

Proposed Prohibition of Fracking etc. (Scotland) Bill

A proposal for a Bill to ban unconventional oil and gas extraction, including by means of hydraulic fracturing.

Consultation by Claudia Beamish, MSP for South Scotland

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FOREWORD

The purpose of this proposal is to consult on the banning of the onshore extraction of unconventional oil and gas, including by means of hydraulic fracturing, often referred to as fracking. Unconventional oil and gas extraction - referred to in this document by the generic label UOG - encompasses shale oil, shale gas, coalbed methane, and underground coal gasification.



Onshore extraction is understood to cover all oil and gas resources that are located in the Scottish onshore area, which includes all land within the low-tide line, plus major estuaries (including the Firth of Forth).

There are a range of reasons why many stakeholders and communities do not think it is appropriate to proceed with on-shore UOG. There are also reasons why others think that on-shore UOG should be able to take place.

My reasons for proposing a ban on UOG are specific and evidence based. They are principally about the imperative need to tackle climate change.

At a global level, the climate change science is now irrefutable. Climate change is happening fast and it is created by us - humankind. As a result of the science and its starkly real impacts, the majority of the global community agreed in Paris last year to limit global temperature rises to well below 2°C above a pre-industrial baseline, and to pursue efforts to keep temperatures within a 1.5°C limit.

The impacts are, of course, already being experienced by us all here in Scotland - more extreme weather patterns, more frequent and serious flooding, coastal erosion, and changes in our wildlife, their habitats and migration patterns.

In this global and Scottish context, Scotland has set a range of challenging greenhouse gas emissions targets - both annual and long term¹. We also have the Reports on Proposals and Policies with the third of these - The Climate Action Plan - to be laid before the Scottish Parliament and scrutinised early in 2017.

In October 2016, the Scottish Government agreed not to include underground coal gasification in its future energy mix. This is only part of the UOG picture, however - other forms of UOG including hydraulic fracturing, are still only suspended by temporary moratorium.

This approach simply prolongs the uncertainty for communities and businesses across Scotland, particularly in areas known to have potential for UOG. The scientific basis for banning UOG already exists, and I believe there is no need to wait any longer.

My proposed Member's Bill puts forward an alternative path for consideration and scrutiny. Taking account of both the Scottish and global contexts, I am clear that it would not be appropriate to allow another form of oil and gas extraction here in Scotland. This paper will demonstrate how the exploitation and burning of further oil and gas reserves without any current commercially viable method of storing the carbon dioxide (CO₂) emissions created, together with fugitive emissions of other greenhouse gases from the extraction process, and the potential displacement of the development of renewables, will all create barriers to Scotland transitioning to a low carbon economy.

UOG is not a transition technology for Scotland. There is no need for it in Scotland in the challenge to reduce emissions and provide energy for our country. I am clear that on the grounds of the climate change science alone, there should be a ban on UOG because we should not start relying on a new frontier of fossil fuels. I also acknowledge the numerous other issues associated with UOG, which will be explored further in this consultation.

I would like to thank all the stakeholders who have already informed some of the thinking behind this proposed Bill.

I encourage all those with views on UOG in Scotland to take part in this consultation process - community groups, businesses, trade unions, non-governmental organisations, and individuals. Hearing views from a wide range of stakeholders will aid understanding of the issues and the best way forward. This will inform a Member's Bill that I intend to introduce in the Scottish Parliament as early as possible in 2017.

I look forward to hearing your views.

Yours

A handwritten signature in cursive script that reads "Claudia Beamish". The signature is written in black ink and is positioned below the typed name.

Claudia Beamish MSP
3rd November 2016

1. HOW THE CONSULTATION PROCESS WORKS

This consultation relates to a draft proposal I have lodged as the first stage in the process of introducing a Member's Bill in the Scottish Parliament. The process is governed by Chapter 9, Rule 9.14, of the Parliament's Standing Orders which can be found on the Parliament's website at:

<http://www.scottish.parliament.uk/parliamentarybusiness/17797.aspx>

At the end of the consultation period, all the responses will be analysed. I then expect to lodge a final proposal in the Parliament along with a summary of those responses. If that final proposal secures the support of at least 18 other MSPs from at least half of the political parties or groups represented in the Parliamentary Bureau, and the Scottish Government does not indicate that it intends to legislate in the area in question, I will then have the right to introduce a Member's Bill. A number of months may be required to finalise the Bill and related documentation. Once introduced, a Member's Bill follows a 3-stage scrutiny process, during which it may be amended or rejected outright. If it is passed at the end of the process, it becomes an Act.

At this stage, therefore, there is no Bill, only a draft proposal for the legislation.

The purpose of this consultation is to provide a range of views on the subject matter of the proposed Bill, highlighting potential problems, suggesting improvements, and generally refining and developing the policy. Consultation, when done well, can play an important part in ensuring that legislation is fit for purpose.

The consultation process is being supported by the Scottish Parliament's Non-Government Bills Unit (NGBU) and will therefore comply with the Unit's good practice criteria. NGBU will also analyse and provide an impartial summary of the responses received.

Details on how to respond to this consultation are provided at the end of the document.

Additional copies of this paper can be requested by contacting me at Claudia Beamish MSP, M1.10, Scottish Parliament, Edinburgh, EH99 1SP.

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Email: claudia.beamish.msp@parliament.scot

Enquiries about obtaining the consultation document in any language other than English or in alternative formats should also be sent to me.

An on-line copy is available on the Scottish Parliament's website (www.parliament.scot) under Parliamentary Business/Bills/Proposals for Members' Bills. This is the link here:

<http://www.scottish.parliament.uk/parliamentarybusiness/Bills/12419.aspx>

2. INTRODUCTION AND BACKGROUND

2.i What is UOG?

Unconventional oil and gas extraction

Conventional oil and gas extraction is the process by which oil or gas is pumped from the ground using natural pressure. Unconventional oil and gas (UOG) extraction describes where underground deposits cannot be brought to the surface using natural pressure alone. There are various sources of onshore natural oil and gas and various ways to extract it unconventionally.

When the issue of UOG is debated in public fora, the term “fracking” is often used to describe the processes as a whole. It’s worthwhile to note that “hydraulic fracturing” is a technique used to fracture the rock in order to extract gas. This is commonly termed “fracking”. While “fracking” is often used as shorthand to describe all UOG techniques, UOG extraction does not always involve hydraulic fracturing.

While fracking is widely used to extract shale oil and gas and coalbed methane, some of these sources can be exploited by other unconventional means as well. UOG also includes Underground Coal Gasification (UCG), which does not involve fracking; rather it is an industrial process that converts coal into syngas. As the proposed Bill covers all forms of onshore UOG, this consultation refers to ‘Unconventional Oil and Gas’ extraction, or UOG.

Methods of UOG

Shale gas and shale oil are naturally trapped within beds of shale rock, which is dense, found deep beneath the surface and, until recently, has been impossible to extract. It is extracted by drilling underneath the ground vertically to the ‘target’ strata and horizontally along the strata, and by hydraulic fracturing. “Hydraulic fracturing” means creating fractures in the rock by pumping in under high pressure a mixture of water, sand and chemicals, thus allowing the oil or gas trapped in the rock to be released to the surface where it is collected.

