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Aidan Stennett

Onshore Fracking (Prohibition) Bill

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This Bill Paper seeks to assist the Northern Ireland Assembly, and in particular its Committee for the Economy, in scrutinising the Onshore Fracking (Prohibition) Bill. The Paper provides background information contextualising the Bill and an overview and analysis of its clauses. It also considers some of the broader implications arising from the Bill, including potential financial considerations.

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Key Points

The Onshore Fracking (Prohibition) Bill (OF Bill) contains provisions that if enacted would make the onshore hydraulic fracturing of petroleum unlawful in Northern Ireland (NI). The OF Bill seeks to amend the Petroleum Act (Northern Ireland) 1964. That Act gives the Department for the Economy (DfE) rights to search, bore for and get petroleum in NI and the "internal waters adjacent" to NI. It also provides the DfE with the power to grant licences with respect to petroleum in those areas.

The analysis below raises a number of issues that the Committee for the Economy may wish to seek further views on during its scrutiny of the OF Bill, including whether:

- The definition of hydraulic fracturing outlined in the OF Bill is appropriate;
- The geographical scope of the proposed hydraulic fracturing prohibition is appropriate; and,
- The OF Bill should set out penalties for breach of its proposed prohibition.

In addition, the analysis identified a range of potential fiscal, economic and other benefits and harms associated with hydraulic fracturing and unconventional oil and gas development. The analysis also examined studies into the fiscal and economic impacts of unconventional hydrocarbon development commissioned by the Scottish Government. It found that despite the studies reaching positive conclusions in these areas both jurisdictions have chosen not to develop unconventional hydrocarbons.

Executive Summary

Policy moratoriums on the use of hydraulic fracturing in connection with petroleum exploration are in place in all four jurisdictions within the United Kingdom (UK) – namely Northern Ireland (NI), England, Scotland and Wales.

The Onshore Fracking (Prohibition) Bill (OF Bill), as introduced, proposes the prohibition of onshore hydraulic fracturing for petroleum in NI. The OF Bill consists of one substantive clause, which seeks to introduce the prohibition through amendment of the Petroleum (Northern Ireland) Act 1964.

Section 2 of this Bill Paper considers the substantive clause of the introduced OF Bill; noting three areas in which the Committee may wish to seek views, namely whether:

- The definition of hydraulic fracturing outlined in the OF Bill is appropriate;
- The geographical scope of the proposed hydraulic fracturing prohibition is appropriate; and,
- The OF Bill should set out penalties for breach of its proposed prohibition.

Research into key economic, societal and environmental impacts of future onshore petroleum exploration and production, including unconventional oil and gas UOG in NI, was commissioned by the Department of Economy in 2019 and was completed in July 2020. The findings of that research have not been published at the time of writing this Paper.

During the Assembly's second stage debate on the OF Bill, the Minister for the Economy noted that he was prepared to publish those findings in the form of a DfE report, as they had led the Department to the preferred option of an eventual legislative ban on onshore petroleum development in NI. Those findings included limited economic benefits and potential environmental and societal harms.

In the absence of such a DfE report, Sections 3 and 4 of this Paper rely on other sources of information to examine key broader fiscal, economic, environmental, social and health implications of the OF Bill's proposals. Those sources include, but are not limited to, studies carried out on behalf of the Welsh and Scottish Government's into the impact of UOG development in those two jurisdictions. Those Sections identify research findings as follows:

- In Scotland, research found that UOG has potential both to increase government revenue and to stimulate economic growth and job creation.
- Similar research in Wales demonstrated potential economic and job creation benefits.
- Despite the noted findings, neither jurisdiction has chosen to support UOG development.

- In England, a National Audit Office (NAO) examination of public expenditure on hydraulic fracturing identified “known costs” estimated at £32.7 million (m) between 2011 and 2020. Those costs have been incurred by a range of public bodies including the Business, Energy and Industrial Strategy, the British Geographical Survey and police forces, despite no commercial extraction of UOG in the region.
- Academic and regulator literature on the use hydraulic fracturing for UOG development identifies a number of potential benefits and harms, including environmental, social and health benefits/harms.
- From an emissions perspective, whether UOG was viewed as a benefit or harm depended on what alternative fuel it was examined against. For example, relative to coal, UOG was seen to have emissions benefits. Conversely, UOG was seen to lead to greater greenhouse gas emission, when compared to conventional natural gas.
- There have been recent calls on the United Kingdom Government (UKG) to reassess its policy moratorium on hydraulic fracturing. Such calls for change cite energy security amongst the reasons that a change in policy might be desirable. Those calls should be seen against a backdrop of unstable global energy markets and diminished domestic natural gas supplies in the UK. Despite that context, the UKG has not changed its position on UOG or hydraulic fracturing in England.

When relying on this Bill Paper, note that is contents are not intended to provide legal advice or opinion.

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Introduction

The Onshore Fracking (Prohibition) Bill (OF Bill) is a Private Member's Bill (PMB); introduced to the Assembly by the Bill Sponsor – Áine Murphy, Member of the Legislative Assembly (MLA) - on 29 November 2021. The OF Bill, as introduced, includes provisions that, if enacted, would make the onshore hydraulic fracturing of petroleum unlawful in Northern Ireland (NI). Hydraulic fracturing is an area within the legislative competence of the Assembly.[1]

This Bill Paper aims to support the Assembly, including the Committee for the Economy (the Committee), when considering the OF Bill, as introduced. To facilitate, Section 1 of the Paper provides background information, including current status of hydraulic fracturing in NI, Great Britain (GB) and the Republic of Ireland (RoI). Thereafter, Section 2 of the Paper provides an overview of the substantive clauses of the Bill. To support engagement on the Bill, Section 3 examines financial implications potentially arising from the OF Bill for the NI public purse; while Section 4 outlines some broader considerations. Section 5 concludes, drawing on findings presented earlier in the Paper.

Throughout, key potential issues for consideration are presented in blue boxes, to support Members in their plenary and committee capacities.

When relying on the Paper, note that is contents are not intended to provide legal advice or opinion.

[1] Northern Ireland Act 1998 s6 https://www.legislation.gov.uk/ukpga/1998/47/section/6

1 Background – hydraulic fracturing in the UK

Hydraulic fracturing is a well stimulation technique often used when extracting "unconventional" oil and gas (UOG) from subterranean rock. It does so by injecting fracturing fluid (a mixture of water, sand and chemicals) into horizontally drilled boreholes. The fracturing fluid opens fractures in the rock, allowing gas or oil to be extracted. It is used to access "unconventional" hydrocarbon deposits that cannot easily be accessed through conventional means; often such deposits are found in tight sandstone, shale and coal beds.[2]

Within the United Kingdom (UK), the actual or potential use of hydraulic fracturing is most commonly associated with the exploration and production of shale gas. According to the British Geological Survey (BGS), the UK has an estimated shale gas resource of between 822 trillion cubic feet to 2,281 trillion cubic feet. Although the BGS has also stated that *"without exploratory drilling and testing and further research",* it is unable to provide a certain estimate of the amount of this resource that could be commercially extracted.[3]

At the time of writing this Paper, some form of moratorium on the practice is in place in each part of the UK. In addition, the Republic of Ireland (RoI) introduced a legislative ban on the activity in 2017. The following subsections provide an overview of the current position in each jurisdiction.

1.1 Northern Ireland

The Department for the Economy (DfE - formerly the Department of Enterprise, Trade and Investment (DETI)) is responsible for granting licenses to "explore for, bore and get petroleum" in NI under the "Petroleum (Production) Act (Northern Ireland) 1964". According to the DfE, all of onshore NI is available for petroleum licence applications; and such applications are considered on a "first come, first served" basis.[4]

In 2011, the DETI granted four petroleum exploration licences in NI. The granting of these licenses, and subsequent developments related to the use of those licenses, led to community and political opposition. This opposition was particularly focussed on the license granted to Tamboran Resources Pty Limited, which covered parts of County Fermanagh. [5] In December 2011, the Assembly debated and carried the following motion on hydraulic fracturing:

> *That this Assembly believes that a moratorium should be placed on onshore and offshore exploration, development and production of shale gas*

[2] House of Commons Library, Briefing Paper: shale gas and fracking (31 March 2020) https://researchbriefings.files.parliament.uk/documents/SN06073/SN06073.pdf

[3] *Ibid*

[4] The Department for the Economy, Petroleum Licencing (accessed 23 June 2020) https://www.economy-ni.gov.uk/articles/petroleum-licensing

[5] See for example BBC News NI, Hundreds attend County Fermanagh anti-fracking protest https://www.bbc.co.uk/news/uk-northern-ireland-28412299

> *by withdrawing licences for hydraulic fracturing (fracking), at least until the publication of a detailed environmental impact assessment into the practice; notes that hydraulic fracturing can put local water sources at risk of contamination; further notes that, amongst a variety of adverse environmental impacts, the process of fracking can cause serious well blowouts, which put both workers and local communities at risk; considers that the production of hard-to-reach fossil fuels is not compatible with efforts to achieve carbo reduction targets; and urges the Minister of Enterprise, Trade and Investment to give greater support to the generation of energy from renewable sources instead.*[6]

In August 2015, the then Minister for the Environment rejected a planning application by Tamboran Resources to drill an exploratory borehole in County Fermanagh. In October 2014, the company's license had been terminated. The license granted in 2011 had included a *"drill or drop"* clause. That clause required the holder to inform the DETI on its decision to drill or drop its plans within three years of the granting of the license. The DETI's decision to terminate the license, followed an extension of the three-year period to allow the company to complete exploratory work.[7]

Subsequently, in September 2015, the "Strategic Planning Policy Statement – Planning for Sustainable Development" (SPPS) was published by the former Department of the Environment. That Statement had a statutory basis under Part 1 of the Planning Act (Northern Ireland) 2011; requiring the Department of Infrastructure (formerly the Department of the Environment) to:

> *…formulate and co-ordinate policy for securing the orderly and consistent development of land and the planning of that development.*[8]

The SPPS outlined the *"…core planning principles to underpin delivery of the two-tier planning system with the aim of furthering sustainable development".* The SPPS stated that:

> *…in relation to unconventional hydrocarbon extraction there should be a presumption against their exploitation until there is sufficient and robust evidence on all environmental impacts.*[9]

The SPPS established a *"presumption against"* planning permission for developments seeking to exploit unconventional hydrocarbons in NI. However, it did not explicitly specify a presumption against either hydraulic fracturing or fracking. Rather, it created

[6] Northern Ireland Assembly, Minutes of Proceedings (06 December 2011) www.niassembly.gov.uk/assembly-business/minutes-of-proceedings/archive-minutes/session-2011-2012/tuesday-6-december-2011/

[7] BBC News NI, Tamboran legal challenge to licence termination (01 October 2014) https://www.bbc.co.uk/news/uk-northern-ireland-29438441

[8] Department for Infrastructure, Planning Policy, the Strategic Planning Policy Statement (accessed 22 February 2022) https://www.infrastructure-ni.gov.uk/articles/planning-policy

[9] Department of the Environment, Strategic Planning Policy Statement for Northern Ireland – Planning for Sustainable Development (September 2015) https://www.infrastructure-ni.gov.uk/sites/default/files/publications/infrastructure/SPPS.pdf

a “presumption against” unconventional hydrocarbon extraction in general, not hydraulic fracturing in particular. Additionally, the presumption against unconventional hydrocarbon extraction is to exist “until there is a sufficient and robust evidence on all environmental aspects”.

