

**Number: WG34712**



Llywodraeth Cymru  
Welsh Government

Welsh Government

## Consultation Document

### Petroleum Extraction Policy in Wales

Date of issue: 3<sup>rd</sup> July 2018

Action required: Responses by 25th September 2018

## Overview

Following the Wales Act 2017 Welsh Ministers will take over responsibility for licensing onshore petroleum extraction from the UK Oil & Gas Authority (OGA) on the 1<sup>st</sup> October 2018.

This consultation seeks your views on both our draft policy towards petroleum extraction in Wales and on the evidence that has informed the draft policy.

## How to respond

Replies to this consultation should be submitted by 23:59 25<sup>th</sup> September 2018 at the latest in one of the following ways:

### Using the Online Form:

#### ***Or by post or e-mail:***

By requesting a response form from and sending it to:

[YmatebionYnni-EnergyResponses@llyw.cymru](mailto:YmatebionYnni-EnergyResponses@llyw.cymru)  
[YmatebionYnni-EnergyResponses@gov.wales](mailto:YmatebionYnni-EnergyResponses@gov.wales)

Fossil Fuel Policy – Petroleum Consultation  
Division of Decarbonisation and Energy  
Department for Energy, Planning and Rural Affairs  
Welsh Government Cathays Park  
Cardiff, CF10 3NQ

## Further information and related documents

**Large print, Braille and alternative language versions of this document are available on request.**

## Contact Details:

### For Further information:

**Email: [YmatebionYnni-EnergyResponses@llyw.cymru](mailto:YmatebionYnni-EnergyResponses@llyw.cymru)  
[YmatebionYnni-EnergyResponses@gov.wales](mailto:YmatebionYnni-EnergyResponses@gov.wales)**

## General Data Protection Regulation (GDPR)

The Welsh Government will be data controller for any personal data you provide as part of your response to the consultation. Welsh Ministers have statutory powers they will rely on to process this personal data which will enable them to make informed decisions about how they exercise their public functions. Any response you send us will be seen in full by Welsh Government staff dealing with the issues which this consultation is about or planning future consultations. Where the Welsh Government undertakes further analysis of consultation responses then this work may be commissioned to be carried out by an accredited third party (e.g. a research organisation or a consultancy company). Any such work will only be undertaken under contract. Welsh Government's standard terms and conditions for such contracts set out strict requirements for the processing and safekeeping of personal data.

In order to show that the consultation was carried out properly, the Welsh Government intends to publish a summary of the responses to this document. We may also publish responses in full. Normally, the name and address (or part of the address) of the person or organisation who sent the response are published with the response. If you do not want your name or address published, please tell us this in writing when you send your response. We will then redact them before publishing.

You should also be aware of our responsibilities under Freedom of Information legislation

If your details are published as part of the consultation response then these published reports will be retained indefinitely. Any of your data held otherwise by Welsh Government will be kept for no more than three years.

### Your rights

Under the data protection legislation, you have the right:

- to be informed of the personal data holds about you and to access it
- to require us to rectify inaccuracies in that data
- to (in certain circumstances) object to or restrict processing
- for (in certain circumstances) your data to be 'erased'
- to (in certain circumstances) data portability
- to lodge a complaint with the Information Commissioner's Office (ICO) who is our independent regulator for data protection.

For further details about the information the Welsh Government holds and its use, or if you want to exercise your rights under the GDPR, please see contact details below:

Data Protection Officer:

Welsh Government

Cathays Park

CARDIFF

CF10 3NQ

e-mail: [Data.ProtectionOfficer@gov.wales](mailto:Data.ProtectionOfficer@gov.wales)

The contact details for the Information Commissioner's Office are:

Wycliffe House

Water Lane

Wilmslow

Cheshire

SK9 5AF

Tel: 01625 545 745 or 0303 123 1113

Website: <https://ico.org.uk/>

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## **Foreword from Lesley Griffiths, Cabinet Secretary for Energy, Planning and Rural Affairs**

The Wales Act 2017, which received Royal Assent last year, is a step forward in handing further control over the consenting of energy projects and other important regulatory frameworks to Wales, including the future onshore licensing of oil & gas extraction. The new petroleum licencing powers are an opportunity to consider what should be the appropriate balance of energy sources in Wales, for now and future generations.

As a new area of responsibility for Welsh Government, we commissioned evidence in 2017 to inform our future policy towards petroleum extraction and its administration in Wales. This evidence is set out as part of the consultation.

The assessment of the evidence has been informed by a number of important pieces of legislation. The Wellbeing of Future Generations Act requires us to demonstrate how the actions we take will improve the well being of Wales. The Environment (Wales) Act 2016 has placed a duty on Welsh Ministers to ensure Welsh carbon emissions in 2050 are at least 80% lower than the 1990 baseline. Our statutory Natural Resource Policy sets out our approach and priorities to sustainably managing our natural resources.

More generally, we have been working across Government to develop and implement our Economic Action Plan, which places decarbonisation as a central pillar for future prosperity. We have announced new ambitious targets for renewable energy production with 70% of Wales' electricity consumption to be generated from renewable sources by 2030.

Our aim is to sustainably manage our natural resources in a way which meets the needs of Wales today, without compromising the needs of future generations. To meet our climate change targets, our long-term aim is to remove fossil fuels from our energy mix whilst minimising economic impact and providing clarity for investors and encouraging them to invest in lower carbon alternatives.

We believe the further development of new petroleum sources runs counter to the ambitions identified in the Wellbeing Goals and our commitment to a low-carbon future. We do not believe the evidence set out in the consultation presents a compelling case that the benefits of petroleum extraction outweigh our commitment to sustainably manage our natural resources for future generations. We are unwilling to risk the future wellbeing of communities when the potential for local long term jobs is small.

Whilst Wales is a small country, we have had a longstanding and proud commitment to play a role as a global citizen. This consultation seeks stakeholder feedback on our proposals to put into effect a policy to not allow any new petroleum licensing in Wales or support fracking as we committed to in Taking Wales Forward (2016-2021). I welcome your views on whether the proposals in this consultation document will help us deliver our objectives.

## Glossary

<b>AMM</b>	Abandoned Mine Methane
<b>Appraisal</b>	The process of finding out how much oil or gas may be present and establishing if it has the potential to be developed commercially.
<b>Capacity</b>	The design capacity of the installation i.e. the maximum rate at which the installation can operate. It is not historical or actual production levels or throughput.
<b>CMM</b>	Coal Mine Methane
<b>Development</b>	The process of building production facilities and drilling first exploration and production wells.
<b>Discharge</b>	Direct or indirect introduction or input to surface waters or groundwater.
<b>Disposal</b>	Any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy.
<b>Exploration</b>	The search for mineral deposits of economic value, including sampling, bulk sampling, drilling and trenching, but excluding any works required for the development of such deposits, and any activities directly associated with an existing extractive operation.
<b>Extractive waste</b>	Waste directly resulting from the prospecting, extraction, treatment and storage of mineral resources and the working of quarries.
<b>Gas</b>	Any substance that is gaseous at room temperature and atmospheric pressure.
<b>Groundwater</b>	All water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil.
<b>Hazardous waste</b>	Waste as defined in regulation 6 of the Hazardous Waste (England and Wales) Regulations 2005. Hazardous substances include - substances or groups of substances that are toxic, persistent and liable to bio-accumulate.
<b>Hydraulic Fracturing</b>	A method of breaking down a formation by pumping fluid at very high pressure. The objective is to increase production rates from a reservoir.
<b>Hydrocarbon</b>	A compound containing only the elements hydrogen and carbon. May exist as a solid, a liquid or a gas.