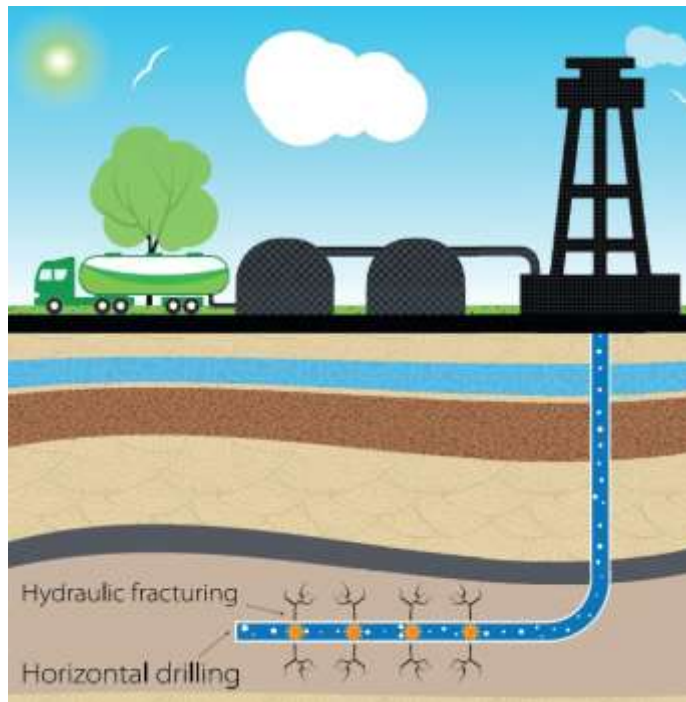
Coalbed methane (CBM) is natural gas found within coal seams that have not been previously mined because they are too deep or poor quality. If the seams are thin, and already naturally contain fractures, or fracture very easily, well designs are adapted to drain water from it, reducing the pressure and allowing methane to escape. If the seams are thicker, or deeper, and fracture less easily, then hydraulic fracturing may be required to release the gas.

Underground coal gasification (UCG) typically targets coal seams that cannot be accessed by traditional methods. It is an industrial process that involves igniting

coal while it is still underground and capturing the synthesis gas (or “syngas”) that is produced at the surface.

Onshore and offshore UOG

The new powers that are to be devolved to the Scottish Parliament (under the Scotland Act 2016) cover the licensing of “onshore petroleum”. This is understood to cover all oil and gas resources that are located in the Scottish onshore area, which includes all land within the low-tide line, plus major estuaries (including the Firth of Forth).² It does not, however, include offshore areas, meaning that in particular a legislative ban on unconventional extraction of oil and gas from existing North Sea fields will continue to be outside the Parliament’s competence.



2.ii Scottish Government Moratoria

The Scottish Government introduced a moratorium on shale oil and gas and coalbed methane developments, put in place in January 2015.³ In the meantime, it has commissioned research projects on:

- transport impacts ,
- seismic monitoring,
- site decommissioning and aftercare,
- climate change impacts ,

- economic impacts
- public health impact assessment

A separate moratorium on underground coal gasification (UCG) was introduced in October 2015, and the Scottish Government commissioned an independent examination by Professor Campbell Gemmell, former CEO of SEPA.⁴ On 6th October 2016, the Scottish Government stated it would not support UCG technology⁵ based on the findings of Professor Gemmell's report which recommended "progress towards a ban" due to the lack of research and development of the technology, regulation, and monitoring, UCG industrial performance data, community engagement, and due to the context of climate and decarbonisation objectives.⁶

2.iii The current regulatory regime

Rights to the UK's petroleum resources are held by the Crown, but the UK Government has power to grant companies exclusive licences to search and bore for oil and gas. At present there are two licensing regimes: the Oil and Gas Authority grants Petroleum Exploration and Development Licences (PEDLs) in respect of shale oil, shale gas and coalbed methane extraction and the UK Coal Authority grants equivalent licences in respect of UCG operations. Coal Authority licences, as well as PEDLs, are required for coalbed methane operations.

The new devolution settlement embodied in the Scotland Act 2016 will, however, make many changes. Its sections 47 to 49 deal with onshore petroleum, and when they come into force, the granting of licences in respect of shale oil, shale gas, and coalbed methane will fall within devolved competence. This is only the first stage of the process, however, and a company with a licence will still need other permissions before operations can begin.⁷ The further permissions needed include planning permissions from the local authority and an environmental permit from the Scottish Environment Protection Agency (SEPA). There are currently three live PEDL licences wholly or partly in Scotland, which are temporarily restricted by the Scottish Government's moratorium.⁸ If those licences are still in force when any ban comes into operation, appropriate account will need to be taken of them to consider how these licences can be made inactive.

By contrast, the granting of UCG licences remains reserved to the UK authorities under the Scotland Acts.⁹ The Scottish Government has blocked UCG from its future energy mix, and has written to the Secretary of State for Business, Energy, and Industrial Strategy inviting him to revoke the only existing UCG licence relating to exploration in Scotland, and to not issue any new licences. The Scottish Government has also confirmed that it intends to continue to use

the planning powers available to it to ensure that UCG applications do not receive planning or environmental permission.

3 Global Climate Context

In 1992 the United Nations held the first Conference on Environment and Development (UNCED). The Conference's objective was the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."¹⁰

Parties agreed the UN Framework Convention on Climate Change (UNFCCC), the first global treaty to prevent climate change. The 1997 Kyoto Protocol saw parties negotiate stronger action and legally binding commitments.

Since 2000, world leaders from the parties have met annually at Conferences of the Parties (COP) to further strengthen and advance the UNFCCC. The most recent of these meetings, COP21, was held in Paris 2015, and was considered to be a landmark in the decades of global climate negotiations.

At COP21 the global leaders of 195 countries agreed to limit "the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels."¹¹ Following ratification by over 55 countries accounting for more than 55% of global emissions, the agreement came into force on 4 November 2016, and provides a framework for global emissions reductions from 2020. The Agreement contains a mixture of legally binding and non-legally binding commitments. There are no penalties for non-compliance.¹²

The Alliance of Small Island States (AOSIS) led the campaign "1.5 To Stay Alive" for the 1.5°C target,¹³ and its subsequent inclusion in the COP21 agreement is significant.

From 1850-2015, Met Office research found the average global temperature has already risen by just under 1°C¹⁴. Even if every country delivers in full the emission reduction it is currently committed to by the Intended Nationally Determined Contributions that will only be enough to keep emissions to 2.7°C.¹⁵

3.i Scottish Climate Context

The Climate Change (Scotland) Act 2009 ("the 2009 Act") demonstrated Scotland's ambition to lead the world in steps to reduce greenhouse gas emissions. It set the target of 80% reduction in greenhouse gas emissions by 2050, with an interim target of a 42% reduction by 2020, stronger targets than the rest of the UK. Furthermore, the Act requires an annual assessment of

greenhouse gas emissions in Scotland, measured in tonnage.¹⁶ The Act also requires Scottish Ministers to:

- Establish a Scottish Committee on Climate Change, or to give an existing body this advisory function. The Scottish Government uses the UK Committee on Climate Change for this function.
- Regularly report to the Scottish Parliament on progress towards targets.
- Public bodies to have a duty to contribute to the reduction in emissions
- Further provisions – Climate Change Adaptation Programme, Land Use Strategy, plans to promote energy efficiency and renewable heat.
- A public engagement strategy and a planned spending report on the draft budget proposals to be laid before the Scottish Parliament.

As set out in the 2009 Act, a Report on Proposals and Policies (RPP) must be published to explain how it will deliver the target reductions. The third Report on Proposals and Policies, to be known as The Climate Change Action Plan, will be laid before the Scottish Parliament by the end of 2016. It will contain the plan to meet emissions reductions targets from 2028 – 2032 across all sectors.

The Scottish Government has reported an annual assessment of greenhouse gas emissions to the Scottish Parliament five times now, reporting the tonnage of emissions each year from 2010 – 2014. The first four targets were missed.

