beyond this.

After ratifying UNCLOS, states had ten years to submit data to the Commission on the Limits of the Continental Shelf to establish ownership over the extended continental shelf. Deadlines for several countries are imminent.

4 Methane hydrates

Natural gas is predominately methane (CH₄). Methane hydrate is one of a number of 'unconventional' sources of fossil fuels (along with shale gas, coalbed methane and underground coal gasification³²) which are becoming increasingly attractive as energy prices rise, and emissions controls tighten under climate change policies.

Methane hydrate is a solid substance like ice, in which methane molecules are 'caged' by water molecules; there is no chemical bond. Hydrates form at high pressures and low temperatures where methane and gas are available, and are therefore associated with the deep ocean (over 500 metres) and the permafrost, where they have been found in Siberia, Alaska and the Canadian Arctic.³³

²⁹ HC Deb 5 February 2002 c728

³⁰ As well as the eight member states the Inuit Circumpolar Conference (ICC), the Saami Council, the Russian Association of Indigenous Peoples of the North (RAIPON), the Aleut International Association), the Arctic Athabaskan Council and the Gwich'in Council International are permanent participants.

³¹ Op. cit.

³² A POST Note on [Unconventional Gas](#) gives background on the range of sources

³³ "[Hydrate: fossil fuel or lurking menace?](#)" and "[Investigating Methane Hydrates](#)" both *Earthwise* 24, British Geological Society 2007

4.1 Environmental concerns

Although the methane hydrate reservoir can be considered an unconventional gas resource, it also forms a huge carbon sink and the danger is that the methane is simply released if the hydrates become destabilised. The hydrates disassociate when they are depressurised or warmed, releasing methane, which is of course a potent greenhouse gas.³⁴ This might even happen without disturbance, if the climate warms; there are significant uncertainties.³⁵ Environmentalists also argue that exploiting unconventional fossil fuel sources at all is distracting from developing renewables. Because many reserves are in the permafrost, this also potentially opens up the Arctic to further oil exploration.

4.2 Exploitation

The [US Department of Energy](#) (DOE) has a methane hydrate R&D programme “to develop the tools and technologies to allow environmentally safe methane production from arctic and domestic offshore hydrates”. It also has a [methane hydrate primer 2011](#)³⁶ which says that:

Methane hydrate is a fairly concentrated form of natural gas. When dissociated at normal surface temperature and pressure, one cubic foot of solid methane hydrate will release about 164 cubic feet of methane gas. This is one of the reasons people are interested in methane hydrate as a potential source of methane for energy supply.

It describes drilling technologies as being similar to conventional drilling but more expensive because of the complications:

As pressure in the well bore is reduced, free water in the formation moves toward the well, causing a region of reduced pressure to spread through the formation. Reduced pressure causes the hydrate to dissociate and release methane. Subsequent removal of water and gas causes a further reduction in pressure and further dissociation and methane production.

One complication is that hydrate dissociation is an endothermic process— meaning it is a process that uses heat. So, a natural consequence of dissociation is cooling and potential re-freezing of adjacent portions of the reservoir. To be successful, a methane hydrate production strategy must include sufficient depressurization to cause the hydrate to dissociate and, in some cases, the addition of localized heating to overcome the natural tendency of the hydrate in the reservoir to return to its stable, frozen state.

Therefore methane hydrate wells will be more complex than most gas wells. Field trials are currently taking place at [Ignik Sikumi](#) in Alaska where the drilling muds are chilled, for example, to protect the permafrost. The US DOE also says:

In addition to these technical challenges, production of natural gas from methane hydrate would need to be carried out with attention to the potential environmental impacts and safety concerns associated with this unique resource. Any future development would need to use techniques that minimize the release of methane to the atmosphere, and development activities in both arctic and marine settings would need to be carried out in ways that maximize protection of these environments.

The US DOE’s National Energy Technology Laboratory’s methane hydrate newsletter [Fire in the Ice](#)³⁷ says that many estimates of global gas hydrate potentials as an energy resource

³⁴ Methane is around 25 times more powerful than carbon dioxide as a greenhouse gas

³⁵ HC Deb 10 October 2011 c33W and see <http://www.independent.co.uk/news/science/vast-methane-plumes-seen-in-arctic-ocean-as-sea-ice-retreats-6276278.html> about the possibility of ‘catastrophic releases’

³⁶ http://www.netl.doe.gov/technologies/oil-gas/publications/Hydrates/2011Reports/MH_Primer2011.pdf

are misleadingly high because only those in Arctic and marine sands (as opposed to muds, for example) are really recoverable.

4.3 UK potential

The pressure needs to be high for hydrates to form and remain stable so generally they are only found at greater depths. This limits their potential on the UKCS. A [BGS article](#)³⁸ shows the 'hydrate stability zone map' for the UK on its second page.

Zac Goldsmith MP recently asked about the UK's position on methane hydrates.³⁹

To ask the Secretary of State for Energy and Climate Change what his Department's latest estimate is of the reserves of methane hydrate in the UK; what his Department's policy is on the extraction of methane hydrate; and if he will make a statement.

Charles Hendry: The presence of methane hydrates in deep waters west of Shetland is possible, but has not been established. In the absence of any commercial technology for exploiting such resources, no estimate of reserves can be made at the present time. As with all other hydrocarbon resources, the Department would only allow exploitation where this can safely be carried out with full regard for protection of the environment.

Reporting this written answer, the *Daily Mail* quoted Professor Bahman Tohidi, director of the [Centre for Gas Hydrate Research](#) at Heriot-Watt, who said:⁴⁰

'For methane hydrate you need water depths of more than 1,640ft.

'The only place we have those water depths is west of Shetland. We haven't seen any hydrates yet but there could be some there.

'If there is a potential, it needs to be investigated.

'I would say there are chances of it being in UK waters, but even if there is nothing in the UK we should be developing the technology. It definitely will be a major industry. I always say it is far too big to be ignored - it's like the elephant sitting outside your doorstep and we can't ignore it. Sooner or later we will develop the technology.'

In the same article Alex Kemp, Professor of Petroleum Economics at Aberdeen noted that methane hydrates was probably not present 'in any significant amounts' on the UKCS, labelling it 'futuristic'. However, the point regarding the technology is that regardless of UK reserves, as with carbon capture and storage and other unconventional gas reserve technologies, there may be the potential for the UK to exploit and export its existing oil and gas expertise.

³⁷ December 2011 edition

³⁸ *Earthwise* 24, BGS 2007 "[Hydrate: fossil fuel or lurking menace?](#)"

³⁹ HC Deb 6 February 2012 c73W

⁴⁰ *Daily Mail* "Is 'fire ice' wonder fuel buried under the Scottish coast? It was initially thought only to exist in the outer reaches of the solar system Stocks could last 300 years" 8 February 2012 <http://www.dailymail.co.uk/sciencetech/article-2098351/Is-ice-wonder-fuel-buried-Scottish-coast.html>