## Glossary-contd

<b>MDL</b>	Methane Drainage Licence
<b>Natural gas</b>	A mixture of hydrocarbon compounds and some non-hydrocarbons, which exist either in gaseous state or in a solution, often associated with oil and coal. Methane is the main component, typically 90% of the gas.
<b>Permit</b>	An environmental permit granted under the Environmental Permitting (England and Wales) Regulations 2016 by Natural Resources Wales or the Local Authority, which allows the operation of a regulated facility subject to certain conditions.
<b>PEDL</b>	Production Exploration Development Licence
<b>Production</b>	Commercial production of oil and/or natural gas from production wells.
<b>Reservoir</b>	The underground formation where oil and gas has accumulated. It consists of a porous rock to hold the oil or gas, and a cap rock that prevents its escape.
<b>Resource formation</b>	The geological formation that contains the oil and gas resources.
<b>Site surface water</b>	Rainwater and/or surface run off accumulating within the site.
<b>Trade effluent</b>	This is any liquid matter, other than clean surface water and domestic sewage that is discharged from onshore oil and gas activities
<b>UCG</b>	Underground Coal Gasification.
<b>UKCS</b>	United Kingdom Continental Shelf.
<b>UOG</b>	Unconventional Oil & Gas
<b>Waste</b>	Any substance or object which the holder discards or intends or is required to discard.
<b>Waste gas</b>	A gas which the holder discards or intends or is required to discard.
<b>Waste facility</b>	Any area designated for the accumulation or deposit of extractive waste, whether in a solid or liquid state or in solution or suspension.
<b>Water abstraction</b>	Where water is removed from a source of supply (river, watercourse, lake, estuary or groundwater), whether temporarily or permanently.
<b>Well Decommissioning</b>	Typically includes plugging of wells; removal of well equipment, production tanks and associated installations; and surface remediation.
<b>Well stimulation</b>	A treatment performed to restore or enhance the productivity of a well, for example hydraulic fracturing treatments

## **1. Introduction**

### **Why we are consulting**

- 1.1 The Wales Act 2017<sup>1</sup> devolves further responsibilities to Wales. From October 2018 licensing functions relating to onshore petroleum extraction will be transferred from the UK Oil & Gas Authority (OGA) to the Welsh Ministers.
- 1.2 The new petroleum licencing powers<sup>2</sup> are an opportunity to consider our approach to the extraction of petroleum within the wider legislative and policy context here in Wales.
- 1.3 The responses gathered in this consultation will inform our future policy towards petroleum extraction.

### **The Aim of the Consultation**

- 1.4 To seek your views on our draft petroleum policy, on the evidence upon which it is based and to provide an opportunity for the public and organisations to put forward additional evidence to inform future policy on extracting petroleum.
- 1.5 The consultation does not consider Underground Coal Gasification, which is the process of partially combusting coal underground to produce Syngas, and therefore is not petroleum.
- 1.6 We are not consulting on the use of fossil fuels to generate electricity.

### **How we are consulting?**

- 1.7 We are consulting in line with the National Principles for Public Engagement<sup>3</sup>, encouraging everyone who has a view to be involved and respond.
- 1.8 Through a series of questions asked in this document, we are seeking your views on the evidence we have gathered to date on petroleum extraction. We also recognise there may be other information and evidence that you may wish to bring to our attention.

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<sup>1</sup> <http://www.legislation.gov.uk/ukpga/2017/4/contents/enacted/data.htm>

<sup>2</sup> <http://www.legislation.gov.uk/ukpga/2017/4/part/2/crossheading/onshore-petroleum/enacted>

<sup>3</sup> <https://participation.cymru/en/principles/>



## **Consultation Questions**

- 1.9 A summary of the accumulated evidence is set out in Chapter 5. Each evidence report is published alongside this consultation.
- 1.10 For each subsection of evidence, eg Health, Transport, you are asked whether you have a view on the findings of the report.
- 1.11 Chapter 7 sets out the proposed future policy for Petroleum Extraction in Wales. You are asked whether you agree with the proposed policy.
- 1.12 The consultation response form also provides an opportunity to make additional comments when replying to all questions.
- 1.13 Responses to consultations may be made public on the internet or in a separate report. If you would prefer your response to be kept confidential please indicate this by ticking the relevant box on the response form.

## **2. Petroleum**

### **What is Petroleum?**

- 2.1 Petroleum naturally occurs within rocks in the subsurface. Petroleum reserves have been formed over thousands of years by heat and pressure turning organic matter to oil and gas.
- 2.2 Petroleum is used to generate electricity, power most modes of transport, heats our homes and can be used to make various products.
- 2.3 The Petroleum Act 1998<sup>4</sup> defines petroleum as:
  - any mineral oil or relative hydrocarbon and natural gas existing in its natural condition in strata; but
  - does not include coal or bituminous shales or other stratified deposits from which oil can be extracted by destructive distillation

### **Conventional**

- 2.4 Conventional petroleum fields are usually found in porous and permeable sedimentary rocks, such as sandstones or limestone, in which the gas and or oil is trapped, under pressure, in underground reservoirs. Conventional extraction techniques involve the drilling of a petroleum reservoir which has sufficient pressure for the petroleum to flow out of the ground once drilled. Conventional extraction is typically cheaper than unconventional extraction.

### **Unconventional**

- 2.5 Unconventional petroleum fields refer to natural oil and gas trapped in deep underground rocks which has been traditionally hard to reach. Unconventional techniques are more complex as they require additional processes to free the petroleum from the ground. Types of unconventional gas in Wales include shale gas, coal bed methane, abandoned mine methane, and coal mine methane.

### **Coal Bed Methane**

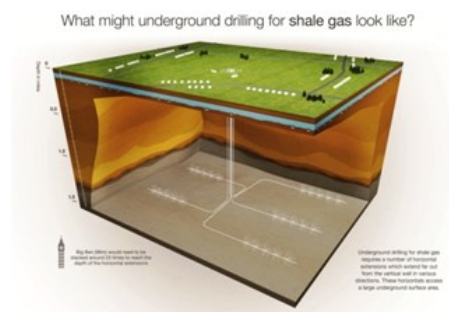
- 2.6 The term coal bed methane (CBM) refers to gas naturally occurring within un-mined coal seams. It is recovered through drilling and a process known as 'dewatering'. Much of the coal, and thus much of the CBM, lies at shallow depths, making wells easy to drill and relatively inexpensive to complete.

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<sup>4</sup> <http://www.legislation.gov.uk/ukpga/1998/17/contents>

## Shale Gas

- 2.7 Shale gas is natural gas, mainly methane, held in fractures and pore spaces, or gas adsorbed on organic material within shale rock.
- 2.8 Shale gas is extracted from the rock using hydraulic fracturing techniques ie 'fracking'.



## **How much petroleum is located under Wales?**

- 2.9 Whilst Wales has a long history in coal extraction, there has been minimal petroleum development to date, limiting the availability of actual data on the scale and location of petroleum reserves.
- 2.10 A report in 2004, by Jones et al, titled "UK Coal Resource for New Exploitation Technologies Final Report"<sup>5</sup> stated there is not enough data available in Wales to provide a comprehensive assessment of the potential volumes of all of the potential gas, especially for shale gas.
- 2.11 A Study of Potential Unconventional Gas Resources in Wales by the British Geological Survey (BGS)<sup>6</sup>, commissioned by the Welsh Government and published in 2013, identified that petroleum in the form of coal bed methane is present in coal seams in North and South Wales whilst shale gas, present in shale rock which is at greater depths than coal seams, is less prevalent.
- 2.12 Based on a 10% recovery factor BGS suggested a resource estimate for CBM in South Wales of between 3 and 6billion cubic metres (bcm), and between 3 and 9bcm in North Wales.
- 2.13 The locations of potential petroleum recoverable reserves are identified as the 'Current Licenced Blocks' in the map<sup>7</sup> dated June 2016.
- 2.14 Appendix A provides additional detail on PEDLs in North and South Wales.

<sup>5</sup> <http://nora.nerc.ac.uk/id/eprint/509526/1/CR04015N.pdf>

<sup>6</sup> <https://gov.wales/docs/desh/publications/140626-energy-study-of-potential-unconventional-gas-resource-in-wales.pdf>

<sup>7</sup> <http://gov.wales/docs/desh/publications/140626-energy-study-of-potential-unconventional-gas-resource-in-wales.pdf> Page 16

## **How petroleum is extracted**

- 2.15 Onshore drilling refers to drilling deep holes under the earth's surface to access a reserve of petroleum. Borehole drilling of wells is common to all types of gas and oil developments. A key priority for borehole drilling is "well integrity" to ensure the protection of groundwater during the drilling process and any associated activities.
- 2.16 Directional drilling is the ability to deviate the drill head from the vertical to the horizontal in a controlled manner, such that different areas of a reservoir can be accessed from a single position on the surface.