In 2016, the emissions levels for 2014 were published, showing that Scotland had met its annual climate change target for the first time. Scotland also met its 2020 target six years earlier than had been hoped for – to reduce greenhouse gas emissions by 42% - lowering emissions by 45.8% from 1990 – 2014.¹⁷

A variety of factors contributed to the target being met, including a fall in Scotland's share of the EU Emissions Trading System (ETS), a warmer than average winter, and policy decisions.¹⁸ The action taken so far has been described as “low hanging fruit,”¹⁹ and the UK Committee on Climate Change states much more must be done, particularly in sectors of transport, agriculture, and renewable heat.²⁰

The SNP manifesto for the 2016 election promised a new target of more than 50% emissions reduction by 2020²¹, which is expected to be set out in a forthcoming Climate Change Bill.

The UK climate change risk assessment predicts that Scotland will experience:

- Higher temperatures in summer and winter.
- Increased winter rainfall.
- Decreased summer rainfall.
- More extreme weather in summer and winter.

- A rise in relative sea level.²²

4. THE CASE FOR A BAN ON UNCONVENTIONAL OIL AND GAS EXTRACTION

This proposal for a Member's Bill to ban unconventional oil and gas extraction is based on the premise that the processes involved increase greenhouse gas emissions into the atmosphere and exacerbate climate change. UOG encompasses a range of new forms of extraction of oil and gas in Scotland at a time when, as a nation, we are committed to moving towards a low carbon economy.

Additionally, this proposal invites respondents to comment on the wider range of other issues relating to unconventional oil and gas extraction, set out in the sections below. These include issues regarding: water and air pollution, health, seismic activity, community, and economy.

4.i Climate Change

"You can be in favour of fixing the climate. Or you can be in favour of exploiting shale gas. But you can't be in favour of both at the same time"²³ John Ashton, former Special Representative on Climate Change to the Foreign Secretary 2006-2012.

The climate change argument against UOG is irrefutable. To limit the dangerous rise in global temperatures, Scotland has committed itself to a number of ambitious national targets and has a global responsibility to honour the international COP21 Paris agreement, including the effort to limit warming to 1.5°C. It is for these climate science, and climate justice, reasons that this Member's Bill proposes to ban the onshore unconventional extraction of shale oil, shale gas, coalbed methane, and underground coal gasification in Scotland.

The global carbon budget for 2000-2050 was estimated at 886 GtCO₂, a third of which was used up by 2011. Globally, the proven oil and gas reserves are estimated at 2795 GtCO₂ – the equivalent of nearly five times the estimated carbon budget.²⁴ What this means is that 80% of known fossil fuel reserves must not be burned unabated if we are to stay within the 2°C threshold. It goes without saying that to limit warming to the 1.5°C necessary to avoid the most disastrous consequences of global warming for low lying and small island states requires even more of these reserves to remain untouched. Scotland, indeed the UK's, UOG resource is additional to these reserves. The divergence between our reserves and our carbon budget limits is being increasingly acknowledged on the global stage. In 2013 Mark Carney, Governor of the Bank of England, urged investors to consider long term impacts on climate change, stating that

the “vast majority of reserves are un-burnable.”²⁵ The argument that Scotland should be fracked because it may be rich in gas cannot be upheld if there is a serious commitment to addressing climate change. The long term damage from exploiting this resource far outweighs any short term value that might be gained.

The burning of natural gas contributes to greenhouse gas emissions – but this is essentially the same whether the gas is extracted conventionally or unconventionally. The International Energy Agency has indicated that unconventional oil and gas extraction could see the global gas supply triple by 2035. This could result in a global temperature rise of more than 3.5°C.²⁶ Unabated, this new frontier of oil and gas would have devastating impacts around the world.

4.ii Fugitive Emissions

The UK Committee on Climate Change recognises that greenhouse gas emissions can occur at every stage of oil and gas extraction – exploration, well development, production, and decommissioning.²⁷ A significant risk associated with UOG is the unintentional leakage known as ‘fugitive emissions’. Fugitive emissions refer to the greenhouse gases that may leak into the atmosphere. The documentation on this issue is at an early stage, yet evidence from the USA suggests system leaks are commonplace.²⁸ The greenhouse gas at risk of leaking is methane – a gas significantly more potent than CO₂ over a shorter time period. The most recent IPCC assessment found that one tonne of methane is equivalent to 28-34 tonnes of CO₂ over a 100-year period. It has been estimated that if UOG involved a 3% level of extraction leakage, it would have a more damaging climate impact than coal.²⁹ While there is uncertainty over the level of methane leakage, the potential threat to our climate cannot be ignored. Further uncertainty surrounds “super-emitters” – occurrences of significant methane leakage over significant periods of time³⁰, the characteristics of which the UK Committee on Climate Change acknowledges are “not currently fully understood.”

4.iii A Transition Fuel?

It has been claimed that unconventionally extracted gas could act as a transition fuel, to ease the move to a low carbon economy by substituting coal with gas. In Scotland, the last Scottish coal power station closed in March 2016.³¹ Across the rest of the UK, with which we share a national grid, all coal-fired power stations should be closed by 2025, unless they are fitted with Carbon Capture and Storage technology.³²

A UK unconventional gas extraction industry survey in 2014 found 64% of stakeholders believed it would take “at least a decade for shale gas exploitation to make a meaningful impact,”³³ by which point unabated coal-fired power generation should be phased out. Furthermore, in 2014 the total “gas-in-place” central estimate of the Midland Valley, Scotland, is relatively small (2.27 trillion cubic metres) and it is not known how much of this resource is extractable. It is therefore open to question as to whether the development would be economically viable. This uncertainty and the incompatible timescales remove the possibility for UOG to act as a positive emissions reduction mechanism, or transition fuel. Instead, UOG industry in Scotland could compete with North Sea production.^[iv] Furthermore, it could risk displacing the development of renewables.

4.iv Renewables

Renewables are unlimited sources of energy from wind, hydro, wave, solar, tidal, biomass, and geothermal. While oil and gas stocks are depleting and emit harmful greenhouse gases, renewable energy is sustainable and does not directly contribute to rising global temperatures, although emissions will result from manufacturing and installing renewables infrastructure.³⁴ Development of renewable energy is considered vital in the prevention of climate change.³⁵

Scotland has significant capacity for renewable energy. While Scotland accounts for only 10% of the UK’s total energy consumption³⁶, it produced 29% of the UK’s renewable energy in 2014.³⁷



The Scottish Government has set a number of renewables targets to hit by 2020:

- 30% of total energy consumption to be from renewables
- 100% of electricity demand to be met from renewables
- 11% of non-electrical heat demand to be met from renewables
- 10% of transport demand to be met from renewables
- 12% reduction in energy consumption.