At present, there are no active petroleum licences in NI. The DfE, however, is considering two applications at present. Neither of those applications “currently propose …. hydraulic fracturing”, as noted by the Minister for the Economy during the second stage debate on the OF Bill. Additionally, the consultation documents relating to those applications noted that, should an application be granted:

> *Before an oil well and all the associated engineering works can be drilled, including fracking, the Licensee must make a Planning Application accompanied by an Environmental Impact Statement (EIS). The scope and terms of reference of the EIS will be agreed by Planning Service, NIEA and other regulators. The Planning Application will be assessed by the planning authorities according to the well-established process, which includes wide-ranging public and governmental consultation and assessment of the all the relevant environmental, engineering, economic and social issues.*[10]

As such, any planning application will be considered in line with current planning policy, which includes a “presumption against” unconventional hydrocarbon extraction, unless there is *“sufficient and robust”* evidence to suggest the process should be allowed to proceed.

1.2 England

Prior to November 2019, the UK Government (UKG) had been supportive of UOG development, and the associated use of hydraulic fracturing. The UKG had previously introduced a number of legislative restrictions on such practice in England and Wales.[11]

Section 50 of the Infrastructure Act 2015 amended the Petroleum Act 1998, inserting a new section into the 1998 Act (Section 4A). The new section specified 13 legislative requirements – i.e. conditions - to be met before hydraulic fracturing consent could be granted. Amongst those conditions were prohibitions of the process within “protected groundwater source areas” and “other protected areas”. Subsequently, Onshore Hydraulic Fracturing (Protected Areas) Regulations 2016 defined “protect groundwater sources areas” and “other protected areas”. The latter definition included National Parks, the Broads, areas of natural beauty and World Heritage sites.[12]

[10] Department for the Economy, Frequently asked questions hydrocarbons (oil & gas) exploration in Northern Ireland (accessed 22 February 2022) https://www.economy-ni.gov.uk/sites/default/files/consultations/economy/petroleum-licence-application-pla1-16-faqs.pdf

[11] Licencing powers were devolved to the Welsh Government in 2017, prior to which the UKG passed legislation applicable to both jurisdictions.

[12] *Ibid* Regulation 3

On 2 November 2019, the UKG announced that:

> *Fracking will not be allowed to proceed in England…following the publication of new scientific analysis*.[13]

The scientific analysis referred to in the above quote is a report published by the UK's Oil and Gas Authority, which examined seismic activity at a hydraulic fracturing site in Lancashire. According to the UKG, that study found that:

> *…it is not possible to accurately predict the probability or magnitude of earthquakes linked to fracking operations.*[14]

The UKG also stated that due to this finding and the previous seismic activity in the area, it could not:

> *…rule out future unacceptable impacts on the local community.*[15]

As a result, it placed a moratorium on hydraulic fracturing in England until *"compelling new evidence is provided"*.[16]

1.3 Scotland

The licensing of onshore oil and gas extraction was devolved to Scotland by the Scotland Act 2016; effective from 9 February 2018.

Prior to this, in January 2015, the Scottish Government had put in place a policy moratorium on UOG, which had placed a temporary prohibition on hydraulic fracturing in Scotland. That policy ban was implemented *via* the Scottish Planning system under relevant provisions contained in the Town and Country Planning (Scotland) Act 1997, as amended.[17] The purpose of the policy moratorium was to allow the Scottish Government to undertake *"a far-reaching investigation into"* UOG.[18]

The Scottish Government undertook its investigation throughout 2017-19. The process included a series of consultations, in 2017, 2018 and 2019, as well as a "Strategic Environmental and Business Regulator Impact Assessment of unconventional gas development in Scotland" in 2018. The investigation led to its publication of a "…finalised position onshore unconventional oil and gas development…" on 3 October 2019. Its final position stated: (i) the development of an onshore UOG in Scotland would "…make achieving [Scotland's] ambitious energy and climate change commitments even more challenging…"; and, (ii) the research commissioned did not

[13] Department for Business, Energy and Industrial Strategy and the Oil and Gas Authority, Government ends support for fracking (2 November 2019) https://www.gov.uk/government/news/government-ends-support-for-fracking
[14] *Ibid*
[15] *Ibid*
[16] *Ibid*
[17] Town and Country Planning (Scotland) Act 1997 http://www.legislation.gov.uk/ukpga/1997/8/contents
[18] The Scottish Government, Policy, Oil and gas (accessed 22 February 2022) https://www.gov.scot/policies/oil-and-gas/unconventional-oil-and-gas/

"…provide a strong enough basis…" to address community concerns surrounding the impact of unconventional hydrocarbon development.

On the basis of those conclusions, the Scottish Government stated it would not support the development of UOG in Scotland. As a result, on 3 October 2019, the Heads of Planning Scotland and the Scottish Environment Protection Agency were "…informed of the finalised policy position…" and a Planning Direction was issued to reflect the wording of the policy. As a result, any planning decisions on onshore UOG development in Scotland, under planning legislation, are to be premised on the "…policy that does not support unconventional oil and gas development in Scotland…". That policy change also is to be reflected in the fourth iteration of Scotland's National Planning Framework. A draft Framework document was published for consultation in November 2021. That draft stated:

> *The Scottish Government does not support the development of unconventional oil and gas in Scotland. This means development connected to the onshore exploration, appraisal or production of coal bed methane or shale oil or shale gas using unconventional oil and gas extraction techniques, including hydraulic fracturing and dewatering for coal bed methane.*[19]

Consultation on the draft Framework remains open to 31 March 2022.[20] Final approval and adoption of the Framework is expected during 2022.[21]

As noted earlier, powers relating to the granting of onshore oil and gas licensing were devolved to the Scottish Government on 9 February 2018. As such, in addition to the planning process:

> *…Scottish Ministers....discharge their devolved licensing powers having regard to the adopted policy of no support for unconventional oil and gas in Scotland. Therefore, while we cannot foreclose consideration of future* [license] *applications, given the terms of our finalised policy. We do not anticipate granting any new unconventional oil and gas licences in Scotland.*[22]

In sum, as is the case with England, Scotland's legal ban on hydraulic fracturing use has been achieved through a policy moratorium. Unlike England, it relies on planning legislation, under which a Planning Direction was issued by the Chief Planner. No additional legislative steps were taken in Scotland to establish a ban on such use.

[19] Scotland 2045 - fourth National Planning Framework - draft: consultation Policy 22 https://www.gov.scot/publications/scotland-2045-fourth-national-planning-framework-draft/pages/5/ (10 November 2021)
[20] https://www.transformingplanning.scot/national-planning-framework/get-involved/consultation-process/
[21] Scotland 2045 - fourth National Planning Framework - draft: consultation (10 November 2021) https://www.gov.scot/publications/scotland-2045-fourth-national-planning-framework-draft/pages/1/
[22] *Ibid*

1.4 Wales

As noted in subsection 1.2 above, prior to the devolution of petroleum licensing powers to the Welsh Government, the Infrastructure Act 2016 placed restrictions on the use of hydraulic fracturing in the region. In addition, the Welsh Government relied on the prevailing planning system to prevent hydraulic fracturing.

Hence, in May 2016, the Welsh Government issued the "Town and Country Planning (Notification) (Underground Coal Gasification) (Wales) Direction". Under that Direction, any applications received by local planning authorities relating to hydraulic fracturing use are to be *"referred to Welsh Ministers where local planning authorities...*[are]…*minded to approve them".* In such cases, Ministers then are responsible for determining whether the application is to receive planning permission. The Direction introduced an effective policy moratorium on fracking activity; but it did not apply to exploratory drilling. As such, a number applications received planning permission following the Direction's introduction.[23]

Thereafter, following the devolution of powers to grant petroleum licenses *via* the Wales Act 2017, in 2018 the Welsh Government consulted on its draft petroleum policy. That draft policy proposed not to authorise the undertaking of:

> *… any new petroleum licencing in Wales, or support applications for hydraulic fracturing petroleum licensing consents.*[24]

On the basis of replies received during that consultation and additional research commissioned by the Welsh Government, a "Written Policy Statement" on petroleum extraction was published in December 2018. That Statement specified hydraulic fracking would not be supported in Wales. It also stated that the Government would not undertake any new petroleum licensing in Wales and that individual licences would be considered only "…to ensure the safe management of abandoned mines or to support scientific research…". [25]

1.5 Republic of Ireland

In March 2011, three onshore petroleum licenses were awarded in the RoI. Those licenses did not include permission for hydraulic fracturing, but two of the three companies that held licenses subsequently did apply for further licenses to carry out exploratory drilling. The RoI introduced a moratorium on hydraulic fracturing in 2013. The Government stated that it would not consider any additional onshore licences until

[23] Senedd Research, In Brief, Drilling down the Welsh Government proposes policy to ban petroleum extraction (06 September 2018 https://seneddresearch.blog/2018/09/06/drilling-down-the-welsh-government-proposes-policy-to-ban-petroleum-extraction/

[24] Welsh Government, Written Statement: Petroleum Extraction Policy statement (10 December 2018) https://gov.wales/written-statement-petroleum-extraction-policy-statement

[25] Welsh Government, Written Statement: Petroleum Extraction Policy statement (10 December 2018) https://gov.wales/written-statement-petroleum-extraction-policy-statement

the findings of its commissioned Unconventional Gas Exploration and Extraction Joint Research Programme (UGEE) were published.[26]