### Conventional Extraction

- 2.17 Conventional wells drilled for natural gas or oil are vertical wells, drilled straight down from the surface to the rock formation where the petroleum is located.
- 2.18 Conventional oil and gas' fields are usually situated in easier to reach layers of rock. Conventional techniques involve the drilling of an oil or gas reservoir which has sufficient pressure for the oil/gas to flow out of the ground once drilled. Conventional extraction is cheaper than unconventional extraction.

### Unconventional Extraction

#### De-Watering

- 2.19 Extraction of Coal Bed Methane (CBM) requires the pumping out of high volumes of water. Water naturally permeates coal beds, and the pressure traps methane within the coal. To produce CBM water must be drawn off first, lowering the pressure so methane can flow out of the coal and to the well bore.
- 2.20 Permeability within the coal seam is necessary to enable the CBM to flow to the production borehole following dewatering. Experience in the USA and Australia has shown that, in many cases, the permeability caused by naturally occurring fractures is sufficient to release methane once the seams are depressurised by dewatering.
- 2.21 Most CBM wells initially produce large volumes of water and small volumes of gas. Over time, the produced water volume decreases, and the gas rate increases. This is the opposite of conventional gas wells, which are characterized by high initial gas rates which decline with time.

2.22 CBM production does not normally require hydraulic fracturing (fracking) although developers may choose to undertake a “mini-frack” towards the end of development to maximise the gas extracted. Mini-Fracks use much less fluid, chemicals and sand than a full hydraulic fracturing process.

### Hydraulic fracturing (fracking)

2.23 Shale gas is held in fractures and pore spaces within shale rock and is predominantly Methane. Shale gas cannot flow under its own pressure but is extracted from the rock using hydraulic fracturing techniques.

2.24 Hydraulic fracturing or “fracking” is the process of drilling down into the earth before a high-pressure water mixture is directed at the rock to release the gas inside. Water, sand and chemicals are injected into the rock at high pressure, to create narrow fractures to allow the gas to flow out of the well. Once the fractures have been created, small particles, usually of sand, are pumped into them; these particles keep the fractures open when the water is flowed back up the well.

2.25 Hydraulically fracturing conventional wells can help extraction by improving flow rates. Not all borehole wells will be subject to fracking as it may not be appropriate for the local geology or required for the type of oil or gas being explored.

### **The role of Fossil Fuel in Wales**

2.26 Wales decommissioned its final oil-fired power station in 1999. Wales’ oil refining terminals, in Pembroke, import energy for heat for buildings, energy for industrial activities and fuel for agricultural machines, vehicles and aviation.

2.27 The UK Government has committed to close all unabated coal-fired power stations by 2025<sup>8</sup>. Energy demand in Wales is increasingly met from imported gas which is less polluting than coal. The Welsh Government has set a target of generating 70% of electricity demand from renewable sources by 2030<sup>9</sup>, whilst acknowledging the role for gas as a transition fuel until it is replaced by renewables and low carbon nuclear generation.

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<sup>8</sup> <https://www.gov.uk/government/consultations/coal-generation-in-great-britain-the-pathway-to-a-low-carbon-future>

<sup>9</sup> <https://gov.wales/newsroom/environmentandcountryside/2017/170928-lesley-griffiths-high-on-ambition-for-clean-energy/?lang=en>

2.28 British Gas calculate just under a half of the current UK's gas arrives in pipelines from Europe<sup>10</sup>. The majority of deliveries of Liquefied Natural Gas [LNG] supplies for the UK as a whole is imported through gas terminals in Wales in the form of cooled and compressed LNG from Qatar and Russia. LNG is forecast to replace the fall in UK Continental Shelf natural gas supplies in the coming years, potentially providing 60% of GB demand by 2035<sup>11</sup>.

2.29 In 2016 62.9% of electricity generation in Wales was from gas, due mainly to the cessation of Wylfa nuclear generation in 2015 and reduction in coal-fired electricity generation. Electricity consumption in Wales is 6% of the UK's total electricity consumption.

### Gas use in Wales

2.30 Natural Gas in Wales is used to heat homes and to generate electricity. With further electrification expected to take place in the home, industry and transport, demands for gas is expected to increase. Gas, for the foreseeable future will also provide backup for intermittent renewable energy, to ensure consistency of supply for households and industry.

### Oil use in Wales

2.31 The oil which arrives in Wales is transported in vessels. Wales has no domestic onshore oil production. Oil products imported via Pembroke, not consumed in Wales, are transferred to England via pipeline or rail.

2.32 The UK Government's Department for Business, Energy and Industrial Strategy [BEIS] state "oil-based fuels are currently the UK's main source of energy, and supplied over 40% of the UK's final energy demand in 2016.

2.33 The principal source of the UK's crude oil imports has consistently been Norway, historically accounting for around two-thirds of all imports. Imports from the Organization of Petroleum Exporting Countries (OPEC) accounted for 28 per cent of the UK's crude imports in 2016. Principally the imports from OPEC countries come from Nigeria and Algeria. Russia supplies the 4th highest at 5% .

2.34 Consumer demand for transport fuels, heating fuels and for feedstocks to produce plastics and other products is over a third of the UK's energy consumption.

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<sup>10</sup> <https://www.britishgas.co.uk/the-source/our-world-of-energy/energys-grand-journey/where-does-uk-gas-come-from>

<sup>11</sup> [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/651297/gas-security-supply-assessment.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/651297/gas-security-supply-assessment.pdf)

### 3. Petroleum Licences and Consents

#### What is the Welsh onshore oil & gas licensing area?

3.1 The Wales Act 2017 transfers to Welsh Ministers onshore petroleum licensing. The Wales onshore area licence boundary includes inshore estuary waters<sup>12</sup>.

#### How are onshore licences currently managed, and what will change in October 2018?

3.2 The OGA are currently responsible for petroleum licensing in England and Wales. From the 1<sup>st</sup> October Welsh Ministers will acquire the responsibility for all Welsh onshore licensing, including existing licences, and approvals associated with them.

3.3 Welsh Ministers will be responsible for the granting and regulation of three distinct types of licence;

- **Petroleum Exploration and Development Licence (PEDL)** which grant exclusive rights to search and bore for, and get, petroleum within a specified area. A PEDL is conditional and does not provide in itself authority to drill or commence any other operations without further approval.
- **Landward Petroleum Exploration Licence** which are available for companies wanting to explore but do not need exclusive rights to drill or produce petroleum.
- **Methane Drainage Licence (MDL)** which are required if the operator or owner of a coalmine must capture natural gas to make the mine safe.

3.4 From October the Welsh Government will be responsible for onshore licensing.

3.5 A summary of regulators and their roles from October;;

Welsh Government	Any existing Welsh licensee wishing to exercise their PEDL rights will be required to apply to Welsh Ministers for the relevant consent or approval. This will include consent to drill a borehole, consent to produce petroleum, approval of work programmes, extensions to deadlines and determining the boundary of an oil field for taxation purpose.
Local Planning Authority	Developers seeking to undertake exploratory, appraisal or production activities must apply for planning permission from the local planning authority.
Natural Resources Wales	Companies must apply for the necessary environmental permits associated with any activity that is captured by the relevant environmental legislation.
Health and Safety Executive (HSE)	HSE regulates the health and safety risks to people. In particular, they are responsible for ensuring the appropriate design and construction of a well casing for any oil and gas borehole. HSE requirements for ensuring well integrity also contribute to mitigating environmental risks.
The Coal Authority	Responsible for granting consent for activity which cuts across, disturbs or enters coal seams.