In 2013, 13.1% of Scotland's total final energy consumption came from renewable sources. Scotland has achieved greatest success in the development of renewable electricity, with 49.7% of gross electricity consumption produced by renewables in 2014.³⁸ Renewables also became the largest source of electricity in 2014, for the first time generating more than nuclear and oil and gas.³⁹ Despite these successes, Scottish Renewables predicts the Scottish Government will miss its 2020 target for electricity.⁴⁰

The Scottish Government has made considerably less progress with renewable heat. In 2015 Scotland met at least 5.3% of heat demand from renewable sources⁴¹. Renewable heat has quadrupled from 2009 – 2014⁴², yet Scotland is still well below the European average of 16.5%.⁴³ Of Scotland's total energy use, heat accounts for 52%, compared to electricity 25%, and transport 24%, which demonstrates the scale of the challenge ahead.⁴⁴ Scottish Renewables predict the Scottish Government will miss the 2020 target for non-electrical heat.⁴⁵ Research published by WWF Scotland, Friends of the Earth Scotland, and RSPB Scotland suggests that by 2030 Scotland will need to be generating 40% of heat demand from renewables, if we are on the most cost-effective path for meeting our climate change targets.⁴⁶



The renewables sector supports the employment of 21,000 people, and brings £1billion per year in investment. The sustainable nature of the industry implies future growth, and in a 2013 sample of existing renewables organisations in Scotland, 54% considered their employment would increase while only 1.6% felt their employment would decrease⁴⁷

One study found a £32billion capital investment in shale gas could displace 21GW of onshore wind capacity.⁴⁸ This could reduce the appetite for innovation and investment in the renewables sector, leaving Scotland behind in the flourishing low carbon market.⁴⁹

4.v Carbon Capture and Storage

Carbon Capture and Storage (CCS) is the technology to capture, transport, and store carbon dioxide emissions caused by the burning of coal and gas, rather than releasing this damaging greenhouse gas into the atmosphere. This carbon abatement technology can capture up to 90% of CO₂ emissions at source⁵⁰, which are then stored in an underground site.

The Intergovernmental Panel on Climate Change states that CCS will be necessary if we are to meet emission reduction targets. A recent report from the Parliamentary Advisory Group on CCS states that with urgent action CCS still holds significant climate mitigation potential, stating “There is no justification for delay.”⁵¹

However, the slow progress of CCS has raised concerns that it is now too late for worthwhile development to prevent climate change.⁵² Despite the promise, integrated, large scale CCS progress has been insufficient here and around the world. In the UK, fluctuating support from the UK Government has stalled any advancement. In November 2015, the UK Government withdrew the CCS Competition funding of £1billion, making the possibility of CCS development in the UK for the foreseeable future remote.

Without its immediate development, carbon budgets will call for significant reductions in UK and European gas consumption beyond 2050⁵³. While the future of CCS development is uncertain, it cannot be seen as a “panacea”⁵⁴ that justifies the development of a new onshore unconventional oil and gas extraction industry.

4.vi Biodiversity

Scotland is committed to an ambitious Biodiversity Strategy to protect and restore species and habitats across the country. Under this strategy, the United

Nations Aichi Targets, and the European Union Biodiversity Strategy, Scotland has a 2020 target to take six Big Steps for Nature; ecosystem restoration; investment in natural capital; quality greenspace for health and education benefits; conserving wildlife in Scotland; sustainable management of land and freshwater; sustainable management of marine and coastal ecosystems.⁵⁵

Nature's contribution to the well-being and prosperity of Scotland should not be undervalued. Scottish biodiversity contributes £21.5 billion to the economy, and insect pollination services alone are valued at £43million per year.⁵⁶ Some of the biggest risks to biodiversity are pollution, land use modification, and climate change. The physical development footprint required for well pads, roads, and other UOG associated infrastructure can have significant impacts on habitat loss or fragmentation. Drilling, construction, and increased vehicle and people activity⁵⁷ causes sound, light, and water pollution that disturbs sensitive species and habitats.⁵⁸

Furthermore, this paper has already highlighted the threat UOG poses to our climate, and the resulting shift in weather patterns and sea level can disturb habitats and species far beyond Scotland. UOG development in Scotland risks a reduction of the diversity and connectivity of our habitats.

5. Water Issues and Pollution

There is a body of academic work documenting water pollution as a result of unconventional oil and gas extraction. Firstly, there is documented evidence to show that there is a risk of polluting groundwater as a result of errors in the construction of drills and wells leading to accidents. There is also uncertainty over the chemical content of waste 'flow-back fluid' that returns back to the surface. This can be highly toxic, saline and include naturally occurring radioactive materials (NORMS) as a result of the UOG process and must be treated and disposed of properly. Finally, the pressure on increasingly scarce water resources is increased by the volumes of water used for unconventional gas extraction.

5.i Chemical content of hydraulic fracturing liquid

The drilling and hydraulic fracturing fluids used in unconventional gas operations generally contains a cocktail of chemicals and silica sand used to lubricate the water, carry the gas to the surface, and prop the fractures in the ground apart in order for the gas to escape. Different mixtures of chemicals are used depending on the company involved and the geological makeup of the area. Companies have traditionally been loath to release a lot of detail on the content of the liquid they use. However, some information is available on the

chemical makeup of the water, and the American Environmental Protection Agency recently published a summary of chemicals used in USA operations.⁵⁹

A 2012 US study gathered information on reported chemicals from Material Data Safety sheets of 944 drilling and hydraulic fracturing products. Of the 353 chemicals amongst these that could identified by Chemical Abstract Service (CAS): 75% could affect the skin, eyes, and other sensory organs, and the respiratory and gastrointestinal systems; 40-50% could affect the brain, nervous, immune and cardiovascular systems, and the kidneys; 37% could affect the endocrine system; and 25% could cause cancer and mutations.⁶⁰

There is evidence to show that in the USA hydraulic fracturing liquid has been found in water sources in surrounding areas. Hydraulic fracturing and other oil and gas operations contaminated groundwater in Pavillion, Wyoming, according to a study by Stanford University scientists.⁶¹ The findings raise concerns about possible water pollution in other heavily fracked and geologically similar communities in the U.S. West.



There is also evidence of ‘produced water’, which is water from ancient underground lakes pushed to the surface by UOG activity, containing a variety of toxins and carcinogens including BTEX chemicals (Benzene, Toluene, Ethyl benzene and Xylene) and even naturally occurring radioactive materials (NORMS) which can contaminate surrounding areas. A February 2011 study in the New York Times,⁶² based upon thousands of internal documents from the

Environmental Protection Agency, state regulators, and drillers, found never-reported studies by the EPA and a confidential study by the drilling industry that both concluded that radioactivity in drilling waste cannot be fully diluted in rivers and other waterways. The New York Times found that of more than 179 wells producing wastewater with high levels of radiation, at least 116 reported levels of radium or other radioactive materials 100 times as high as the levels set by federal drinking-water standards. At least 15 wells produced wastewater carrying more than 1,000 times the amount of radioactive elements considered acceptable. In the UK, Cuadrilla withdrew applications for permits for UOG in Lancashire after evidence showed that water produced from its activities found levels of radium 90 times higher than naturally occurring levels in drinking water.⁶³

5.ii Pathways for groundwater pollution

There are a number of pathways that can lead to contamination of groundwater from the migration of chemicals introduced or mobilised by the UOG process, including faulty well construction, well failure over its lifetime, naturally occurring and induced fractures, as well as through accidents, spills and explosions, all of which are difficult, expensive and dangerous to clean up.⁶⁴ The majority of hydraulic fracturing activity has taken place in the United States, and an Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources (Environmental Protection Agency 2015) noted that there were 151 known cases in which fracturing fluids or chemicals spilled on or near a well pad, with a median volume of 1,600l per spill. Causes included equipment failure, human error, failure of container integrity, and others (e.g. weather and vandalism), with the most common being equipment failure - more than 30% of the spills were from fluid storage units.⁶⁵

Recent evidence from the US suggests that between 7-9% of shale gas wells fail within the first three years of drilling.⁶⁶ In the longer term, offshore oil and gas failure rates do not suggest a promising future for the longer-term integrity of onshore UOG with a 2006 Norwegian Petroleum Safety Authority study published in 2010 indicating that 18% of wells had integrity issues and a further 7% had been shut down because of such problems.⁶⁷ A study from the Gulf of Mexico found similar well failure rates within a year of drilling to the shale industry with 6% failing in the first year, but wells of over 15 years old experienced a 50% failure rate.⁶⁸ Given that hundreds of thousands of wells are required for commercially viable operations, failure rates such as these could equate to hundreds of leaking wells across the country should the industry be allowed to proceed.