In 2014, the UGEE was launched; funded by RoI's Environmental Protection Agency, the Department of the Environment, Climate and Communications, and by the Northern Ireland Environment Agency. It was tasked with examining the potential environmental and human health impacts of hydraulic fracturing. The UGEE's final report was published in 2016; concluding that there were "three main impacts" of hydraulic fracturing "…where the data and/or experience do not permit reliable assessment…". As such, the report found that those impacts could not be "…discounted by regulatory control and good practice…", in that they were:

- Groundwater aquifer pollution as the result of well failure or the deterioration of well integrity.
- The risk of pollutant and gas migration to the aquifer through fractures in rock.
- Gas emissions following the closure of the well.[27]

Subsequently in 2017, the exploration for and extraction of onshore petroleum in the RoI was prohibited following the enactment of the "Petroleum and Other Minerals Development (Prohibition of Onshore Hydraulic Fracturing) Act 2017 (the RoI Act). The RoI Act amended the Petroleum and Other Minerals Development Act 1960, adding a new Chapter to that Act, which both defined and prohibited hydraulic fracturing. The RoI Act provided that:

> *…it shall not be lawful for a person to search for, get, raise, take, carry away or work petroleum by means of hydraulic fracturing.*[28]

Additionally, it stated that the prohibition:

> *...shall apply in respect of petroleum that is situated in the State including the internal waters.*[29]

But:

> *…shall not apply in respect to petroleum that is offshore.*[30]

Furthermore, the RoI Act stated that any person who contravenes the specified prohibition would be guilty of offence and liable to a fine and/or imprisonment for up to six months.[31]

[26] Unconventional Gas Exploration and Extraction Joint Research Programme, Integrated Synthesis Report (2016) http://www.epa.ie/pubs/reports/research/ugeejointresearchprogramme/EPA%20-%20UGEE%20Integrated%20Synthesis_web.pdf

[27] *Ibid*

[28] Petroleum and Other Minerals Development (Prohibition of Onshore Hydraulic Fracturing) Act 2017, s1 https://www.irishstatutebook.ie/eli/2017/act/15/enacted/en/html

[29] *Ibid*

[30] *Ibid*

[31] *Ibid*

2 The Onshore Fracking (Prohibition) Bill

The OF Bill is short, consisting of just three clauses. Of these only Clause 1 is substantive. The other two clauses set out the Commencement procedures and short title of the Act, should it be enacted. For this reason, the subsections that follow focus only on Clause 1.

This Section examines the one substantive clause of the OF Bill – Clause 1 - setting out what it seeks to do. It also highlights a number of issues arising from that Clause, drawing on comments made during the second stage debate on the OF Bill.

2.1 What does the Bill propose?

Clause 1 of the OF Bill, if enacted as introduced, would amend section 1(3) and section 2 of the Petroleum (Production) Act (Northern Ireland) 1964 (the Petroleum Act).

Section 1(1) of the Petroleum Act 1964 vested rights to petroleum found in NI strata to the former Ministry of Commerce (the Ministry). Section 1(3) of the Petroleum Act 1964 empowered the Ministry with the "exclusive right of searching and boring for and getting" that petroleum.[32] That power was further qualified by Section 1(4) of the Petroleum Act 1964, which defined "strata in Northern Ireland" as including:

> *…strata beneath the internal waters adjacent to Northern Ireland, but does not include strata beneath the territorial sea of the United Kingdom adjacent to Northern Ireland.*[33]

According to the United Nations Convention on the Law of the Sea, "waters on the landward side of the baseline of the territorial sea form part of the internal waters of the State".[34] Within that context, "the baseline" generally refers to "the low-water line along the coast".[35]

Section 1(3) and (4) of the Petroleum Act 1964 empowers the DfE to search, bore for and get petroleum in NI and NI's internal waters.[36] Beyond that, rights are vested in the Crown as per section 2(2) of the Petroleum Act 1998, with licensing responsibilities falling to the UK Oil and Gas Authority.

Section 2 of the Petroleum Act 1964 provides the DfE with the powers to grant licences to "search and bore for and get" petroleum.[37]

Clause 1 of the OF Bill, if enacted as introduced, would amend both the DfE's right to "search and bore for and get" petroleum and its right to grant licences to do the same;

[32] Petroleum (Production) Act (Northern Ireland) 1964 s1 https://www.legislation.gov.uk/apni/1964/28/section/1
[33] *Ibid*
[34] https://www.un.org/depts/los/convention_agreements/texts/unclos/part2.htm
[35] *Ibid*
[36] Petroleum (Production) Act (Northern Ireland) 1964 s1 https://www.legislation.gov.uk/apni/1964/28/section/1
[37] Petroleum (Production) Act (Northern Ireland) 1964 s2 https://www.legislation.gov.uk/apni/1964/28/section/2

by inserting a new section into the Petroleum Act 1964. That new section, "Section 2a", would make "onshore hydraulic fracturing … unlawful" and as a consequence:

- The Ministry would have no right of searching and boring for and getting petroleum by way of onshore hydraulic fracturing;
- No licences permitting hydraulic fracturing could be granted under the Section 2 of the Petroleum Act 1964; and,
- Licences under Section 2 of the Petroleum Act 1964 granted prior to the enactment of the new Section 2a would have "…no effect to the extent that it permits onshore hydraulic fracturing…".[38]

The proposed section 2a defines hydraulic fracturing within the context of the Petroleum Act 1964 as the:

> *…generation of mechanical fractures in the shale or strata encased in shale by means of the physical process of pumping fluid at high pressure, which is carried out in connection with the use of a well to search or bore for petroleum.*[39]

Additionally, it states hydraulic fracturing would be considered as onshore, if it involved the fracturing of strata **other than** strata beneath the:

- Foreshore;
- Internal waters adjacent to NI; and,
- The territorial sea of the UK adjacent to NI.[40]

2.2 Key potential considerations arising from the OF Bill as introduced

The following subsection outlines some key potential implications arising from the OF Bill as introduced.

2.2.1 The meaning of "hydraulic fracturing"

During the second stage debate on the OF Bill, questions arose as to the precise definition of hydraulic fracturing within the Bill's context. Specifically, the Minister for the Economy asked:

> *…whether* [the] *definition of "hydraulic fracturing" in the Bill means high volume hydraulic fracturing? Secondly, does it relate only to petroleum or will the Bill also outlaw fracking when it is used for water boreholes.*[41]

[38] The Onshore Fracking (prohibition) Bill as introduced (29 November 2021) http://www.niassembly.gov.uk/assembly-business/legislation/2017-2022-mandate/non-executive-bill-proposals/onshore-fracking-prohibition-bill/bill---as-introduced/

[39] *Ibid*

[40] *Ibid*

[41] Northern Ireland Assembly, Official Report: Tuesday 08 February 2022, Onshore Fracking (Prohibition) Bill: Second Stage (8 February 20222) http://aims.niassembly.gov.uk/officialreport/report.aspx?&eveDate=2022/02/08&docID=366587#3950036

On the second point, it is important to note that although hydraulic fracturing is a well stimulation technique used in hydrocarbon extraction, a similar technique is used for other reasons such as creating "improved permeability in underground geothermal reservoirs". The OF Bill, if enacted as introduced, would ensure that the "Ministry" has no right of searching and boring for and getting petroleum by way of onshore hydraulic fracturing. Additionally, it would ensure that no licences would be granted for hydraulic fracturing under the Petroleum Act 1964. However, as introduced, the OF Bill makes reference to hydraulic fracturing in a restricted context, i.e. the "searching and boring for and getting" of petroleum.[42]

Potential scrutiny point:

1 The Committee for the Economy may wish to seek the views of the DfE and other stakeholders as to whether the OF Bill, as introduced, sufficiently defines specific types of prohibited hydraulic fracturing, which would ensure legal certainty in its application?

The OF Bill is less explicit on the first point, i.e. whether it refers to high-volume hydraulic fracturing or not. It seeks to prohibit the use of hydraulic fracturing in petroleum extraction. The OF Bill's definition of hydraulic fracturing makes no reference to the volume of hydraulic fracturing fluid used in the process. Rather, as noted above, it defines the process as the:

> *…generation of mechanical fractures in the shale or strata encased in shale by means of the physical process of pumping fluid at high pressure, which is carried out in connection with the use of a well to search or bore for petroleum.*[43]

Literature on hydraulic fracturing in a hydrocarbon development context draws a distinction between "low volume" and "high volume". The former is used in the process of extracting conventional hydrocarbons and some tight gas; the latter is used in the extraction of unconventional hydrocarbons, such as shale gas.[44] Comparing water consumption used in the extraction of different types of natural gas, the International Energy Agency found that the extraction of conventional gas with fracture stimulation used between 0.005 and 0.05 cubic metres of water per terajoule (m^3/TJ) of natural

[42] The United States Geological Survey, What is hydraulic fracturing? (accessed 22 February 2022) https://www.usgs.gov/faqs/what-hydraulic-fracturing#:~:text=Hydraulic%20fracturing%20is%20a%20well,permeability%20in%20underground%20geothermal%20reservoirs.

[43] The Onshore Fracking (prohibition) Bill as introduced (29 November 2021) http://www.niassembly.gov.uk/assembly-business/legislation/2017-2022-mandate/non-executive-bill-proposals/onshore-fracking-prohibition-bill/bill---as-introduced/

[44] See for example, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the exploration and production of hydrocarbons (such as shale gas) using high volume hydraulic fracturing in the EU (2014) https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52014DC0023R%2801%29

gas production. Water use in the extraction of shale gas was found to be significantly greater; ranging from 2 to 100 m^3/TJ.[45]

Furthermore, Section 50 of the Westminster enacted Infrastructure Act 2015 amended the Petroleum Act 1998, inserting a new section into that 1998 Act. The new section specified 13 legislative requirements – i.e. conditions - to be met before hydraulic fracturing consent could be granted in England and Wales. Within those jurisdictions, the Infrastructure Act 2015 defined hydraulic fracturing as an activity that is:

> *...carried out in connection with the use of* [a] *relevant well to search or bore for or get petroleum.*[46]

And which "involves, or is expected to involve, the injection of:

> *…more than 1,000 cubic metres of fluid at each stage, or expected, stage of fracturing.*[47]

Or:

> *…more than 10,000 cubic metres of fluid in total.*[48]

Two points are worth noting about Section 50 of the Infrastructure Act 2015, i.e.:

1. The definition of hydraulic fracturing extend only to England and Wales (no similar definition could be located in NI legislation).
2. The definition was criticised at the time of the Bill's passage through Westminster. Some argued that the minimum volume of fluid used to define the process was under-inclusive, in that its scope would be too large to capture all incidents of hydraulic fracturing. A University of Edinburgh academic noted at the time that 43% of the 17,000 gas wells hydraulically fractured in the United States (US) between 2000 and 2010 would not be defined as hydraulic fracturing under the prevailing UK legislation. The UKG argued the definition was consistent with the "approach taken by the European Commission" and that the Government was "confident that the right projections are in place" to ensure safety.[49]

In relation to the above, it should be noted that during the second stage debate for the OF Bill, the Bill's sponsor noted that the intention of the proposed legislation was to:

[45] International Energy Agency, World Energy Outlook, Special Report on Unconventional Gas, Golden rules for a golden age of gas (2011) https://iea.blob.core.windows.net/assets/8422ef9a-9ae8-4637-ab1c-ddb160ab7c59/WEO_2012_Special_Report_Golden_Rules_for_a_Golden_Age_of_Gas.pdf

[46] Infrastructure Act 2015, s50 https://www.legislation.gov.uk/ukpga/2015/7/section/50?view=interweave+extent

[47] *Ibid*

[48] *Ibid*

[49] See for example The Guardian, UK government's fracking definition 'could allow drilling without safeguards' (13 April 2016) https://www.theguardian.com/environment/2016/apr/13/uk-governments-fracking-definition-could-allow-drilling-without-safeguards

> *… firmly to ban **all forms of onshore fracking** and to shut the door tightly on the prospect of any fracking on the island of Ireland.*[50] [Emphasis added]

Potential scrutiny point:

2 The Committee for the Economy may wish to seek the views of the DfE and other stakeholders as to whether the scope of the specified definition for "hydraulic fracturing" in the OF Bill, as introduced, is sufficiently broad, to achieve the legislative intent underpinning the Bill – i.e. a prohibition of onshore hydraulic fracturing in NI?

2.2.2 The geographical extent of the proposed prohibition

As noted in Section 1 of this Paper, the Petroleum Act 1964 vested the rights to petroleum found in NI strata and the "internal waters" adjacent to NI, to the then "Ministry of Commerce". Rights to petroleum found in UK territorial waters adjacent to NI are vested in the Crown as per section 2(2) of the Petroleum Act 1998, with licensing responsibilities falling to the UK Oil and Gas Authority.

The OF Bill, as introduced, seeks to prohibit the use of hydraulic fracturing with respect to petroleum found within NI's onshore area. As such, it explicitly states that the proposed prohibition would not, if enacted, apply to strata beneath the:

- Foreshore;
- Internal waters adjacent to NI; and,
- The territorial sea of the UK adjacent to NI.

Of the proposed categories, the Crown Estate is responsible for the territorial sea of the UK adjacent to the NI. It also manages approximately 65% of NI's foreshore and riverbed. However, as noted, the specified rights to petroleum in the "internal waters adjacent to NI" are vested in the DfE as per the Petroleum Act 1964. The OF Bill, as introduced, therefore proposes a prohibition of hydraulic fracturing in respect to only the onshore petroleum rights vested in the DfE. The Bill does not extend this ban to the offshore petroleum rights vested in the DfE within the limits set out in the Petroleum Act 1964 – i.e. limited to the internal waters adjacent NI. During the second stage debate the OF Bill, its Sponsor commented on the underpinning rationale limiting the prohibition to NI's onshore petroleum rights only, stating:

> *The Bill pertains to only onshore fracking, where "onshore" includes everything apart from the foreshore, the internal waters adjacent to the North and the territorial sea of the North. It was my intention that the Bill would prohibit onshore and offshore fracking, but I was advised that the seabed and underlying natural resources are reserved matters. I wrote to the British Secretary of State about whether the Bill could legislate for*

[50] Northern Ireland Assembly, Official Report: Tuesday 08 February 2022, Onshore Fracking (Prohibition) Bill: Second Stage (8 February 20222) http://aims.niassembly.gov.uk/officialreport/report.aspx?&eveDate=2022/02/08&docID=366587#3950036

> *offshore as well as onshore fracking. I did not, however, receive the necessary confirmation. That having been said, the intention of the Bill is firmly to ban all forms of onshore fracking and to shut the door tightly on the prospect of any fracking on the island of Ireland.*[51]

It is worth noting in the context of the above quote, that the definition of "onshore" used in the RoI's "Petroleum and Other Minerals Development (Prohibition of Onshore Hydraulic Fracturing) Act 2017" applied to:

> *... petroleum that is situated in the State including the **internal waters**.*[52] [emphasis added]

The RoI Act further states that internal waters "has the same meaning as it has in Part 3 of the Sea-Fisheries and Maritime Jurisdiction Act 2006".[53] The definition set out in Sea-Fisheries and Maritime and Jurisdiction Act 2006 is as follows:

> *The internal or inland waters of the State extend to all sea areas which lie on the landward side of the baseline of the territorial seas…*[54]

As such, "inland waters" in this context includes some offshore element.

Potential scrutiny point:

3 The Committee for the Economy may wish to seek the views of the DfE and other stakeholders as to whether the scope of the OF Bill's proposed hydraulic fracturing prohibition extends to all relevant geography, given the Bill's underlying legislative intent?

2.2.3 Consequences of breaching the prohibition

The OF Bill's intention is to introduce a new section into the Petroleum Act 1964 that will ensure that "onshore hydraulic fracturing is unlawful" in NI. Its provisions, if enacted as introduced, would also ensure that the DfE no longer has the power to search and bore for and get petroleum using hydraulic fracturing; nor would it have the power to grant licences to that effect. In addition, the proposed OF Bill's provision aims to render ineffective any hydraulic fracturing permission granted by licence prior to the OF Bill's enactment.

Although the OF Bill, if enacted as introduced, would make onshore hydraulic fracturing unlawful in NI, it does not include any provisions that set out penalties for breaching the prohibition. As noted in subsection 1.5 of this Paper, the RoI's "Petroleum and Other

[51] Northern Ireland Assembly, Official Report: Tuesday 08 February 2022, Onshore Fracking (Prohibition) Bill: Second Stage (8 February 20222) http://aims.niassembly.gov.uk/officialreport/report.aspx?&eveDate=2022/02/08&docID=366587#3950036

[52] Petroleum and Other Minerals Development (Prohibition of Onshore Hydraulic Fracturing) Act 2017, s1 https://www.irishstatutebook.ie/eli/2017/act/15/enacted/en/html

[53] *Ibid*

[54] Sea-Fisheries and Maritime and Jurisdiction Act 2006, part 2, s86 https://www.irishstatutebook.ie/eli/2006/act/8/enacted/en/print#sec86

Minerals Development (Prohibition of Onshore Hydraulic Fracturing) Act 2017" made it unlawful for a person to search for, get, raise, take, carry away or work petroleum, by means of hydraulic fracturing. That RoI Act also ensured that any person who contravenes the Act's prohibition is guilty of offence and liable to a fine and/or imprisonment for up to six months.[55]

There are examples of similar approaches in other jurisdictions. For example, in 2015 the Government of the New Brunswick, Canada passed the "Prohibition Against Hydraulic Fracturing Regulation" under Section 59 of the province's "Oil and Natural Gas Act 1976". That Regulation stated:

> *No person shall hydraulically fracture a well.*[56]

It also made it a "Category J" offence not to comply with this provision.[57] Under New Brunswick law, a category J offence is punishable with a fine of between $500 and £200,000 ($500,000 for a second conviction of the same offence), or with imprisonment of up to 18 months.[58]

Similarly, in Australia, the Government of Victoria enacted legislation to explicitly prohibit hydraulic fracturing, *via* the "Resources Amendment Legislation (Fracking Ban) Act 2017". That Act made carrying out any hydraulic fracturing activity an offence, punishable by a fine.[59]

In March 2021, the state also passed the Constitution Amendment (Fracking Ban) Act 2021, which enshrined the prohibition of hydraulic fracturing in the state's Constitution. That Act constrained the state parliament's power to repeal, alter or vary any provisions that prohibit hydraulic fracturing. Under the Act, the repealing, altering, or varying of provisions included the reducing the penalty for contravening provision, or narrowing the "class of person liable to a penalty".[60]

Potential scrutiny point:

4 The Committee for the Economy may wish to seek the views of the DfE and other stakeholders as to whether the OF Bill's proposed hydraulic fracturing prohibition

[55] Petroleum and Other Minerals Development (Prohibition of Onshore Hydraulic Fracturing) Act 2017, s1 https://www.dccae.gov.ie/en-ie/natural-resources/legislation/Documents/47/Petroleum%20and%20Other%20Minerals%20Development%20(Prohibition%20of%20Onshore%20Hydraulic%20Fracking)%20Act%202017.pdf

[56] New Brunswick Regulation 2015-28 under the Oil and Natural Gas Act (O.C. 2015-138) s2 https://www.canlii.org/en/nb/laws/regu/nb-reg-2015-28/latest/nb-reg-2015-28.html

[57] *Ibid* s3

[58] New Brunswick, Provincial Offences Procedure Act, SNB 1987, c P-22.1 s 56, 57, and 64

[59] Victorian Legislation, Resources Amendment Legislation (Fracking Ban) Act 2017 https://content.legislation.vic.gov.au/sites/default/files/9824f9ff-0a5b-3f8e-9fbd-20ac0f6c4268_17-008aa%20authorised.pdf

[60] Victoria Legislation, Constitution Amendment (Fracking Ban) Act 2021 https://content.legislation.vic.gov.au/sites/default/files/2021-03/591133bs1.pdf

should be accompanied by a penalty when entities breach it; and if so, what would be an appropriate level of penalty for such a breach?

3 Potential financial implications of the OF Bill

The following section identifies **key potential financial implications arising for the "public purse", if the OF Bill is enacted as introduced**. From that restricted lens – i.e. the public purse - it looks at that: (i) the potential public revenue that would be generated should unconventional hydrocarbon development be permitted in NI; and (ii) the cost to the public purse associated with unconventional hydrocarbons development, including the cost associated with administration, and the policing of protests.

This Section does not consider the fiscal impact of other potential consequences of pursuing unconventional gas development, including, but not limited to, those effecting the below in terms of the public or private sectors:

- Environment;
- Visual landscape;
- Tourism;
- Agriculture; and,
- Health.

The Section first sets out what is known from a NI perspective, before drawing on experience in Scotland and England.