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<sup>12</sup> <http://www.legislation.gov.uk/uksi/2014/1686/made>

## How many current licence areas are in Wales

3.6 Petroleum Licences, issued over the last 30 years by the UK Government, give a developer the exclusive rights to explore for and develop oil or gas in a particular geographic area. Named Petroleum Exploration Development Licences (PEDLs) from 1996, there are fourteen current PEDLs in Wales. The last PEDL licences in Wales were awarded in 2008.

3.7 A PEDL vests in the licence holder the exclusive rights to exploit petroleum, within the licenced area, subject to the requirement to obtain all other necessary regulatory consents applicable to drilling operations, which can include planning consent and environmental permitting.

## Financial matters relating to licensing

3.8 Developers are subject to a number of financial payments when holding a licence:

Annual Rental: Licence holders are subject to an annual rental currently payable to the UK Government based on the acreage owned, and how long they have held the licence. Whilst setting and collection of rental will remain with UK Government, after the 1<sup>st</sup> October any rentals collected will be transferred to Welsh Government.

Administration Fees: Licence holders are required to pay a fee to cover the cost of administration each time they apply for a consent, an approval, or request to forfeit the licence. From October these fees will be payable to Welsh Government.

Taxation: Tax due on extracted petroleum is collected by Oil Gas & Authority, and payable to UK Government Treasury.

Land Access: Whilst a licence holder has the exclusive rights to search for petroleum within a specified geographic area, if they do not own the land they need to negotiate a land access fee payable to the landowner.



## **4. The Policy Context**

4.1 There are a number of pieces of legislation and policies which are key to informing our approach to the extraction of fossil fuels in Wales. These are set out below.

### **Well-being of Future Generations (Wales) Act 2015<sup>13</sup>**

4.2 This Wellbeing Act is about improving the economic, social, environmental and cultural well-being of Wales through sustainable development. The Act places a well-being duty on public sector bodies to take action to achieve 7 well-being goals in accordance with a sustainable development principle. The goals are as follows;

- **A Prosperous Wales**  
An innovative, productive and low carbon society which recognises the limits of the global environment and therefore uses resources efficiently and proportionately (including acting on climate change), and which develops a skilled and well-educated population in an economy which generates wealth and provides employment opportunities, allowing people to take advantage of the wealth generated through securing decent work.
- **A Resilient Wales**  
A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change including climate change.
- **A Healthier Wales**  
A society in which people's physical and mental well-being is maximised and in which choices and behaviours that benefit future health are understood.
- **A More Equal Wales**  
A society that enables people to fulfil their potential no matter what their background or circumstances, including their socio economic circumstances.
- **A Wales of Cohesive Communities**  
Attractive, viable, safe and well-connected communities.
- **A Wales of Vibrant Culture and Thriving Welsh Language**  
A society that promotes and protects culture, heritage and the Welsh language, and which encourages people to participate in the arts, sports and recreation.
- **Globally Responsible Wales**  
A nation which, when doing anything to improve the economic, social, environmental and cultural well-being of Wales, takes account of whether doing such a thing may make a positive contribution to global well-being.

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<sup>13</sup> <http://www.legislation.gov.uk/anaw/2015/2/contents/enacted>

4.3 The Well-being Act sets out five ways of working needed for public bodies to achieve the seven well-being goals:

- Long-term : balancing short-term needs with the need to safeguard the ability to meet long-term needs.
- Integration : consider how the body's objectives may impact on each of the well-being goals and how the objectives impact on each other and upon other public bodies objectives.
- Involvement : involve people in decisions that affect them.
- Collaboration : acting in collaboration with others that could help the body to meet its well-being objectives.
- Prevention : acting to prevent problems occurring or getting worse may help public bodies to meet their objectives.

### **Environment (Wales) Act 2016 and Natural Resources Policy**

4.4 The Environment (Wales) Act 2016<sup>14</sup> focuses on the sustainable management of our natural resources. In 2017, to support the implementation of the Act, the Welsh Government published its Natural Resources Policy, the focus of which is the sustainable management of Wales' natural resources to maximise their contribution to achieving goals within the Well-being of Future Generations Act. The policy sets out three National Priorities;

- Delivering nature-based solutions.
- Increasing renewable energy and resource efficiency.
- Taking a place-based approach.

4.5 These three priorities have been designed to tackle the challenges that Wales faces and realise the significant opportunities provided by our natural resources.

4.6 Alongside this key policy, the Environment (Wales) Act places a duty on Welsh Ministers to reduce greenhouse gas emissions by at least 80% by 2050, from a 1990 baseline. It also provides the Welsh Ministers with powers to put in place statutory emission reduction targets and establish a carbon budgeting framework to support the delivery of these targets. These legislative provisions support the objectives of the 2015 Paris Climate Change agreement, which marked a shift to a clean economy which is global and irreversible, and provided markets with a clear direction on the scale of investment needed.

4.7 Broadly in support of these decarbonisation objectives, the Welsh Government has announced ambitious new targets for renewable energy production with 70% of Wales' electricity consumption to be generated from renewable sources by 2030.

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<sup>14</sup> <http://www.legislation.gov.uk/anaw/2016/3/contents/enacted>

## Planning Policy

- 4.8 Future planning policy will embed well-being by moving us towards a low carbon, resilient society, of providing secure and well-paid jobs, for everyone in Wales by improving our lives and health and enhances our well-being.
- 4.9 A consultation on Draft Planning Policy Wales: Edition 10 (PPW10)<sup>15</sup> was published earlier this year setting out the proposed treatment of the extraction of onshore oil and gas within the planning energy hierarchy to reflect their position as the least preferred source of fuel for power generation. Responses to the PPW10 consultation will be considered alongside the responses to this consultation.
- 4.10 The Welsh Government published a Planning Notification Direction on Unconventional Oil and Gas in 2015<sup>16</sup>, and Underground Coal Gasification in 2016<sup>17</sup>.
- 4.11 Planning applications for the exploration, appraisal, or extraction of unconventional oil and gas which would utilise unconventional techniques (including hydraulic fracturing), and applications for underground coal gasification must be referred to the Welsh Ministers, where local planning authorities are minded to approve them. This allows the Welsh Ministers to consider whether the application should be called in for determination.
- 4.12 “Unconventional gas and oil production” is intended to capture any operation which involves some form of intervention. Thus an operation which involves drilling, whether vertical or vertical and horizontal, and pumping water out to release the gas will be caught by the 2015 Direction as the pumping of water is an intervention.

## Marine Planning

- 4.13 The recent draft Welsh National Marine Plan highlighted the importance of ensuring the marine environment enhances the economic, social and environmental well-being of Wales. Marine planning also has an important role in supporting our climate change objectives through minimising the emission of greenhouse gases offshore. The draft plan stated where significant emissions of greenhouse gases cannot be adequately addressed, proposals for regulated activities must present a clear and convincing justification for proceeding for development.

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<sup>15</sup> <https://beta.gov.wales/planning-policy-wales-edition-10>

<sup>16</sup> <https://gov.wales/topics/planning/policy/dear-cpo-letters/unconventional-oil-and-gas/?lang=en>

<sup>17</sup> <https://gov.wales/topics/planning/policy/dear-cpo-letters/underground-coal-gasification-direction-2016/?lang=en>

4.14 The marine plan includes provision relating to both devolved and retained functions. Offshore oil & gas licensing for petroleum extraction is reserved to the Oil & Gas Authority, however marine licensing is devolved to Wales.

### **Taking Wales Forward and Prosperity for All**

4.15 Taking Wales Forward (2016) is the Welsh Government's Programme for Government 2016-2021<sup>18</sup>. The Programme for Government reinforced the Welsh Government's continued opposition to fracking, based on evidence.

4.16 Prosperity for All (2017) is the Welsh Government's new national strategy which identified that Wales will be taking a lead in areas such as decarbonisation and demonstrating our intent to create more sustainable economic infrastructure.

## **5. The evidence for the impact of onshore petroleum extraction**

### **Developing the evidence**

5.1 In 2014, the Welsh Government commissioned a report, the Economic Impact of Unconventional Gas in Wales, to evaluate the potential of unconventional gas resources in Wales and the economic opportunities that might arise from any development.