There is also a real risk that pollution could occur by way of naturally occurring faults and fractures. This is perhaps particularly the case with CBM and UCC

given the higher porosity of coal and the occurrence of naturally occurring cleats and faulting and a history of mining in the Midland Valley of Scotland.

There is also a real concern that some accidents are impossible to completely clean up, and that there are long term, and unforeseen effects of introduced and naturally occurring chemicals mobilised by the UOG process seeping into the surrounding land is compounded by excessive water withdrawals.

5.iii Pressure on water resources

Although Scotland does not generally suffer from water scarcity, it is still vulnerable to water shortages caused by prolonged periods of dry weather. Uncertainty over water resources in Scotland is likely to increase with changes in weather patterns as a result of climate change. In its Water Scarcity Plan, SEPA spell out that water is a finite resource that must be protected and any attempts by organisations to put pressure on those resources must be very carefully monitored. ^[iii]

Additionally, the last Environment Agency report on water stress in England showed that several areas are now classed as being under serious water stress. As demand for water in the south east of England increases and the supply diminishes, more pressure will be put on the UK as a whole. ⁶⁹ Each stage in a multi-stage fracturing operation requires around 1,100-2,200 m³ of water, so that the entire multi-stage fracturing operation for a single well requires 9,000-29,000m³ (9-29 million litres) of water⁷⁰.

6. Air Pollution

There is a relatively large body of evidence to suggest that UOG leads to increases in air pollution. As wider issues of methane and CO₂ emissions have been discussed previously, this section will deal exclusively with other forms of air pollution caused by UOG.

Volatile organic compounds (VOCs) are organic compounds that easily become vapours or gases. Along with carbon, they contain elements such as hydrogen, oxygen, fluorine, chlorine, bromine, sulphur or nitrogen. UOG processes and other stages of the oil and gas production process release nitrogen oxides and VOCs, which react in the presence of sunlight to form ozone ('smog').⁷¹

Hydraulic fracturing fluid flow-back not only contains the chemical additives used in the drilling process but also contains heavy metals, radioactive materials, VOCs and hazardous air pollutants (HAPs) such as benzene, toluene, ethyl benzene and xylene.

UOG companies dispose of the waste fluid and gas brought to the surface by flaring and venting it into the atmosphere, 'dewatering' through evaporation, and the use of condensate tanks. Uintah County, Utah, home to one of the highest-producing oil and gas fields in the country, experienced dangerously high levels of VOCs and resultant ozone. In 2013 VOC emissions were calculated to be the equivalent of emissions from 100 million automobiles.⁷² Finally, there is the risk of fugitive emissions of VOCs as part of the process.



6.i Transport

Significant air pollution emissions come not only from natural gas drilling and processing operations, but from transportation.⁷³ Each hydraulic fracturing event requires on average an estimated 5 million gallons of water in addition to large quantities of proppants and chemicals. Based on fluid transportation and other well-pad activities (e.g. construction, equipment), a total of 3,950 heavy and light-duty truck trips are required for each horizontal well, given that each well can be hydraulically fracked multiple times during its productive life. Fine diesel particulate matter, as well as nitrogen oxides and VOCs, are emitted into the atmosphere during transportation.

There have also been concerns raised about the effect of noise pollution from transportation around sites. This is particularly the case if there are night-time movements, but frequent daytime heavy vehicle movements are also stressful due to perceived and actual threats to safety, loss of access for walking and cycling, and increased congestion⁷⁴, particularly on small rural roads.

7. Health

There is a growing body of evidence of potentially very serious public health impacts for communities living in and around gas fields, as well as workers in the industry. There remain significant gaps in understanding the full extent of short and long-term risks to public health from the UOG industry. This is a substantial factor in the decision of the Governor of New York State to ban hydraulic fracturing.⁷⁵ The authors of a study from Cornell University warn that the gas boom is an uncontrolled health experiment on an enormous scale⁷⁶.

In 2015 the British Medical Journal published a letter signed by twenty prestigious doctors, pharmacists and public health academics, arguing against fracking on a precautionary principle to protect public health.⁷⁷

Health risks linked to the industry include: low birth weights and congenital disorders; adverse reproductive health impacts; increased respiratory disease; mental health and wellbeing; as well as longer-term risks of cancers.

There are a number of studies linking UOG to low birth weights and congenital defects in babies born to mothers living within the vicinity of drilling operations. A University of Pittsburgh study found that the greater the exposure to gas wells in terms of proximity and density, the higher the risk of mothers giving birth to low weight babies.⁷⁸ A working paper from Cornell University looked at birth weight outcomes in pregnant mothers living within 2.5 km of a gas well and found that the incidence of low birth-weight increased by 25%.⁷⁹ A subsequent study built on this work by examining birth records in Pennsylvania between 2004 and 2011 (but yet to be peer-reviewed) backed up the Cornell findings, and found that the risk of low birth-weight is doubled in infants born within a 2.5km radius of gas drilling sites.⁸⁰ Airborne particulates have been identified as the likely route of exposure in terms of these impacts.

Air samples taken near a closed-loop UOG operation in Colorado found spikes in polycyclic aromatic hydrocarbons (PAHs) during drilling and fracking stages. The health effects of exposure to these chemicals can impact: skin, eyes and sensory organs; the respiratory system; the gastrointestinal system; the brain and nervous system; the immune system; kidney function; cardiovascular function and blood; cancer risk and tumorigenesis; genotoxicity; the endocrine system; the liver and metabolic system. The same study also detected a large number of volatile organic compounds including high levels of methane and methylene chloride.⁸¹

Communities living near CBM fields in Australia complain of respiratory problems, rashes and irritated eyes. An investigation by a concerned GP in early 2013 of 38 households in close proximity to 21 coalbed methane wells in Tara, Queensland, found that 58% of residents reported definite adverse health effects related to gas drilling and a further 19% were uncertain. Symptoms include breathing difficulties, rashes, joint and muscle pains, nausea and vomiting, and spontaneous nosebleeds, and are consistent with exposure to naturally occurring chemicals which are commonly used in drilling and fracking operations in the unconventional gas industry⁸².



Researchers from the National Oceanic and Atmospheric Administration (NOAA) and the University of Colorado found that gas operations were leaking highly toxic and carcinogenic benzene into the air, and inferred from this pilot study that both methane and non-methane emissions are highly likely to be underestimated in inventories.⁸³ A recent health risk assessment of air emissions showed residents living a half-mile or less from gas wells are at a greater risk of adverse health effects than those living more than a half-mile away. It was found that sub chronic exposures to air pollutants during well completions pose the greatest risk, with benzene being the major contributor to cumulative cancer risks.⁸⁴

Mining the large amounts of silica sand needed for fracking liquid releases large amounts of silica dust into the atmosphere, prolonged exposure to which can cause lung cancer, pulmonary tuberculosis, autoimmune disorders, chronic renal disease, and other adverse health effects.⁸⁵ The Trade Unions Congress notes silica as a considerable health risk for drill site workers, alongside exposure to other chemical cocktails, moving equipment, and the risk of explosion through the release of hydrocarbons.⁸⁶ In the US, fracking workers are more than seven times as likely to die on the job as other types of workers.⁸⁷

Finally, the development of an unconventional oil and gas extraction site can result in continuous activity, potentially for years at a time,⁸⁸ which can have a negative impact on mental health and wellbeing due to the sustained noise, light, or odour pollution and disturbance.⁸⁹

While much of this research is from global perspectives and may not neatly apply to Scotland's context of geology and regulation, the precautionary principle must apply when the potential risks are so concerning.