3.1 Northern Ireland

The DfE has commissioned research into the economic, societal and environmental impacts of future onshore petroleum exploration and production, including UOG in NI. That research was referenced during the second stage debate on the Bill, when the Minister for the Economy commented on its progress, while referencing its findings recorded in what is known as the "Hatch Report"; currently under DfE consideration. The Minister stated:

> *The final Hatch report was delivered to my Department in July last year. My officials have given careful consideration to its findings as well as other relevant international studies in order to develop evidence-based policy options. That report was circulated to my Executive colleagues, but I am now prepared to publish it so that all interested parties can read it.*[61]

[61] Northern Ireland Assembly, Official Report: Tuesday 08 February 2022, Onshore Fracking (Prohibition) Bill: Second Stage (8 February 20222) http://aims.niassembly.gov.uk/officialreport/report.aspx?&eveDate=2022/02/08&docID=366587#3950036

At the time of writing this Paper, the Hatch Report has not been published.[62]

Potential scrutiny point:

5 The Committee for the Economy may wish to ask the DfE when it expects to publish the Hatch Report.

Nonetheless, the DfE has published some information on potential revenue streams from UOG as part of its guidance to licence applicants. Therein, the DfE has identified three revenue streams:

- **Ring Fence Corporation Tax:** standard corporation tax applicable to all companies (with modifications, such as capital allowances), with the addition of a "ring fence". The ring fence prevents taxable profits from oil and gas extraction in the UK being reduced by losses from other activities or by excessive interest payments.
- **Supplementary charge:** an additional charge set at 20% on an applicant's ring fence profits, excluding finance costs.
- **Royalties:** levied at 7.5% of gross value of oil and gas won in a particular licence area, less an allowance for the cost associated with conveying, treating and initial storage of the oil and gas between the well head and the point of valuation. Royalties are payable to the DfE, but:

  > *…may be claimed by former owners of the mineral rights by way of compensation for the vesting of these rights in DFE under the Petroleum (Production) Act (Northern Ireland) 1964…*[63][64]

Potential scrutiny point:

6 The Committee for the Economy may wish ask the DfE to share any estimate it has made on the potential public revenue that might be generated from UOG development in NI.

In the absence of detailed NI specific information, the subsections which follow rely on studies into the financial implications of UOG: "Economic Impact Assessment of unconventional gas in Scotland", a study conducted by KPMG on behalf of the Scottish Government (the 2016 Scottish Study)[65]; and, a 2019 National Audit Office (NAO) report on "Fracking for shale gas in England" (the 2019 NAO Report). Each report took a different approach to assessing the public purse implications arising from UOG exploration. The 2016 Scottish Study focussed on potential government revenue that

[62] RaISe contacted DfE on 16 February 2022 requesting a publication date for the Hatch Report. The Department were unable to provide a date at that time.

[63] Department for the Economy, Guidance for Applicants, Petroleum Licensing in Northern Ireland (December 2018) https://www.economy-ni.gov.uk/sites/default/files/publications/deti/petroleum-licensing-in-ni--guidance-for-applicants.pdf

[64] A request for clarity on the issue of royalties, particularly on who the former owners of minerals rights might be, was submitted to the Department for the Economy on 3 June 2021. At the time of writing no response had been received. This paper will be updated once a response has been provided.

[65] The Findings of the Scottish Study are premised on a British Geographical Survey central estimate of the available shale gas resource in the region of 80.3 trillion cubic feet (or 2,273.9b m^3) and central shale oil estimate of 6b barrels of oil equivalent.

may be generated through UOG exploration. The 2019 NAO Report focussed on the cost to tax payers in England that have resulted from fracking development to date. The following subsections examine each report's findings in turn.

3.2 The 2016 Scottish Study

As noted, the focus of the 2016 Scottish Study's assessment examined potential revenue that could be generated through UOG development. It included an estimate of potentially impacted tax receipts across the UK. The 2016 Scottish Study demonstrated that potential revenue that may be derived from allowing the development of UOG in the UK could extend beyond those identified by the DfE above – i.e. corporation tax, the supplementary charge and royalties. It examined a much broader range of public revenue streams, including revenue arising from the direct taxation of oil and gas companies and their employees, as well as revenues associated with supply chain effects. To that end, the 2016 Scottish Study estimated potential revenues derived from:

- Direct taxes, including corporation tax on companies working in the UOG area, and income tax and National Insurance on employees (employee taxes) in the UOG industry and "other impacted sector";
- Indirect taxation (Value Added Tax) on goods and service purchased in the supply chain to support UOG development; and,
- Local government taxation through business rates.[66]

The 2016 Scottish Study's findings in this area are summarised in Table 1 below, which show projected total tax receipts across the UK from 2018 to 2062, based on specified scenarios. The Table shows estimates across three potential growth scenarios – i.e. low, central and high growth scenarios. As can be seen from the Table, there is considerable variation across the three specified scenarios. In the low growth scenarios, an estimated £500 million (m) in total tax receipts are delivered across the UK between 2018 and 2062. That is equivalent to an average of approximately £11m per year. In the central scenario, that figure rises to £1,400m, or approximately £31m per year. In the high growth scenario (referenced above), it is estimated that a total of £3,850m will be generated in the 45 years, or approximately £86m per year.[67] In each case, indirect taxes are the largest contributing element to total tax revenue. Direct tax revenue is estimated to be lower than indirect tax revenue. Employee taxes are estimated to contribute more to direct taxes than corporation tax revenue.

[66] KPMG, Economic Impact Assessment of unconventional oil and gas in Scotland (October 2016) https://www.gov.scot/binaries/content/documents/govscot/publications/research-and-analysis/2016/11/unconventional-oil-gas-economic-impact-assessment-scenario-development-unconventional-oil/documents/00509321-pdf/00509321-pdf/govscot%3Adocument/00509321.pdf

[67] *Ibid*

Table 1: Tax receipts from UOG across the United Kingdom to 2062[68]

		Low (£m)	Central (£m)	High (£m)
Direct taxes	Corporation tax	25	110	860
	Employee taxes	90	250	610
Indirect taxes		310	890	2,140
Business Rates		75	150	240
Total		**500**	**1,400**	**3,850**

Source: KPMG (2016)

The authors of the 2016 Scottish Study were unable to further disaggregate their broad estimates between the Scottish and the UKG; nor has it been possible for RaISe to locate a disaggregation of estimated tax receipts to NI level at the time of writing this Paper.

Potential scrutiny points:

7 Would the DfE please share any estimate of the potential tax receipts that could be generated through UOG development in NI?

8 If not, would the DfE confirm whether such an analysis will feature as part of the Hatch Report when published?

Ultimately, the Scottish Government concluded that other factors outweighed the potential fiscal and economic benefits of unconventional gas development, in particular its "energy and climate change commitments". On that basis, it did not "support the development of UOG in Scotland".

3.3 The 2019 NAO Report

As noted the 2019 NAO Report examined the cost to tax payers of supporting shale gas development in England. The Report specifically examined the period 2011 to 2020. It noted that the Whitehall Department for Business, Energy and Industrial Strategy (BEIS) did "not know the full cost of supporting shale gas development to date or the future public investment that may be required". It stated that costs had been borne by "government department, regulators, local authorities and other local bodies". The 2019 NAO Report identified "known costs of at least" £32.7m between 2011 and 2020. Those costs included £13.4m spent by police forces managing protests. Identifiable expenditure by BEIS was estimated to be £8.5m; of which, the majority (£5.8m) was spent by the British Geographical Survey on the environmental monitoring of shale sites.

The NAO also stated that the estimate:

> *…does not include the cost of appeals, judicial reviews, or the time and expenses of public servants. Because of the uncertainty over how much*

[68] *Ibid*

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

A breakdown of the cost to NI taxpayers could not be located by RaISe at the time of writing.

Potential scrutiny point:

9 Would The Executive Office and the DfE share any estimate of the public expenditure on UOG development in NI to date?

10 If not, would the DfE confirm whether such an analysis will feature as part of the Hatch Report when published?

3.4 Potential financial implications of the OF Bill summary

Research carried out on behalf of the Scottish Government noted that UOG development in Scotland could increase UK tax receipts by between £500m and £3,850m by 2062, or between £11m or £86m per year over 45 years, depending on how successfully the resource was developed. The potential revenue to government identified in the Scottish research included both direct and indirect taxes, as well as business rates. On the other hand, the NAO found that the UK public sector spent at least £32.7m between 2011 and 2020, or approximately £3.6m per year over nine years, on shale gas development in England. That included both administration and the policing costs. These costs were incurred despite no commercial development of shale gas in the regions during this time.

Additionally, it is important to underscore that this Section does not examine public purse implications of alternative policy options that policymakers in time may choose to pursue as an alternative to supporting the development of UOG. For example, as is identified in the analysis that follows below, the Scottish Government have chosen to pursue renewable energy development, rather than unconventional hydrocarbon exploration and development. However, it should be noted that this policy choice is also likely to stimulate economic activity and job creation, which will impact on the public purse by generating corporation tax and income tax revenue.

4 Key additional considerations from the OF Bill

This section outlines potential key additional considerations arising from the OF Bill, as introduced. The focus here is on the economic, social and environmental considerations arising from the Bill's proposed hydraulic fracturing prohibition for petroleum in NI. As noted in Section 3, above, the Hatch Report had not been published at the time of writing of this Paper. According to the terms of reference of that Report, it was to examine the economic, social and environmental factors associated

with “onshore petroleum and, separately UOG development” in order to assess the viability of both.

The Minister for the Economy provided some indication of the Report’s conclusions in three noted areas during the second stage debate on the OF Bill. He stated:

> *My paper also recommended my preferred option of introducing a moratorium and eventual legislative ban on all forms of onshore petroleum exploration and production. That was based on a number of factors. First, a moratorium and ban on all forms of onshore petroleum exploration and production would not disadvantage the local economy. As I said, in the last 50 years, there has been no commercial production of oil or gas in Northern Ireland. Hence there is no reliance on the sector. Specifically, the Hatch Regeneris research concluded that* ***the potential positive economic impacts of petroleum exploration and production would be relatively minor****. The preferred option would therefore ensure a focus on the growth of the low-carbon renewable energy sector, which would use a secure indigenous resource and support people into secure, well-paid jobs. Secondly,* ***a moratorium and ban on all forms of onshore petroleum exploration and production would remove the possibility of potential adverse societal and environmental impacts on local communities and the rural environment, as no further exploration or development would be permitted.*** [Emphasis added].