5.2 The Regeneris report's assessment of the impact of onshore gas extraction used the earlier report from the British Geological Survey "A Study of Potential Unconventional Gas Resource in Wales" (2013).

5.3 In acquiring new powers, further evidence was required to inform our future policy towards petroleum extraction and its administration in Wales. In 2017 Welsh Government commissioned Natural Resources Wales [NRW] to procure a review into the potential impact of onshore petroleum extraction, including coal bed methane [CBM]. The evidence examines the impact on the environment, climate change, health, transport, decommissioning and economy.

5.4 The Scottish Government had previously commissioned evidence<sup>19</sup> on the potential impacts of unconventional oil and gas in Scotland and on the future of the industry. The Scottish evidence is the most recent available in the UK and referenced studies from overseas.

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<sup>18</sup> <https://gov.wales/about/programme-for-government/?lang=en>

<sup>19</sup> <http://www.gov.scot/Topics/Business-Industry/Energy/onshoreoilandgas/EvidenceGathering>

- 5.5 The evidence generated for Wales has included consideration of the application of the Scottish Government findings to Wales. The main geographical difference between the two nations is that shale rock is more accessible in Scotland, whilst coal seams are common in Wales.
- 5.6 The Welsh Government also received independent advice in December 2017 from the Committee on Climate Change (CCC) on what level Welsh interim carbon targets and budgets should be set. The advice is published in <sup>20</sup>Building a low-carbon economy in Wales – Setting Welsh carbon targets, December 2017. Any future petroleum policy will be considered in the context of Wales’s transition to low carbon generation and the requirement to reduce carbon emissions.

## **Summary of the Petroleum evidence programme**

### What was the available existing evidence

- 5.7 The UK, Scottish and Northern Ireland Governments have recently produced and published substantial evidence packages to support their onshore oil and gas exploitation policy development. These studies have concentrated on ‘unconventional’ sources of oil and gas. These studies outline the potential impact of an emerging petroleum production industry with regards to the following key issues: economy, climate change, transport, decommissioning, health impact, seismicity and environment regulation
- 5.8 Due to the limited scale of recent unconventional oil and gas developments in the UK, current evidence is reliant on desk studies, evidence from outside of the UK, evidence produced during conventional petroleum production and evidence from comparable industries. Therefore, current studies are seldom specific to individual geographic regions. Furthermore, past evidence has not been considered in the context of the unique Welsh policy and legislative landscape. Consideration was required to determine whether a future domestic petroleum extraction industry, supplying homes and businesses in Wales, is compatible with the principles that underpin;
- The Environment (Wales) Act 2016, including the National Natural Resource Policy; and
  - The Well-being of Future Generations Act (2015)

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<sup>20</sup> <https://www.theccc.org.uk/publication/building-low-carbon-economy-wales-setting-welsh-carbon-targets/>

5.9 NRW was commissioned to review and set out the expected impact in Wales of petroleum extraction in relation to the economy, climate change, environment, transport and decommissioning. In particular, NRW was asked to consider the following;

- Identify lessons and conclusions that can be transferred to the Welsh political, social, environmental, economic and industrial landscape.
- Apply a quantitative and qualitative analysis to the conclusions to determine applicability within Wales.
- Identify critical gaps in existing evidence base.
- Where available, review evidence published by the UK regulators that would fill gaps in the UK and Welsh government evidence base.
- Review emerging academic or industrial evidence to identify further options to fill evidence gaps in the government evidence base.
- Review emerging academic or industrial evidence to identify emerging hazards and risks.
- Recommend how best to fill remaining critical evidence gaps.
- Identify any inconsistencies between the reports, contradictory assumption or conclusions.

The various pieces of evidence gathered are published alongside this consultation.

### **Climate Change:**

5.10 In 2015, oil and gas extraction accounted for 72kt carbon dioxide equivalent (CO<sub>2</sub>e), which is approximately 0.16% of total Welsh emissions. In Wales, these emissions are predominately associated with extraction of gas and result from the combustion of gas to power the extraction installations. This source has grown significantly from the 1990 base year level of 0.14 kt CO<sub>2</sub>e although the total contribution to Welsh emissions remains small. Unconventional gas exploration and extraction would likely increase reported emissions if petroleum extraction was increased in Wales.

### **Committee on Climate Change**

5.11 The Committee on Climate Change is the independent adviser to Welsh Government in respect of the Welsh Ministers decarbonisation targets set under the Environment (Wales) Act 2016.

5.12 Under the Infrastructure Act 2015<sup>21</sup>, the Committee on Climate Change has a duty to assess what impact UK production of onshore petroleum may have on the UK Government's ability to meet emissions reduction targets under the Climate Change Act 2008 . The Committee's first report<sup>22</sup>, in March 2016, focused primarily on production of shale gas, as this has larger potential implications for emissions than other sources of onshore petroleum.

5.13 The CCC concluded that exploiting shale gas by fracking on a significant scale is not compatible with UK climate targets unless three tests are met:

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

Test 2: Overall UK Gas consumption must remain in line with carbon budgets set to meet carbon reduction targets.

Test 3: Gas production emissions must be accounted within carbon budgets

5.14 The evidence on coal bed methane (CBM) is limited, both regarding the emissions footprint and potential size of a UK industry. If exploitation of CBM were proposed in any significant way for the UK then the CCC recommended in the 2016 report that it would come back to look at its emissions in further detail.

### **What Welsh Government asked**

5.15 Given that CBM is of primary interest in Wales, Welsh Government requested confirmation as to whether the three tests that the CCC set in the 2016 report for shale gas, also apply to CBM production.

### **What review and/or analysis was conducted**

5.16 The CCC considered the scale of the potential industry in Wales based on the number of proposed developments with planning consent and/or environmental permits and the volume of acreage covered by existing petroleum licences.

5.17 This enabled the CCC to determine:

- Whether the scale of the proposed CBM developments was significant, thereby necessitating an entirely new review of GHG emissions specifically for CBM.
- Whether the three tests in the shale gas focused report could be considered directly applicable to CBM developments in Wales.

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<sup>21</sup> <http://www.legislation.gov.uk/ukpga/2015/7/contents/enacted>

<sup>22</sup> <https://www.theccc.org.uk/publication/onshore-petroleum-the-compatibility-of-uk-onshore-petroleum-with-meeting-carbon-budgets/>

## **What were the outcomes and/or recommendations?**

- 5.18 The CCC confirmed that the three tests are applicable to CBM production in Wales. The main relevant test is the first, which relates to keeping the greenhouse gas footprint of production low. Within this test, the requirements include:
- technologies and techniques are employed in order that the greenhouse gas footprint of production is kept low
  - a monitoring regime is put in place that catches potentially significant emissions of methane early
- 5.19 Given the lack of available evidence on the full greenhouse gas footprint of CBM production, however, the CCC recommended that it is particularly important that, should production go ahead, both of these requirements are fulfilled, and are seen to be fulfilled.
- 5.20 Furthermore, it would be very important to collect and publish data on the greenhouse gas footprint of both development and production in order to enhance the evidence base. It would be valuable to undertake full 'baseline' monitoring of any proposed sites, in order to understand the level of methane concentrations that already exists before any production occurs.

<b>Q1: Do you have a view on the Climate Change evidence?</b>
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### **Environmental Evidence and Analysis**

- 5.21 Due to the very limited scale of petroleum extraction developments in Wales, there is little evidence of the potential impact of the industry on Welsh citizens, Welsh business and the Welsh landscape and environment.

### **What Welsh Government asked**

- 5.22 Welsh Government commissioned a short study into both the potential for Coalbed Methane (CBM) production in Wales, and the potential impact of the production on socio-economic, environmental and public health issues. The investigation was to analyse current qualitative and quantitative spatial information across economic, socio-economic, environmental and public health issues, thereby enabling policy makers to undertake an informed assessment of the potential impact of CBM production in Wales.