8. Communities

This proposal highlights a range of the issues that would impact communities – health issues, seismic activity, water, air and noise pollution, loss of biodiversity, and namely the impacts of climate change.

In February 2016, figures from the Department of Energy and Climate Change showed support for unconventional oil and gas extraction was falling. Of those who knew a lot about it, 53% oppose UOG and 33% support it.⁹⁰ Despite this, the UK Government still purports to be “all out for shale,”⁹¹ and the Scottish Government has abstained from a final decision,⁹² and only recently changed policy on UCG.

Historic experience with the fossil fuel extraction industry could leave communities without confidence in local planning procedure and protections. The liquidation of opencast coal companies left host communities across Central Scotland with unrestored sites scarring the landscape, as well as a range of other problems regarding unemployment and the environment.⁹³ It was estimated in 2013 that at least twelve opencast mines remain delayed or abandoned in Scotland, including Chalmerston mine which ended production in 1998.⁹⁴ Regulation of opencast mining had to be dramatically tightened over the years in relation to proximity to settlements, dust and noise pollution, water issues, traffic concerns and visual blight. During this process of planning and regulatory tightening, many people were exposed to stress and challenging circumstances. There would be significant cost of developing a robust regulatory regime. Regulators are already under pressure from cuts, and it is

unclear how this would be funded. Communities have a right to be concerned by further unconventional oil and gas extraction development.

While unconventional oil and gas extraction in Scotland is either under moratorium or blocked by policy, the UK offers alarming examples of the disregard for community voices. In 2014 the UK Government incentivised councils to support unconventional oil and gas plans by offering them 100% of business rates from operations, a significant rise from 50%.⁹⁵ Most recently, the UK Government approved plans for hydraulic fracturing at Preston New Road site in Lancashire, despite community and council rejecting the application last year.^{96 97} Many communities and activists have anecdotal experience of the fight to protect their local environment, and their voices should not be undermined again.

In 2015, the Information Commissioner compelled the UK Government Department for Environment, Food and Rural Affairs to publish a Rural Economy Impacts Report. The report stated that property value in proximity to drilling sites was likely to fall, and property within one mile of the site had potential to fall as much as 7%.⁹⁸ Ministers were quick to discredit this report, but a recent study on the impact of drilling in a licensed UOG site in Lancashire found a house price drop of 2.7-4.1% within a much greater radius of 30km⁹⁹, particularly due to the threat of earthquakes and additional insurance costs.¹⁰⁰ This is an important concern to both the wider economy, and people's personal finances, for which a loss on their property value would be distressing.

9. Seismic Activity

Unconventional gas extraction around the world has had alarming seismic effects. High pressure injection of water has been found to induce seismicity that would not naturally occur. The greatest seismic threat results from the re-injection of waste fluids, and a large body of the research undertaken is based on United States case studies. Management of flowback fluid during the hydraulic fracturing process can also lead to seismic activity, as demonstrated by the 2011 earthquakes that halted Cuadrilla's Preese Hall fracking operations in Lancashire.

The United States Geology Survey 2011 stated that due to UOG and wastewater disposal, earthquakes are 100 times more likely to occur now than in 2008.¹⁰¹ Data from the US National Earthquake Information Center shows Oklahoma experienced 842 earthquakes in 2015, compared to a historical average of two a year.¹⁰²

The UK Government currently predicts that the risk of seismic activity from hydraulic fracturing is low,¹⁰³ largely due to differing geologies and industry

regulations. However, there have been concerning instances – unconventional gas extraction in Lancashire was found to cause 50 small seismic events over eight months,¹⁰⁴ the two most notable quakes measuring 2.3 and 1.5 on the Richter scale.¹⁰⁵ Further research is examining the cumulative impact that a number of small earthquakes may have on existing fault lines, and although there is little understanding of this so far, this is a serious concern to the surrounding people and property.

Given the limited number of waste treatment facilities in the UK capable of handling waste fluids from fracking operations, and the challenging logistics involved with managing flow-back fluid, storage, transportation to appropriate facilities, there is potentially serious risk of induced seismic activity from UOG operations. It should be noted that while smaller earth tremors may not be felt by the local population, the risk of damage to well integrity and knock on consequences of leaks remain.

10. Economy

The economic case for unconventional gas is often overstated by industry and politicians. Jobs and investment figures quoted tend to be from the most optimistic scenarios, using production scenarios based on key ‘sweet-spots’ in the US. While the US is predicted to become a net exporter of gas by 2017¹⁰⁶, comparisons to the Scottish context may be inappropriate for a number of reasons, including geology and population density.¹⁰⁷ The estimated cost of drilling a shale gas well in Europe varies between \$6.5 and \$14 million, compared to \$4 million on the Marcellus in the US, in part due to differences in the availability of rigs and drilling services.¹⁰⁸ In 2015 Shell announced it would not invest in UK shale gas due to high cost, geology and access issues.¹⁰⁹

Unconventional oil and gas extraction job estimates range from lowest estimate 2,500 and high activity scenario 16,000 (DECC, 2013¹¹⁰), to the optimistic 74,000 (Institute of Directors, funded by Cuadrilla¹¹¹). Industry figures tend to focus on jobs during peak times, not the longer term production phase. The Regeneris report for Cuadrilla claimed 1,700 jobs would be created in Lancashire,¹¹² but this is for one year only, and this figure falls to less than 200 jobs after three years. This is because the majority of the jobs are in the drilling phase. Furthermore, there is uncertainty over how many of the available jobs will be filled locally. In the Preese Hall Lancashire test site, only 17% of jobs went to local people, and were in non-specialist sectors.¹¹³

In addition, there are potentially adverse effects on existing jobs in agriculture, tourism, food and drink, and others impacted by real and perceived damage to ‘brand Scotland’. The loss of land value is a concern, and research in Australia found that for every 10 new gas jobs, 18 agricultural jobs were lost.¹¹⁴

As highlighted earlier in this document, unconventional oil and gas extraction would be additional competition to both the existing North Sea production and the renewables sector. In the context of our climate targets and the Paris Agreement's aim to limit warming to 1.5°C, and the timescales involved in developing the unconventional oil and gas industry, it does not make economic sense for Scotland to invest in the infrastructure needed for UOG.

11. Offshore Hydraulic Fracturing

Hydraulic fracturing has been used in offshore unconventional oil and gas extraction in the North Sea since the late 1970s. Due to the amount of existing exploration data and the infrastructure of the oil and gas fields are well developed. In offshore operations, hydraulic fracturing is primarily used in the well completion phase to optimise production and enhance security of the well.¹¹⁵

This Member's Bill proposal does not include offshore unconventional oil and gas extraction. While there are environmental and climate implications to offshore UOG,¹¹⁶ this Member would propose that it is relatively preferable that the known reserves of North Sea oil and gas are exploited, rather than a new frontier of fossil fuels be opened with the launch of unconventional oil and gas extraction onshore. This route is more in line with the gradual and just shift to a low carbon economy. It also recognises the importance of supporting the offshore oil and gas sector, working to continue exploration and maximise economic recovery on the basis of protecting employment, terms and conditions of offshore workers, and the related onshore supply chain.