In the absence of that Report’s wider dissemination to date, this Section relies on publicly available studies from other regions, to help identify potential issues – economic, environmental, social, health and energy - arising from the OF Bill, as introduced; and thereby facilitate scrutiny of the Bill in an informed context. Such studies provide assessments of the economic impact of UOG development, and identify both risks and benefits of such development. They include, but are not limited to: the 2016 Scottish Study; and a similar study, “Socio-economic Impact of Unconventional Gas in Wales” , commissioned by the Welsh Government and published in 2015 (the 2015 Welsh Study).[69]

4.1 Economic considerations

Both the 2016 Scottish Study[70] and the 2015 Welsh Study[71] assessed the potential impact of UOG development in each jurisdiction. Each analysis focussed on impacts of

[69] Regeneris, Socio-economic impact of unconventional gas is wales (July 2015) https://gov.wales/sites/default/files/consultations/2018-06/180703-final-report-socio-economic-impact-of-unconventional-gas-in-wales.pdf

[70] The Findings of the Scottish Study are premised on a British Geographical Survey central estimate of the available shale gas resource in the region of 80.3 trillion cubic feet (or 2,273.9b m^3) and central shale oil estimate of 6b barrels of oil equivalent.

[71] The Welsh Study did not include a central estimate for total recoverable resource, noting a lack of data at the time of writing. It did note that at the time of writing six wells had been drilled in south Wales suggesting which suggested a coal bed methane resource of between 3 and 9b m^3.

gross value added (GVA), job creation and community funding. The following subsections provide a summary of both reports' findings in these areas.

Note the analysis that follows does not consider economic impacts of other potential consequences of pursuing UOG development in Scotland and Wales, such as those effecting the:

- Environment;
- Visual landscape;
- Tourism;
- Agriculture; and,
- Health.

4.1.1 Potential GVA impacts

The **2016 Scottish Study** estimated the potential GVA of two sources of UOG development – shale gas and associated liquids, and coal bed methane – across three potential growth scenarios – i.e. low, central and high growth scenarios. It concluded that the total GVA impact of pursuing UOG development in Scotland over the period 2018-2062 would vary, depending on how successful the industry develops. The findings are presented in Table 2 below.

The Table presents estimated GVA impact of developing both coal bed methane and shale, and of developing only shale gas. Its data reflect the fact the coal bed methane was estimated to have a negative impact of -£334m on total direct GVA, in all three growth scenarios (low, central and high). Note: figures in the bottom two rows, at annual GVA, have been calculated by RaISe relying on the 45-year timeframe used in original KPMG study (2016):

Table 2: Estimated GVA impact of UOG in Scotland – 2018 to 2062[72]

	Low (£m)	Central (£m)	High (£m)
Total GVA impacts	17	1,095	4,427
Total GVA impacts shale development only	143	1,221	4,553
Per annum GVA impact	0.38	24	98
Per annum GVA impact shale development only	3	27	101

Source: KPMG (2016) and RaISe (2022), relying on KPMG (2016)

The findings above assumed that UOG could be successfully developed in Scotland. The KPMG report authors stated:

[72] KPMG, Economic Impact Assessment of unconventional oil and gas in Scotland (October 2016) https://www.gov.scot/binaries/content/documents/govscot/publications/research-and-analysis/2016/11/unconventional-oil-gas-economic-impact-assessment-scenario-development-unconventional-oil/documents/00509321-pdf/00509321-pdf/govscot%3Adocument/00509321.pdf

> *The economic benefits… should be considered in the context of the alternative case in which exploration for UOG in Scotland takes place but resources are not economically viable for development. In this case, expenditure on exploration would take place (our cost estimate for exploration activity in the Central scenario is £240m) but no actual development would take place.*[73]

The **2015 Welsh Study** examined the potential the GVA impact of developing UOG over the period 2015-2029, across the six scenarios stated in Table 3 below. That Table summarises key findings of that analysis. Again, it shows both the estimated total and annual impacts. The Welsh Study also included a sectoral analysis of estimated GVA impacts. As can be seen in the Table, in all scenarios, that was anticipated to be greatest in the manufacturing, energy and construction sector:

Table 3: Estimated GVA impact of unconventional gas exploration and production in Wales, 2015 to 2029[74]

	Low Scenario		Medium Scenario		High Scenario	
	Lower intensity	Higher intensity	Lower intensity	Higher intensity	Lower intensity	Higher intensity
Total GVA impact 2015-2029	**£m**	**£m**	**£m**	**£m**	**£m**	**£m**
Mining, Quarrying & Minerals	0.2	0.3	2.3	5.1	25	58.7
Manufacturing, Energy & construction	0.7	1	8	17.6	65.3	153.5
Distribution & Transport	0.2	0.2	1.8	4	14.3	33.6
Other Private Services	0.6	0.9	7.3	16.2	53.5	125.7
Public Sector	0	0	1.7	3.7	12.3	28.9
Total	**1.7**	**2.4**	**21.1**	**46.6**	**170.4**	**400.4**
Average Annual GVA impact 2015-2029	**£m**	**£m**	**£m**	**£m**	**£m**	**£m**
Mining, Quarrying & Minerals	0	0	0.2	0.3	1.7	3.9
Manufacturing, Energy & construction	0	0.1	0.5	1.2	4.4	10.2
Distribution & Transport	0	0	0.1	0.3	1	2.2
Other Private Services	0	0.1	0.5	1.1	3.6	8.4
Public Sector	0	0	0.1	0.2	0.8	1.9
Total	**0.1**	**0.2**	**1.4**	**3.1**	**11.4**	**26.7**

Source: Regeneris (2015)

[73] *Ibid*

[74] Regeneris, Socio-economic impact of unconventional gas is wales (July 2015) https://gov.wales/sites/default/files/consultations/2018-06/180703-final-report-socio-economic-impact-of-unconventional-gas-in-wales.pdf

Potential scrutiny point:

11 Would the DfE share any estimate of the GVA impact of UOG development in NI?

12 If not, would the DfE confirm whether such an analysis will feature as part of the Hatch Report when published?

4.1.2 Potential job creation impact of hydraulic fracturing support

The 2016 Scottish Study used "peak year employment" as a metric to estimate number of "additional jobs" that could be created by the UOG sector in Scotland. "Peak year employment" estimates the number of additional jobs created at the point when UOG production is at its peak.

Table 4 below provides a summary of the 2016 Scottish Study's conclusions on the peak year employment effects across all three stated scenarios, as measured by full-time equivalent employment (FTE).[75] It also provides a summary of the "channels" of anticipated job creation – namely direct, indirect or induced. As can be seen from the Table, the estimated level of job creation was expected to increase in line with the level of UOG:

Table 4: Estimated GVA impact of UOG exploration and production in Scotland, 2018 to 2062[76]

Employment type		Low (FTE)	Central (FTE)	High (FTE)
Direct employment	Shale gas and associated liquids	430	930	1,280
Indirect employment	Shale gas and associated liquids	20	410	1,700
Induced employment	Shale gas and associated liquids	20	60	120
Total Peak employment		**470**	**1,400**	**3,100**

Source: KPMG (2016)

The **2015 Welsh Study** examined potential job creation over the period 2015 to 2029; measured in "person years" and estimated annual employment, measured as full-time equivalent. As is the case with the GVA estimates for Wales outlined above, the Study examined potential employment impacts across various sectors of the economy and in six different growth scenarios. Table 5 below summarises the Welsh Study's findings in this area.

[75] Full-time equivalent, or FTE, is a unit used in measuring the size of a workforce. An FTE is either a single worker employed on a full-time standard contract, or two or more part-time workers whose hours, when combined, is equivalent to a single worker employed on a full-time standard contract. The purpose of FTE is to measure the size of the workforce while controlling for the hours that individual workers are contracted to perform. https://www.oxfordreference.com/view/10.1093/oi/authority.20110803095838423

[76] *Ibid*

As can be seen from that Table, the cumulative and annual job creation impact of unconventional gas development was estimated to increase in line with the level of resource development:

Table 5: Estimated job creation impact of unconventional gas exploration and production in Wales, 2015 to 2029[77]

	Low Scenario		Medium Scenario		High Scenario	
	Lower intensity	Higher intensity	Lower intensity	Higher intensity	Lower intensity	Higher intensity
Total job impact 2015-2029	Person years	Person years	Person years	Person years	Person years	Person years
Mining, Quarrying & Minerals	3	5	40	80	530	1,240
Manufacturing, Energy & construction	16	23	190	410	1,480	3,480
Distribution & Transport	6	8	70	150	530	1,250
Other Private Services	13	19	160	340	1,130	2,650
Public Sector	1	1	50	100	340	790
Total	**39**	**56**	**510**	**1,080**	**4,010**	**9,410**
Average Annual job impact 2015-2029	FTE	FTE	FTE	FTE	FTE	FTE
Mining, Quarrying & Minerals	0.2	0.3	2.7	5.3	35.3	82.7
Manufacturing, Energy & construction	1.1	1.5	12.7	27.3	98.7	232
Distribution & Transport	0.4	0.5	4.7	10	35.3	83.3
Other Private Services	0.9	1.3	10.7	22.7	75.3	176.7
Public Sector	0.1	0.1	3.3	6.7	22.7	52.7
Total	**2.6**	**3.7**	**34**	**72**	**267.3**	**627.3**

Source: Regeneris (2015)

Potential scrutiny points:

13 Would the DfE share any estimate of the job creation associated with UOG exploitation in NI?

14 If not, would the DfE confirm whether such an analysis will feature as part of the Hatch Report when published?

4.1.3 Community funding

Prior to the withdrawal of support for hydraulic fracturing across the UK, as set out in Section 1 above, the shale gas industry committed to a compensation package for communities that would "host shale development". This package, which was announced in 2013, included:

[77] Regeneris, Socio-economic impact of unconventional gas is wales (July 2015) https://gov.wales/sites/default/files/consultations/2018-06/180703-final-report-socio-economic-impact-of-unconventional-gas-in-wales.pdf

- At exploration stage, £100,000 in community benefits per well-site when hydraulic fracturing takes place; and,
- 1% of revenues at production stage will be paid out to communities (note, individual licence holders were free to offer higher payments to communities).[78]

According to the industry body "United Kingdom Onshore Oil and Gas" (UKOG), in addition to the £100,000 per well available to communities during the exploration phase:

> *Should the site be commercially viable, during the production stage, communities will receive in total 1% of all gross revenues before costs are deducted. The industry estimates that this could add up to over £1.1bn in a 25 year period or about £5m to £10m per site.*[79]

The 2016 Scottish Study estimated total cumulative benefit payments to Scotland, based on a 4% community benefit fund levied on revenue. Its findings are outlined in Table 6 below. Again, it was expected that community fund benefits would increase as successful development increased:

Table 6: Estimated community fund revenue Scotland, based on 4% of production revenues[80]

	Low	Central	High
Shale Gas (£m)	63	187	578
Associated liquids (£m)	1	30	85
Total (£m)	**64**	**217**	**663**

Source: KPMG (2016)

The **2015 Welsh Study** found that:

> *The community benefit payments could represent significant additional income for local communities although the potential to secure long term benefits for these communities depends on the scale of the payments and the mechanisms put in place for allocating and spending this income.*

Based on the UKOG's 1% community benefit scheme, the Welsh Report calculated the community potential benefit estimates for Wales. Those estimates again show the link between potential benefit and the anticipated level of production:

- High scenario – between £14.89m and £34.61m in total over a 15-year period or £1m to £2.3m per year (£0.12m to £0.28m per pad per year);
- Medium scenario - between £1.86m and £4.32m in total or £0.12m to £0.29m per year (and £15k to £36k per pad per year);

[78] Department for Business, Energy & Industrial Strategy, Guidance on fracking: developing shale gas in the UK (12 March 2019) https://www.gov.uk/government/publications/about-shale-gas-and-hydraulic-fracturing-fracking/developing-shale-oil-and-gas-in-the-uk#community-and-public-engagement

[79] UK Oil and Gas, Economic Benefits (accessed 15 June 2021) https://www.ukoog.org.uk/economy/benefits

[80] *Ibid*

- Low scenario – this does not include any new shale gas activity; and hence there are no specific community benefit payments associated with it.[81]

Potential scrutiny points:

15 To date, has the DfE carried out any assessment of potential Community funding associated with UOG development in NI?

16 If not, would the DfE confirm whether such an analysis will feature as part of the Hatch Report when published?

4.1.4 Summary of economic considerations

Both the Scottish and Welsh studies into the potential economic impacts concluded that successful UOG development could lead to economic benefits in the respective jurisdictions. They also found that the level of benefit would likely increase as successful development increased. It is important to note that despite these findings, neither government has chosen to pursue UOG development (for additional detail, please see Section 1 above).

This section did not examine economic implications of alternative policy options that policy makers may choose to pursue as an alternative to supporting the development of UOG. For example, as noted in Section 1 above, the Scottish Government has chosen to develop renewable energy rather than UOG. Stimulating the renewable energy industry is also likely to have broad economic consequences, including increased gross value added (GVA) and job creation impacts. For example, as of 2019, 202,100[82] full-time equivalent (FTE) employees were estimated to be directly employed in the UK's low carbon and renewable energy economy, of which:

- 5,300 were located in NI;
- 165,600 were located in England;
- 21,400 were located in Scotland; and,
- 9,700 were located in Wales.[83]

Additionally, the findings did not consider the economic impact of the environmental, health and social implications associated with UOG development (those issue are considered further in subsection 4.2 below).

[81] Regeneris, Socio-economic impact of unconventional gas is wales (July 2015) https://gov.wales/sites/default/files/consultations/2018-06/180703-final-report-socio-economic-impact-of-unconventional-gas-in-wales.pdf

[82] Numbers do not sum to total due rounding

[83] ONS, Low Carbon and Renewable Energy Survey 2019 https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/finalestimates/2019

Potential scrutiny points:

17 To date, has the DfE assessed the potential economic benefits of UOG development in NI against alternative policy options, such as renewable development?

18 If not, would the DfE advise the Committee for the Economy on whether such an analysis will feature as part of the Hatch Report when published?

19 To date, has the DfE conducted any analysis weighing the benefits of UOG development in NI against the broader economic costs arising from potential environmental, health and social harms?

20 If not, would the DfE advise the Committee for the Economy on whether such an analysis will feature as part of the Hatch Report when published?

4.2 Broader environmental, health and social considerations

This Paper does not provide a full overview and assessment of the broader environmental, health and social implications of hydraulic fracturing and UOG development. It, however, does draw on available research findings. For example, a recent "systematic" literature review on shale gas development in the UK was published in the Energy Reports journal in December 2020. It reviewed 106 scientific articles "in which shale gas exploitation are indicated and studied";[84] finding that the reviewed evidence identified both beneficial and harmful effects of UOG exploitation. Those benefits and harms provide a useful summary of the types of effects that could be realised in NI, if the OF Bill is enacted as introduced.

The identified beneficial effects in the literature review findings related to "the fields of energy, economy and environment", as follows:

- **Energy:** the exploitation was seen as an opportunity to increase energy security. Decreasing a state's reliance upon imported gas, which can sometimes be sourced from "uncertain" sources. This issue is explored in greater detail in subsection 4.3 of this Paper.
- **Economic growth:** as noted in subsection 4.1 above, studies argue that UOG exploitation can stimulate economic activity, government receipts and job creation. Studies also argue that UOG development can lead to lower energy prices, by reducing dependence on imported gas. This argument is again explored in great detail in Subsection 4.3 below.
- **Environmental impacts:** the noted literature review identified a number of emission benefits relative to the continued use of conventional fossil fuels. For example, it

[84] Carolina Álvarez-Ramos, Ana-María Diez-Suárez, Miguel de Simón-Martín, Alberto González-Martínez, Enrique Rosales-Asensio, A brief systematic review of the literature on the economic, social and environmental impacts of shale gas exploitation in the United Kingdom, Energy Reports, Volume 6, Supplement 8, 2020,Pages 11-17,ISSN 2352-4847, https://doi.org/10.1016/j.egyr.2020.10.014.(https://www.sciencedirect.com/science/article/pii/S2352484720313676)

found that the studies showed "that the use of shale gas as a fossil fuel reduces emission of pollutants such as sulphur, mercury and nitrogen oxides compared to other fossil fuels". It also found that CO^2 emissions from shale gas were lower when shale gas was used as a fuel for energy production "…especially if existing infrastructure is used as a CO^2 capture system". In addition, greenhouse gas (GHG) emissions associated with gas fired generation were found to be 50% lower than those for coal fired generation.[85]

The literature review further found that the harmful effects identified in the studies were predominately environmental in nature. The studies, however, also identified harmful economic and health effects, including:

- **Seismicity:** studies found that the injection of water into an area where there were faults in ground could induce seismicity. The likelihood of seismic events occurring was unclear. For example, the National Research Council (2013) found that the "process of injecting and extracting fracking fluid can case an increase in seismic tremors, although these are of small magnitude". More recently, the UK Oil and Gas Authority (2019) "determined that the existing impact of induced seismicity cannot be known with certainty". As noted in Section 1 above, it was that finding that cause the UKG to place a policy moratorium UOG development in England.
- **Water:** the studies reviewed identified a number impacts associated with water use and supply. Hydraulic fracturing was found to use large amounts of water, which could result in diminished water supply. Studies also note that: the concentration of chemicals, such as arsenic and naturally occurring radioactive material, may increase during the injection of fracturing fluids; the treatment of wastewater may give rise to waste that may be polluting; and, increased water used can lead to a raising of groundwater temperatures, which may modify aquatic ecosystems.
- **Emissions:** the studies examined found that shale gas extraction can produce methane emissions. Despite offering improvement relative to coal, GHG emission from shale gas were found to be between 3.5% and 8% higher than those associated with conventional natural gas. Studies have shown that shale gas has higher GHG footprint relative to conventional gas during its extraction and its use for power generation.
- **Economic effects:** from an economic perspective the profitability of wells were found to be low (below 10%). The requirement to financially compensate local areas was found to lead to "an unequal distribution of governmental support". Shale gas development was also found to potentially lead to wage inequalities, in particular because the employment within the sector was found to be male dominated.
- **Health:** studies found potential negative effects on the health of those living close to hydraulic fracturing wells. Air emissions from shale gas extraction were found to cause risk to human health, including: headaches; paralysis of certain areas of the body such as limbs; and, fainting or loss of consciousness due to inhalation of

[85] *Ibid*

emissions. One study found that the cancer resulting from pollution "increases as the distance from the well decreases".[86]

These findings are consistent with other sources. Table 7 below provides a summary of pro and anti-hydraulic fracturing arguments identified from literature produced by the UKG[87], the US Department of Energy[88] and the US Geological Society[89]:

Table 7: Pro and anti-hydraulic fracturing arguments

Pro-hydraulic fracturing arguments	Anti-hydraulic fracturing arguments.
▪ Development of shale gas can contribute to energy needs and enhance security of supply - this is particularly important in countries that are reliant on gas imports; ▪ The Shale industry can generate government revenue - for example in the United States (US) the industry is estimated to contribute US$250 m in government per year; ▪ The shale gas industry can generate economic growth. IN the US it is estimated to contribute s $118.2 b to GDP per year (2013 estimates); and, ▪ The shale gas industry contributes to job creation. In the US the industry had created an estimated 600,000 jobs as of 2013.	▪ Water availability; ▪ Chemical spills; ▪ Impacts of sand mining for use in the hydraulic fracturing process; ▪ Surface water quality degradation from waste fluid disposal; ▪ Ground water quality degradation; ▪ Induced seismicity from injection of waste fluids into deep disposal wells; and, ▪ The reduced air quality, noise, light pollution and landscape changes associated with all oil and gas drilling.

Sources: UKG (2019) US Department of Energy (2013) & US Geological Survey (24 February 2022)

Potential scrutiny points:

21 To date, has the DfE conducted a cost-benefit analysis of the potential environmental, health and social impacts of UOG in NI?