5.23 The study needed to consider:

- Within the existing Welsh Petroleum Exploration and Development licensed areas, what potential exists to extract Coal Bed Methane from sites that are likely:
  - to have minimum negative impact on the environment,
  - to have positive impact on the socio-economic conditions of the communities living nearby,
  - to be located in areas where public health is not already under stress
  - to be economically and technically more viable than other areas
- For proposed developments that have existing planning consent and environmental permits for Coal Bed Methane exploratory activities what would be the potential impact should the sites progress to production activities?

5.24 Cardiff University's Geo-environmental Research Centre was commissioned to undertake the study.

5.25 The aim of the study was to provide an indication of the overall potential impact of a CBM industry in Wales, based on a broad range of assumptions, and thereby aid discussions. The study was not intended to provide definitive conclusions regarding the potential impact of CBM production.

### **What review and/or analysis was conducted**

5.26 The study has been carried out using the Sustainable Earth Energy – Spatial Decision Support System (SEREN-SDSS). This is a generic system that has been designed and developed in the Geo-environmental Research Centre (GRC) at Cardiff University using different Geographical Information Science GIS, Artificial Intelligence and Multi-criteria Decision Analysis techniques.

5.27 This GIS based desktop study provides an investigation into the potential for Coalbed Methane (CBM) production in Wales, and the potential subsequent impact of the production on socio-economic, techno-economic, environmental and public health issues. The report facilitates policy makers to undertake an informed consideration of the potential impact of CBM production in Wales.

5.28 The process applied by the SEREN-SDSS has three distinct elements:

1. **Site suitability** – Site suitability gives a general overview of the study area in terms of suitability for CBM production with respect to the indicators used.
2. **Site Ranking** – The next step is to reduce the number of potential sites by assigning a rank and selecting the highest ranked sites.
3. **Site Impact Assessment** – The final step is to apply an impact assessment on specific proposed developments, i.e. those with existing planning permission. Each proposed development is evaluated against economics/operational, physical/chemical, biological/ecological and social/cultural component

5.29 The study considered the Scottish, Irish (ROI and NI), Welsh and UK Government's published evidence on the potential impact of petroleum production onshore, to identify conclusions that can be transferred to the Welsh environmental landscape.

5.30 The terminology used in the report is consistent and widely used in the research and policy development community. The table accompanying the map for each category, referred to as a 'domain', provides a detailed description of each 'indicator' and 'weight' applied to each sub-category of evidence.

### **What were the outcomes and recommendations**

5.31 There is no oil or gas extraction on a large industrial scale happening onshore anywhere in the UK at present. The potential impact on Wales is therefore based on modelling evidence and applying evidence from industries that use these comparative drilling techniques.

5.32 The evidence does *not* select preferred locations to extract onshore petroleum. The analysis indicates how the social, economic, technical and environmental impact of CBM production might vary across different regions in Wales.

5.33 The report identifies a number of risks, including:

- Using large quantities of water, potentially affecting available water for people and the environment
- Risks to groundwater, through the escape of hydraulic fracturing fluids or substances dissolved from native rocks
- Dissolved substances and naturally occurring materials from rocks that need to be disposed of properly
- Emissions and management of wastes from drilling, hydraulic fracturing, flaring and other on-site operations
- The release of methane, a greenhouse gas, and other pollutants to air
- Polluting water or the ground from operations on the surface

- 5.34 The evidence sets out that potential risks to public health and local environment from exposure to the emissions associated with unconventional gas extraction could be low if the operations are properly run and regulated.
- 5.35 The environment analysis highlights there are areas of Wales where CBM developments could lead to a positive impact on Welsh citizens primarily through employment generation, business activities and investment.
- 5.36 However, the analysis also highlights that there are areas of Wales where CBM developments could lead to potentially significant negative impacts, for example exacerbating existing air quality issues or reducing the social amenity value of the local environment.
- 5.37 When all of the above indicators are combined, the most suitable areas can be found in the south Wales valleys, central Wrexham, and the Denbighshire coast. The least suitable areas are found in Pembrokeshire, outer parts of Wrexham, Flintshire, and inland parts of Denbighshire. Some areas recording higher benefits and lower risks, compared to other areas, are in the south Wales valleys. Some of the areas with an increased likelihood of benefiting from CBM production intersect with PEDL licence areas.
- 5.38 The report's authors conclude that for the proposed sites with existing planning permission, most of the positive scores are associated with the Economic and Operational category i.e. the value of the methane captured, impact on industrial energy users and economic growth. However, other aspects of the analysis shows negative scores, particularly due to the potential increase in air pollution from transportation, the requirement to dispose of waste water and the potential contamination of groundwater due to borehole integrity.

<b>Q2: Do you have a view on the Socio Environmental evidence?</b>
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### **Health**

- 5.39 Whilst the petroleum extraction is a mature industry, unconventional extraction methods are relatively new and there is a lack of operational experience in the UK, including Wales. This means that there is no evidence on the potential impacts of UOG at a local site by site basis although Wales has a long history of similar extractive industries such as coal mining..
- 5.40 The majority of the available research evidence and data on petroleum extraction originates from countries outside the UK which already have commercial scale operations. Most evidence has focused on shale gas activities, especially in the United States, and there is less evidence relating to CBM.

### **What Welsh Government asked**

- 5.41 Public Health Wales (PHW) was asked to consider the availability of evidence on health impacts in relation to the prevalent petroleum in Wales, CBM.
- 5.42 In particular, PHW were asked to consider whether or not the Health Impact Assessment undertaken by Health Protection Scotland provided appropriate evidence to effectively consider the potential health impacts of CBM production in Wales.
- 5.43 PHW were also asked to advise on what additional evidence would be required to fully understand potential health risks.

### **What review and/or analysis was conducted**

- 5.44 PHW agreed to undertake a provisional review of the available evidence and consider what further evidence and data would be necessary to fully consider the potential environmental impact of producing petroleum in Wales.

### **What were the outcomes and/or recommendations**

- 5.45 PHW recommend caution when extrapolating evidence from other countries to Wales since the data used are country-specific and the mode of operation, underlying geology, local site specific factors, local socio-political demographics and the regulatory regime are likely to be very different.
- 5.46 A number of UK reports including those from Public Health England, the Independent Expert Scientific Panel for Scottish Government and the Royal Society noted that the technology and regulatory framework exists to allow for safe extraction of petroleum reserves. Both Public Health England and the Independent Expert Scientific Panel for Scottish Government concluded that the potential risks to public health from exposure to the emissions associated with unconventional gas extraction should be low if the operations are properly run and regulated.
- 5.47 PHW broadly supports this view and feels that a proportionate precautionary approach is warranted based on ensuring that the appropriate mitigation and control measures are put in place to ensure that the regulatory framework identifies and manages all potential hazards from Unconventional Oil & Gas [UOG]. Similar approaches are used to regulate effectively other industries such as incinerators, landfills, waste transfer sites which have the potential to pollute the environment.

5.48 However, PHW stress that it is important to recognise that gaps in the evidence base do exist and more knowledge is needed to better understand the technology to minimise risk and how current regulations can best be applied. PHW advises a more detailed Wales specific review is required to better understand the environmental and wider health implications of petroleum production.

### **Q3: Do you have a view on the Health evidence?**

#### **Transport and Planning**

5.49 In 2016 the Scottish Government commissioned a study on ‘Unconventional oil and gas development: Understanding and mitigating community impacts from transportation’, which aimed to provide an assessment of the impacts of increased traffic flows upon local communities in Scotland, and to identify means of mitigating these impacts.

#### **What Welsh Government asked**

5.50 The authors of the Scottish report, Ricardo, were asked to consider whether the findings of the Scottish Government report are applicable to:

1. the environment and social conditions;
2. the potential availability of UOG resources; and
3. the legislative and regulatory framework, in Wales.

5.51 Ricardo were also asked to identify any evidence gaps which require further research to understand the likely community impacts associated with UOG traffic in Wales.

#### **What review and/or analysis was conducted**

5.52 The report provides an updated summary of the Scottish Government study, which focusses on Wales-specific factors, and assesses whether the conclusions regarding the impacts of UOG traffic on local communities are applicable to Wales.