Onshore unconventional oil and gas extraction additionally raises issues in relation to communities, homes, and the other issues highlighted in this proposal which are not relevant to offshore exploitation, and would require the development of a robust new regulatory framework for a relatively short time.

12. EQUALITIES ISSUES

There have been no particular positive/negative impacts of the proposal identified on any of the protected groups (under the Equality Act 2010) at this stage.

13. SUSTAINABLE DEVELOPMENT

Sustainability lies at the heart of this proposal. The UN's World Commission on Environment and Development defines Sustainable Development as "development which meets the needs of the present without compromising the ability of future generations to meet their own goals". I believe, based on the evidence in this consultation document, that pursuing methods of unconventional oil and gas extraction would have significant negative impacts for future generations - impacts which outweigh any perceived benefits that could possibly be achieved in the short term. Negative and potentially harmful impacts on climate change, air quality, water quality and communities are all strong examples which show that pursuing unconventional oil and gas extraction is not a sustainable policy and does not fit with sustainability principles and objectives.

14. FINANCIAL IMPLICATIONS

As there is no current UOG activity in Scotland, and moratoriums are currently in place, a legislative ban would not have any direct or immediate financial implications.

In a wider context, the financial implications of a ban need to be assessed by reference to the likely costs and benefits of allowing UOG to proceed. Those who advocate UOG would of course claim that UOG has the potential to create jobs, boost economic growth, and make energy cheaper. These claims are countered throughout this consultation, however, and it also provides evidence of the negative effects UOG would have on the climate, air quality, water quality, the environment and communities. While these are not easy to quantify in financial terms, my belief is that they would more than outweigh any positive financial impact of UOG.

11. QUESTIONS

Section 1

ABOUT YOU

1. Are you responding as:

- an individual - in which case go to Q2A
 on behalf of an organisation- in which case go to Q2B

2A. Which of the following best describes you? (If you are a professional or academic, but not in a subject relevant to the consultation, please choose “Member of the public”.)

- Politician (MSP/MP/peer/MEP/Councillor)
 Professional with experience in a relevant subject
 Academic with expertise in a relevant subject
 Member of the public

2B. Please select the category which best describes your organisation:

- Public sector body (Scottish/UK Government or agency, local authority, NDPB)
 Commercial organisation (company, business)
 Representative organisation (trade union, professional association)
 Third sector (charitable, campaigning, social enterprise, voluntary, non-profit)
 Other (e.g. clubs, local groups, groups of individuals, etc.)

3. Please choose one of the following:

- I am content for this response to be attributed to me or my organisation

Please provide your name or the name of your organisation as you wish it to be published:

Name:

- I would like this response to be anonymous (the response may be published, but no name)
 I would like this response to be confidential (no part of the response to be published)

4. Please provide details of a way in which we can contact you if there are queries regarding your response. (Email is preferred but you can

also provide a postal address or phone number. We will not publish these details.)

Contact details:

Section 2

YOUR VIEWS ON THE PROPOSAL

Aim and approach

- 1. Which of the following best expresses your view of the proposal to ban onshore unconventional oil and gas extraction in Scotland?**

- Supportive
- Neutral (neither support nor oppose)
- Opposed
- Unsure

Please explain the reasons for your response.

- 2. Which of the following best expresses your view of the following statement that could be made about unconventional oil and gas extraction in Scotland: “We should be investing in renewables instead of any new fossil fuel sources”**

- Agree
- Neutral (neither agree nor disagree)
- Disagree
- Unsure

Please explain the reasons for your response.

- 3. Which of the following best expresses your view of the following statement that could be made about unconventional oil and gas extraction in Scotland: “This is a valuable new source of energy that could stimulate the economy and create jobs”**

- Agree
- Neutral (neither agree nor disagree)
- Disagree
- Unsure

Please explain the reasons for your response.

4. Which of the following best expresses your view of the following statement that could be made about unconventional oil and gas extraction in Scotland “There are too many risks relating to pollution of the earth, water and air, and increased seismic activity.”

- Agree
 Neutral (neither agree nor disagree)
 Disagree
 Unsure

Please explain the reasons for your response.

5. Which of the following best expresses your view of the following statement that could be made about unconventional oil and gas extraction in Scotland “It could be a useful transition fuel in the move towards a low-carbon economy”

- Agree
 Neutral (neither agree nor disagree)
 Disagree
 Unsure

Please explain the reasons for your response.

6. What do you think would be the main advantages, if any, of banning unconventional oil and gas extraction?
7. What do you think would be the main disadvantages, if any, of banning unconventional oil and gas extraction?
8. Do you think that there are other steps which could be taken (either instead of, or in addition to, legislation) to achieve the aims of the proposal?

Financial impact

9. Taking account of both costs and potential savings, what financial impact would you expect the proposed Bill to have on:

(a) Government and the public sector

- Increase in cost
 Broadly cost-neutral
 Reduction in cost
 Unsure

(b) Businesses

- Increase in cost
- Broadly cost-neutral
- Reduction in cost
- Unsure

(c) Individuals

- Increase in cost
- Broadly cost-neutral
- Reduction in cost
- Unsure

Please explain the reasons for your response.

Equalities

10. What overall impact is the proposed Bill likely to have on the following protected groups (under the Equality Act 2010): race, disability, sex, gender re-assignment, age, religion and belief, sexual orientation, marriage and civil partnership, pregnancy and maternity?

- Positive
- Neutral (neither positive nor negative)
- Negative
- Unsure

Please explain the reasons for your response.

11. In what ways could any negative impact of the proposed Bill on any of these protected groups be minimised or avoided?

Sustainable development

12. Do you consider that the proposed Bill can be delivered sustainably (without having a disproportionate adverse economic, social and/or environmental impact in the longer term)?

- Yes
- No
- Unsure

Please explain the reasons for your response.

General

13. Do you have any other comments or suggestions on the proposal to ban unconventional oil and gas extraction, including by means of hydraulic fracturing?

HOW TO RESPOND TO THIS CONSULTATION

You are invited to respond to this consultation by answering the questions in the consultation and by adding any other comments that you consider appropriate.

Format of responses

You are encouraged to submit your response via an online survey (Smart Survey) if possible, as this is quicker and more efficient both for you and the Parliament. However, if you do not have online access, or prefer not to use Smart Survey, you may also respond by e-mail or in hard copy.

Online survey

To respond via Smart Survey, please follow this link:

<http://www.smartsurvey.co.uk/s/Fracking/>

The platform for the online survey is Smart Survey, a third party online survey system enabling the SPCB to collect responses to MSP consultations. Smart Survey is based in the UK and is subject to the requirements of the Data Protection Act 1998. Any information you send in response to this consultation (including personal data and sensitive personal data) will be seen by the MSP progressing the Bill and by specified staff in NGBU, and may be added manually to Smart Survey.

Further information on the handling of your data can be found in the Privacy Notice, which is available either via the Smart Survey link above, or directly from the member's proposal page.

Smart Survey's privacy policy is available here:

<https://www.smartsurvey.co.uk/privacy-policy>

Electronic or hard copy submissions

If possible, please submit your response electronically – preferably in MS Word document. Please keep formatting of this document to a minimum, and avoid including any personal data other than your name (or the name of the group or organisation on whose behalf you are responding).

Any additional personal data (e.g. contact details) should be provided in the covering e-mail (or a covering letter).

Please make clear whether you are responding as an individual (in a personal capacity) or on behalf of a group or organisation. If you are responding as an

individual, you may wish to explain briefly what relevant expertise or experience you have. If you are responding on behalf of an organisation, you may wish to explain the role of that organisation and how the view expressed in the response was arrived at (for example, whether it reflects an established policy or was voted on by members).