22 If not, would the DfE confirm whether such an analysis will feature as part of the Hatch Report when published?

4.3 Security of energy supply and prices

One of the key arguments made in favour of exploiting UOG is that these untapped resources offer jurisdictions a means to enhance their energy security, or even achieve energy independence. During 2020, the United States (US) produced the second highest volume of natural gas on record. Production during the year was approximately 10% greater than consumption. The US Energy Information Administration has noted that:

[86] *Ibid*

[87] Department for Business, Energy and Industrial Strategy Guidance on fracking: developing shale gas in the UK (Updated 12 March 2019, accessed 18 June 2020) https://www.gov.uk/government/publications/about-shale-gas-and-hydraulic-fracturing-fracking/developing-shale-oil-and-gas-in-the-uk

[88] US Department of Energy, Why is shale important? (2013) https://www.energy.gov/sites/prod/files/2013/04/f0/why_is_shale_gas_important.pdf

[89] United States Geological Survey, What environmental issues are associated with hydraulic fracturing? (accessed 18 June 2020) https://www.usgs.gov/faqs/what-environmental-issues-are-associated-hydraulic-fracturing?qt-news_science_products=0#qt-news_science_products

> *Most of the production increases since 2005 are the result of horizontal drilling and hydraulic fracturing techniques, notably in shale, sandstone, carbonate, and other tight geologic formations.*[90]

The desire for greater energy independence has led some commentators to call upon the UKG to end its current moratorium on hydraulic fracturing.[91] For example, on 14 February 2022 commentators argued that:

> *If our economy is to boom after Brexit, British industry needs a competitive and reliable source of energy which we hold in our own hands and brings investment into this country. Shale gas production achieves all this and more. If we don't produce it here, as we have seen, all we do is import gas from elsewhere, and push up overall carbon emissions too.*[92]

That call for a rethink of the UK's policy took place against a backdrop of increased geopolitical tension in the Ukraine and Russia, which has the potential to impact gas supplies. According to data published by the European Union (EU) statistics agency Eurostat, in 2019 38% of natural gas imported into the EU came from Russia. The same data show that the UK is less reliant on Russian imports, which accounted for just 7% of UK imports of natural gas in 2019.[93] In the same year, Russian imports accounted for 40% of EU "inland natural gas consumption", but 4% of UK inland natural gas consumption. The UK is also more reliant on "indigenous gas production" than the EU. In 2019, 50% of UK inland natural gas consumption came from indigenous production, compared to 17% in the EU.[94] The NI Utility Regulator notes that a "large proportion" of gas sold in NI is from the UK's North Sea gas fields, but adds that imports are becoming increasingly significant due to declining North Sea production.[95]

UK domestic gas production is declining however. According to the London School of Economics, domestic natural production from the UK continental shelf peaked in 2000, and declined significantly until 2012, with the UK importing approximately half of the gas it consumes. In 2021, UK Oil and Gas Authority estimated that UK production of natural gas, excluding shale gas, would decline from 44.9b m^3 in 2020, to 8.9b m^3.[96]

A 2020 study by the Warrick Business School estimated that shale gas production could meet between 17% and 22% of UK gas consumption between 2020 and 2050. The study's published report stated that "…should the UK wish to have a shale gas

[90] US Energy Information Administration, Natural gas explained, where our natural gas comes from (October 2021) https://www.eia.gov/energyexplained/natural-gas/where-our-natural-gas-comes-from.php

[91] See for example Carbon Brief, Tory Grandees urge Boris Johnson to lift 'unconservative' ban on fracking 14 February 2022 https://www.carbonbrief.org/daily-brief/tory-grandees-urge-boris-johnson-to-lift-unconservative-ban-on-fracking

[92] *Ibid*

[93] Eurostat, Imports of natural gas by partner country (accessed 23 February 2022) https://ec.europa.eu/eurostat/databrowser/view/NRG_TI_GAS/default/table?lang=en&category=nrg.nrg_quant.nrg_quanta.nrg_t.nrg_ti

[94] Eurostat, Supply, transformation and consumption of gas (accessed 23 February 2022) https://ec.europa.eu/eurostat/databrowser/view/NRG_CB_GAS/default/table?lang=en&category=nrg.nrg_quant.nrg_quanta.nrg_cb

[95] Utility Regulator Gas Market Overview (accessed 28 February 2022) https://www.uregni.gov.uk/market-overview

[96] https://www.lse.ac.uk/granthaminstitute/explainers/what-potential-reserves-of-shale-gas-are-there-in-the-uk/

industry its role will be to mask the declining production of the UK [continental shelf] and displace a limited quantity of imports". [97]

In this context, it is worth noting that the DfE specification used in the procurement exercise for the Hatch Report referenced the potential for UOG in NI, stating it "…is greatest in the parts of Fermanagh that constitute the Lough Allen Basin". The DfE also noted that previous license holder in the area, Tamboran, had identified recoverable gas volumes of between 45b m^3 and 91b m^3 Bundoran Shale located in both NI and the RoI.[98] Adding that there was "still significant uncertainties around these figures at this early stage of exploration" and that:

> *Other areas of Northern Ireland where shale may be present at depth have some potential for UOG, but are at present much less prospective due to reduced knowledge of the nature, distribution and structure of shale deposits.*[99]

According to the London School of Economics, shale gas development is unlikely to directly impact on gas prices, although it could enhance domestic production. This is because it is unlikely that the gas sourced from shale would be sold significantly below the market price. On this, the March 2020 Warrick Business School study stated:

> *It is widely recognised that the open and liberal nature of the UK's gas market means that the market price – the National Balancing Point – is unlikely to be influenced by shale gas development.*[100]

It is worth noting that the UKG have so far been reluctant to change position on hydraulic fracturing despite calls to reverse current policy, international pressure on gas supply, and rising gas prices. On 10 February 2022, a spokesperson for the UK Prime Minister stated shale gas from hydraulic fracturing was "not a short-term fix" and that it was "still unproven as a resource in the UK". The spokesperson added that "there's unlikely to be sufficient quantities of gas available to address the high prices affecting all of Europe and would have no impact on prices in the short term", even if the UKG ended the moratorium "tomorrow".[101]

Potential scrutiny points:

23 To date, has the DfE conducted an assessment of the UOG resource in NI and its potential impact on gas supply and prices?

[97] *Ibid*
[98] Converted from the original cubic feet on the basis that 1 cubic foot = 0.283168 cubic metre.
[99] Department for the Economy, Specification for research into the economic, societal and environmental impacts of onshore petroleum exploration and production in Northern Ireland (accessed 24 February 2022) https://www.economy-ni.gov.uk/articles/specification-research-economic-societal-and-environmental-impacts-onshore-petroleum-exploration-and
[100] https://www.lse.ac.uk/granthaminstitute/explainers/what-potential-reserves-of-shale-gas-are-there-in-the-uk/
[101] BBC News, Fracking: UK's only shale gas wells to be sealed and abandoned (10 February 2022) https://www.bbc.co.uk/news/uk-england-lancashire-60341226

24 If not, would the DfE confirm whether such an analysis will feature as part of the Hatch Report when published?

5 Concluding remarks

The OF Bill, as introduced, contains provisions that, if enacted, would make the onshore hydraulic fracturing of petroleum unlawful in NI. At present, NI, like other parts of the UK, has a policy moratorium in place on hydraulic fracturing, implemented *via* the existing Planning System. The RoI introduced legislation that made onshore hydraulic fracturing unlawful in 2017.

The OF Bill, if enacted as introduced, would amend the Petroleum Act (NI) 1964. That Act gives the DfE rights to search, bore for and get petroleum in NI and the "internal waters adjacent" to NI. It also provides the DfE with the power to grant licences with respect to petroleum in those areas.

The prohibition proposed by the OF Bill is limited to NI's onshore area. It does not propose hydraulic fracturing prohibition with respect to:

- NI's Foreshore;
- Internal waters adjacent to NI; and,
- The territorial sea of the UK adjacent to NI.

During the second stage debate of the Bill, a question arose as to its precise definition of "hydraulic fracturing". The analysis above identified that the literature on hydraulic fracturing draws a distinction between high and low volume hydraulic fracturing. It also noted that UK Infrastructure Act 2015 included a definition of hydraulic fracturing, which defined the activity within the context of the based on specified volumes of fracturing fluid. That definition in the 2015 Act was not without criticism when introduced. For example, it was argued 43% gas wells hydraulically fractured in the US between 2000 and 2010 would not be defined as hydraulic fracturing under the chosen definition. The Committee for the Economy therefore may wish to seek the views of the DfE and other stakeholders as to whether the OF Bill, as introduced, sufficiently defines specific types of prohibited hydraulic fracturing, which would ensure legal certainty in its application.

The analysis above also noted that:

- The OF Bill, as introduced, proposes to prohibit onshore hydraulic fracturing in NI. Under the OF Bill's provisions this prohibition would not include the internal waters adjacent to NI. The Petroleum Act 1964 vested rights to petroleum found in both onshore NI and the internal waters adjacent to NI in the DfE. The Committee for the Economy may wish to seek OF Bill's proposed hydraulic fracturing prohibition extends to all relevant geography, given the Bill's underlying legislative intent. That should be viewed in the context of the RoI legislation prohibiting hydraulic fracturing in both onshore and in the internal waters in that jurisdiction.

- The OF Bill, as introduced, proposes to make onshore hydraulic fracturing unlawful in NI. It, however, does not set out any penalty for breaching the prohibition. The RoI legislation sets out penalties for breaching the prohibition. Other examples of penalties were identified in state level prohibitions in the US and Australia, at subsection 2.2. The Committee may wish to see views as to whether similar penalties would be appropriate in NI.

The DfE has commissioned research into the economic, environmental, health and social aspects of UOG exploration in NI. At the time of writing this Paper, the Hatch Report had not been published. The Minister for the Economy noted during the second stage debate on this Bill that the findings of that research had led the Minister toward a "preferred option of introducing a moratorium and eventual ban on all forms of onshore petroleum exploration and production". That conclusion was reached on the basis of limited anticipated economic benefits from exploration and a desire to remove negative "societal and environmental effects".

In the absence of the Hatch Report, this paper's analysis relied on other sources of information, particularly studies from Scotland and Wales, to examine the potential fiscal and broader impacts of prohibiting hydraulic fracturing in NI. Those analyses found:

- In Scotland, research found that UOG has potential both to increase government revenue and to stimulate economic growth and job creation.
- Similar research in Wales demonstrated potential economic and job creation benefits.
- Despite the noted findings, neither jurisdiction has chosen to support UOG development.
- In England, a NAO examination of public expenditure on hydraulic fracturing identified "known costs" estimated at £32.7 m between 2011 and 2020. Those costs have been incurred by a range of public bodies including the Business, Energy and Industrial Strategy, the British Geographical Survey and police forces, despite no commercial extraction of UOG in the region.
- Academic and regulator literature on the use hydraulic fracturing for UOG development identifies a number of potential benefits and harms, including environmental, social and health benefits/harms.
- From an emissions perspective, whether UOG was viewed as a benefit or harm depended on what alternative fuel it was examined against. For example, relative to coal, UOG was seen to have emissions benefits. Conversely, UOG was seen to lead to greater greenhouse gas emission, when compared to conventional natural gas.
- There have been recent calls on the United Kingdom Government (UKG) to reassess its policy moratorium on hydraulic fracturing. Such calls for change cite energy security amongst the reasons that a change in policy might be desirable. Those calls should be seen against a backdrop of unstable global energy markets

and diminished domestic natural gas supplies in the UK. Despite that context, the UKG has not changed its position on UOG or hydraulic fracturing in England.