5.53 Wales-specific economic scenarios (based on the scale of the proposed developments with planning and/or environmental consents) were used to provide estimations of the regional scale impact of UOG traffic.

5.54 A strategic review of the planning and regulatory structure in Wales was conducted.

## **What where the outcomes and/or recommendations**

5.55 The report identifies six potential effects on local communities associated with vehicle movements:

- Potential for accelerated road surface degradation
- Risk of increased accidents
- Risk of accidental release of hazardous material during transportation
- Air pollution impacts
- Noise
- Nature conservation

5.56 The report concluded that additional traffic movements associated with UOG resources were found to be unlikely to be significant or detectable at a regional or national scale, and therefore the focus should be on assessing and managing local scale impacts.

5.57 The volume of traffic movements could potentially be greater for Coal Bed Methane de-watering than fracking, because a proportion of fluids used in fracking remains below the surface.

<b>Q4: Do you have a view on the Transport and Planning evidence?</b>
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## **Decommissioning, Site Restoration and Aftercare**

5.58 AECOM authored the Scottish Government commissioned report:

Unconventional Oil and Gas: Decommissioning, Site Restoration and Aftercare - Obligations and Treatment of Financial Liabilities (2016). The research aims of the Scottish report were to:

- better understand the steps that can be taken to ensure decommissioning, site restoration and aftercare can be undertaken in a way that ensures robust regulation and minimises impacts on communities and the environment;
- identify and explore different models of financial guarantee that provide robust security against liabilities and improve understanding of associated costs.

## **What Welsh Government asked**

5.59 AECOM was asked to provide a view on:

- Whether the evidence presented in the Scottish Government Report is applicable or not in Wales
- Whether the recommendations within the Scottish report were equally applicable to Wales.
- The potential impact of Wales's specific legislation on site decommissioning, restoration and aftercare.

## **What review and/or analysis was conducted (AECOM)**

5.60 An assessment was undertaken by AECOM of each individual conclusion, recommendation or evidence gap presented in the Scottish Government Report and its applicability in Wales.

5.61 This report also identifies any significant new and relevant published evidence or evidence gaps which are specific to Wales and which are not addressed by the existing Scottish Government Report.

## **What were the outcomes and/or recommendations**

5.62 The AECOM review identified that the conclusions of the Scottish Government report largely apply to Wales, including the regulation of coal bed methane activities. In particular:

- Decommissioned oil and gas wells are unlikely to leak gases or other fluids from the sub-surface to groundwater or to the atmosphere if constructed and abandoned to comply with international standards and industry best practice.
- Wales, in common with the rest of the UK, has a framework for the regulation and control of decommissioning and aftercare of UOG development comparable with good regulatory systems in other countries
- The devolution of the OGA's powers to the Welsh Government offers the opportunity for Welsh Government to test the financial robustness of operators both during licensing and during licence transfers.

<b>Q5: Do you have a view on the Decommissioning evidence?</b>
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## **Economics**

5.63 Welsh Government commissioned a report entitled 'Socio-economic Impact of Unconventional Gas in Wales', to assess the recoverable reserves of unconventional gas in Wales and the economic benefits. The report was commissioned in accordance with the Energy Wales: A Low Carbon Transition Delivery Plan March 2014<sup>23</sup>.

5.64 The report, prepared in 2015 by Regeneris, AMEC and Cardiff University, examined the potential regional economic benefits of the development of unconventional gas.<sup>24</sup> The 2015 report comprised a literature review examining economic impact evidence on unconventional gas, a review of the UK policy and planning framework, and a review of potential petroleum resources.

5.65 The 2015 report also generated a series of scenarios, which were then examined to estimate direct and indirect economic effects associated with three different scales of unconventional gas activity. The focus in the economic modelling was on local effects in terms of employment and income support.

5.66 The initial research revealed how constraints in the regional supply chain will place limits on how the expansion of unconventional gas capacity could create new economic opportunities in the case of the Welsh economy.

### **What Welsh Government asked**

5.67 In light of new evidence regarding the scale of the proposed petroleum/CBM industry in Wales, Cardiff University were asked to revisit the 2015 report and consider whether the findings of the report, particularly in connection with the different development scenarios around potential coal bed methane, were still applicable.

### **What review and/or analysis was conducted**

5.68 Cardiff University reviewed the original 2015 report against the scale of the proposed developments with planning consents and/or environmental permits in place to determine if the scenarios used in the report still provided a contemporary basis for economic modelling.

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<sup>23</sup> <https://gov.wales/topics/environmentcountryside/energy/energywales/?lang=en>

<sup>24</sup> We take unconventional gas here to cover shale gas (although oil is also relevant but less common in Wales), coalbed methane (CBM) and gasification. Whilst shale gas and CBM refer to specific fossil fuels, gasification refers to one particular technique for extracting product gas including methane.



## **What where the outcomes and/or recommendations**

5.69 Cardiff University determined that little has actually changed in the period July 2015-July 2017. The level of activity expected, and resulting economic effects in Wales are consistent with a Low Development Scenario in the 2015 report. Alignment with the Low Development Scenario is based on the fact that

- There has been no recent exploratory drilling in Wales.
- Planning applications are overwhelmingly CBM as opposed to shale gas.
- Potential developments slated for the early 2020s, would only result in an estimated 11-13 CBM production boreholes.

5.70 The 2015 report by Cardiff University is assessed to still provide a contemporary analysis of economic issues. The key conclusions are:

- Constraints in the regional supply side place limits on the expansion of unconventional gas capacity.
- Unconventional gas economic impacts are likely to be transitory with much of the regional economic activity supported during early stage operations, and with drilling crews expected to be highly mobile. Unconventional gas in Wales is unlikely to be of the scale and nature to create any longer term transformative economic effects for the region.

5.71 The British Geological Survey's conclusion in their 2013 report was there was not enough publically available data to estimate the recoverable reserves of unconventional gas. The position in 2018 remains unchanged.

**Q6: Do you have a view on the Economic evidence?**

## **Additional Sources of Information.**

**Q7: Do you have sources of additional relevant evidence you are aware that has been published? If so please provide details.**

## **6 . Analysis to inform the Future Policy for Wales**

### **Analysis**

6.1 To inform the future petroleum extraction policy for Wales, we have reviewed our evidence base against the Well-being goals and the Sustainable Development principle in the Well-being of Future Generations Act. The Well-being of Future Generations Act requires public bodies in Wales to work better with others and take a more joined up, long-term approach so that policy and decisions have a positive impact on people now and in the future. In particular, we have considered whether supporting or conversely preventing the extraction of petroleum in Wales contributes to the Well-being goals and the Sustainable Development principle.

### **Well-being Goals**

#### **A Prosperous Wales**

- 6.2 This goal describes an innovative, productive and low carbon society which recognises the limits of the global environment and uses resources efficiently and proportionately, including acting on climate change.
- 6.3 The evidence from the 2015 Regeneris study, and revisited through the recent review, is that economic impacts are likely to be transitory with much of the regional economic activity occurring during early stage operations and with specialist personnel expected to be highly mobile and not from the local communities. The scale of petroleum reserves are estimated to be low when compared to the rest of the UK. In particular, activity around shale gas and coal bed methane is unlikely to be an activity that is well embedded in the local economy and is unlikely to be of the scale and nature to create any longer term transformative economic effects for the region.
- 6.4 The extraction of petroleum does not directly contribute to the development of a low carbon society. Evidence shows that the carbon impact of petroleum extraction is relatively small compared to other emission sources in Wales, although this impact would increase with additional petroleum extraction sites. The carbon impact clearly increases however when the petroleum is combusted. Petroleum supports our current economy, particularly as a source of energy to generate electricity, provide heat and as a fuel source for transportation. The recent advice to the Welsh Government from the UK Climate Change Committee shows that there will need to be significant emission reductions across all part of the economy if we are to achieve our statutory emission reduction targets. However, the UKCCC also indicates that petroleum will have an ongoing role to play across a number of sectors in the economy as we transition to a low carbon society.

- 6.5 The financial benefit from the extraction of petroleum accrues largely to the licence holder or the UK Government, in the form of tax receipts. The evidence suggests that any wider economic benefits from petroleum extraction will be transitory.