Where to send responses

Responses prepared electronically should be sent by e-mail to:

claudia.beamish.msp@parliament.scot

Responses prepared in hard copy should be sent by post to:

Claudia Beamish MSP
M1.10
Scottish Parliament
Edinburgh EH99 1SP

You may also contact Claudia Beamish's office by telephone on (0131) 348 6889.

Deadline for responses

All responses should be received no later than **17th February 2017**.

How responses are handled

To help inform debate on the matters covered by this consultation and in the interests of openness, please be aware that I would normally expect to publish all responses received on my website www.frackingbanbill.com. As published, responses will normally include the name of the respondent, but other personal data (signatures, addresses and contact details) will not be included.

Copies of all responses will be provided to the Scottish Parliament's Non-Government Bills Unit (NGBU), so it can prepare a summary that I may then lodge with a final proposal (the next stage in the process of securing the right to introduce a Member's Bill). NGBU will treat responses in accordance with the Data Protection Act 1998. The summary may cite, or quote from, your response and may name you as a respondent to the consultation - unless your response is to be anonymous or confidential (see below).

I am also obliged to provide copies of all responses to the Scottish Parliament's Information Centre (SPICe). SPICe may make responses (other than confidential responses) available to MSPs or staff on request.

Requests for anonymity or confidentiality

If you wish your response, or any part of it, to be treated as **anonymous**, please state this clearly. You still need to supply your name, but any response treated as anonymous will be published without the name (attributed only to "Anonymous"), and only the anonymised version will be provided to SPICe. If you request anonymity, it is your responsibility to ensure that the content of your response does not allow you to be identified.

If you wish your response, or any part of it, to be treated as **confidential**, please state this clearly. If the response is treated as confidential (in whole or in part), it (or the relevant part) will not be published. However, I would still be obliged to provide a complete copy of the response to NGBU, and a copy of any non-confidential parts (i.e. a redacted copy) to SPICe when lodging my final proposal. As the Scottish Parliament is subject to the Freedom of Information (Scotland) Act 2002 (FOISA), it is possible that requests may be made to see your response (or the confidential parts of it) and the Scottish Parliament may be legally obliged to release that information. Further details of the FOISA are provided below.

In summarising the results of this consultation, NGBU will aim to reflect the general content of any confidential response in that summary, but in such a way as to preserve the confidentiality involved. You should also note that members of the committee which considers the proposal and subsequent Bill may have access to the full text of your response even if it has not been published (or published only in part).

Other exceptions to publication

Where a large number of submissions is received, particularly if they are in very similar terms, it may not be practical or appropriate to publish them all individually. One option may be to publish the text only once, together with a list of the names of those making that response.

There may also be legal reasons for not publishing some or all of a response – for example, if it contains irrelevant, offensive or defamatory statements or material. If I think your response contains such material, it may be returned to you with an invitation to provide a justification for the comments or remove them. If the issue is not resolved to my satisfaction, I may then disregard the response and destroy it.

Data Protection Act 1998

As an MSP, I must comply with the requirements of the Data Protection Act 1998 which places certain obligations on me when I process personal data. As stated above, I will normally publish your response in full, together with your name, unless you request anonymity or confidentiality. I will not publish your signature or personal contact information, or any other information which could identify you and be defined as personal data.

I may also edit any part of your response which I think could identify a third party, unless that person has provided consent for me to publish it. If you specifically wish me to publish information involving third parties you must obtain their consent first and this should be included in writing with your submission.

If you consider that your response may raise any other issues concerning the Data Protection Act and wish to discuss this further, please contact me before you submit your response.

Further information about the Data Protection Act can be found at: www.ico.gov.uk.

Freedom of Information (Scotland) Act 2002

As indicated above, once your response is received by NGBU or is placed in the Scottish Parliament Information Centre (SPICe) or is made available to committees, it is considered to be held by the Parliament and is subject to the requirements of the FOISA. So if the information you send me is requested by third parties the Scottish Parliament is obliged to consider the request and provide the information unless the information falls within one of the exemptions set out in the Act, potentially even if I have agreed to treat all or part of the information in confidence or to publish it anonymously. I cannot therefore guarantee that any other information you send me will not be made public should it be requested under FOI.

Further information about Freedom of Information can be found at:

www.itspublicknowledge.info.

¹ <http://www.gov.scot/Resource/0042/00426134.pdf>

² <http://marine.gov.scot/information/baselines-and-bay-closing-lines>

³ <http://www.gov.scot/Topics/Business-Industry/Energy/onshoreoilandgas>

⁴ <http://news.scotland.gov.uk/News/Moratorium-on-underground-coal-gasification-1e1a.aspx>

⁵ <http://news.scotland.gov.uk/Speeches-Briefings/Paul-Wheelhouse-statement-on-Underground-Coal-Gasification-2ca7.aspx>

⁶ <http://www.gov.scot/Resource/0050/00507473.pdf>

⁷ http://www.scottish.parliament.uk/ResearchBriefingsAndFactsheets/S5/SB_16-63_Unconventional_Gas_Frequently_Asked_Questions.pdf

⁸ <http://news.scotland.gov.uk/News/Moratorium-called-on-fracking-1555.aspx>

⁹ http://www.scottish.parliament.uk/ResearchBriefingsAndFactsheets/S5/SB_16-63_Unconventional_Gas_Frequently_Asked_Questions.pdf

¹⁰ <http://unfccc.int/resource/docs/convkp/conveng.pdf>

¹¹ <https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>

¹² <https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>

¹³ <http://aosis.org/small-islands-propose-below-1-5%CB%9Ac-global-goal-for-paris-agreement/>

¹⁴ <http://www.metoffice.gov.uk/research/news/2015/global-average-temperature-2015>

¹⁵ <http://newsroom.unfccc.int/unfccc-newsroom/indc-synthesis-report-press-release/>

¹⁶ <http://www.legislation.gov.uk/asp/2009/12/contents>

¹⁷ <http://www.gov.scot/Resource/0050/00503570.pdf>

¹⁸ <https://documents.theccc.org.uk/wp-content/uploads/2016/09/Reducing-emissions-in-Scotland-2016-Progress-Report-Committee-on-Climate-Change.pdf>

¹⁹ http://www.scottish.parliament.uk/ResearchBriefingsAndFactsheets/S5/SB_16-41_Climate_Change_Subject_Profile.pdf

²⁰ <https://documents.theccc.org.uk/wp-content/uploads/2016/09/Reducing-emissions-in-Scotland-2016-Progress-Report-Committee-on-Climate-Change.pdf>

²¹ <http://www.snp.org/manifesto>

²² https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69487/pb13698-climate-risk-assessment.pdf

²³ https://www.e3g.org/docs/Briefing_for_Lancashire_County_Council.pdf

²⁴ <https://www.carbontracker.org/wp-content/uploads/2014/09/Unburnable-Carbon-Full-rev2-1.pdf>

²⁵ <https://www.theguardian.com/environment/2014/oct/13/mark-carney-fossil-fuel-reserves-burned-carbon-bubble>

²⁶ http://www.worldenergyoutlook.org/media/weowebite/2012/goldenrules/WEO2012_GoldenRulesReport.pdf

²⁷ <https://documents.theccc.org.uk/wp-content/uploads/2016/07/CCC-Compatibility-of-onshore-petroleum-with-meeting-UK-carbon-budgets.pdf>

²⁸ https://www.e3g.org/docs/Briefing_for_Lancashire_County_Council.pdf

²⁹ https://www.e3g.org/docs/Briefing_for_Lancashire_County_Council.pdf

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