### **A Resilient Wales**

- 6.6 A resilient Wales can be achieved through making choices which sustain jobs over the longer term whilst protecting the natural environment for future generations.
- 6.7 The evidence suggests that much of the impact on the environment can be managed at a local level if petroleum extraction sites are properly run and regulated. Fossil fuels including petroleum have historically played a very important role in meeting Welsh and wider UK energy needs and delivering jobs and economic benefit. Over the past few decades, Wales has become much more reliant on importing fossil fuelled energy sources to meet our energy requirements. Going forward Wales is developing policies that seek to reduce fossil fuel use and therefore GHG emissions.
- 6.8 Fossil fuel use can be reduced by increasing energy efficiency and employing non-fossil fuelled energy sources. In the medium to long term, Wales is working to encourage the reduction of fossil fuel energy generation and use. Ending our reliance on fossil fuel in the long term and switching to low carbon and sustainable alternatives is an effective way of reducing the carbon intensity of our energy mix. Developing additional sources of low carbon and renewable generation will support Wales becoming more resilient, particularly from an economic perspective, given the global shift away from fossil fuels. In the short term, the transition to a low carbon economy needs to be carefully managed to ensure the security of our electricity and heating supplies and industrial feedstocks.

### **A Healthier Wales**

- 6.9 A Healthier Wales can be achieved through the reduction in emissions and air pollution as a result of generating energy from low-carbon sources.
- 6.10 As with conventional extraction, the evidence sets out that the potential risks to public health and local environment from exposure to the emissions associated with unconventional gas extraction should be low if the operations are properly run and regulated. However there remains concern around the risks to groundwater, through the escape of hydraulic fracturing fluids or substances dissolved within native rocks.

6.11 However, there are gaps in the evidence base and more knowledge is required to better understand the technology to minimise risk and how current regulations can best be applied. This explains the adoption of the precautionary approach in Planning guidance, particularly in relation to unconventional techniques.

6.12 One of the significant concerns raised by the public relates to increased traffic around petroleum extraction sites. Additional traffic movements associated with unconventional petroleum resources were found to be unlikely to be significant or detectable at a regional or national scale, and therefore the focus should be on assessing and managing local scale impacts through the existing regulatory and planning framework.

### **A more equal Wales, a Wales of cohesive communities and a Wales of vibrant culture and thriving Welsh language**

6.13 There is little in the evidence that suggests that the further development of petroleum extraction will contribute to the goals of a more equal Wales, create more cohesive communities and a Wales of vibrant culture and thriving Welsh language. Many of the potential areas for extraction of petroleum in Wales include some of the most deprived communities in Wales (many of which have previous experience of hosting extractive industries) and the evidence suggests that there is little immediate benefit for the communities in question.

6.14 Most of the economic opportunities associated with extraction are considered to be transitory, with drilling crews highly mobile, nor are there immediate financial benefits to communities resulting from petroleum extraction. The evidence does suggest that the transport impacts on communities from petroleum extraction are unlikely to be significant at a regional or national level. There may however be transport impacts on communities at a more local level which would need to be assessed and managed.

### **A Globally Responsible Wales**

6.15 A Globally Responsible Wales can play its part in supporting global wellbeing by, amongst other things, playing its part in reducing its carbon footprint in order to limit the rise in global temperatures, line with the 2015 Paris Agreement.

6.16 The majority of greenhouse gas (GHG) emissions in Wales are in the form of carbon dioxide (CO<sub>2</sub>), resulting almost entirely from the combustion of fossil fuels. The dominant share of the global energy supply is still based on fossil fuels of oil, coal and gas. Given the close relationship between energy use

and GHG emissions, short term energy policy choices can have significant long term implications for climate change.

- 6.17 The phase-out of fossil-fuel generation will reduce carbon emissions and contribute to keeping the average global temperature below 2°C above pre-industrial levels, and will contribute to the pursuit of efforts to limit the temperature increase to 1.5 °C above pre-industrial levels.
- 6.18 In considering our statutory responsibilities towards reducing carbon emissions there is a lack of evidence on the greenhouse gas footprint of Coal Bed Methane production to enable informed decisions about development of the sector. This evidence will only be available once production starts and carbon emissions have occurred. Wales and the wider UK economy rely heavily on imported petroleum and the key levers relating to energy policy sit with the UK Government. However, Wales does have the power to set policies in relation to the use of its natural resources and limiting the extraction of fossil fuels in Wales, thus ensuring that they are not available for combustion for other purposes, can potentially contribute to the wider goal of limiting global temperature increases and being globally responsible.

#### Sustainable Development Principle

##### **Long-term**

- 6.19 Our evidence as well as our accompanying analysis has considered how our petroleum extraction policy can contribute to our long-term needs. In particular, we have considered the existing needs of society and the role that petroleum plays in supporting existing energy generation, heating, transportation and production and manufacturing. These needs are largely met through the importation of petroleum. We have also assessed the future emission-reduction trajectories for these sectors which suggest rapid and significant decarbonisation over the next 30 years.
- 6.20 Extraction of petroleum in Wales will potentially provide additional supplies of petroleum at a time when we will need to start to reduce our reliance on unsustainable fuel sources. The extraction and use of petroleum will not directly contribute to our long-term vision of a low-carbon Wales. Alongside the carbon impacts, we have also considered the long-term environmental impacts (for instance, the ongoing impacts of petroleum extraction on the natural environment and issues such as groundwater supplies) and the economic impacts of petroleum extraction on Welsh communities.

## **Prevention**

- 6.21 Our evidence work and our assessment has considered the extent to which petroleum extraction can help problems occurring or get worse and assist public bodies in meeting their wellbeing goals. In broad terms, extraction of petroleum will contribute to the additional supply of petroleum within the energy system and it is difficult to know whether such a supply will displace imported petroleum or simply depress existing prices and create additional demand. The extraction of this natural resource, and its potential combustion following extraction, potentially contributes to our overall emissions, either in Wales or beyond. This does not contribute directly to the Prosperity wellbeing goal.
- 6.22 The development of additional petroleum extraction sites creates additional sites which will need to be regulated and monitored over the longer-term, creating additional regulatory and resource requirements, at a time when economies are increasingly moving over to increasingly low-carbon sources of energy generation. The evidence and assessment does suggest that with appropriate regulation and standards, site-specific environmental impacts can be managed at a local level. A similar argument applies to potential impacts on public health. However, there are gaps in the evidence base which explains why the Welsh Government has to date adopted a precautionary approach from a Planning perspective to these types of developments. .

## **Integration**

- 6.23 Our evidence work, and the assessment that we have undertaken to support this consultation, has sought to integrate and consider the different policy issues and impacts related to petroleum extraction in Wales and how our approach can contribute to the different Wellbeing Goals, as set out in the assessment above. In particular, we have considered the environmental (local and global), economic and social impacts related to petroleum extraction in determining our overall approach to petroleum extraction. We have sought to integrate this work with other policies under development such as national planning policy.

## **Collaboration**

- 6.24 We have collaborated with a range of organisations to develop the evidence base and policy in relation to petroleum extraction. This includes working with organisations such as the UK Government, the Oil and Gas Authority, the UK Climate Change Commission and the Office of the Future Generations Commissioner as well as a range of academic and research bodies such as Cardiff University and the British Geological Survey.

## Involvement

6.25. This consultation process will help us to get the views of individuals and organisations on our proposed approach towards petroleum extraction. In parallel with this consultation, the Welsh Government will be consulting in summer 2018 on our low carbon pathway to 2030. This consultation will set out our broad policy proposals on what we need to do to ensure that we meet our 2030 emission reduction targets, in line with our statutory obligations. As part of the consultation process, we will be undertaking engagement events and this will provide an opportunity for individuals and organisations to consider our approach to petroleum extraction within the wider context of decarbonisation.

## In Summary

- 6.26 Prosperity is about far more than material wealth and cannot be delivered through economic growth alone. It is about every person in Wales enjoying a good quality of life, living in a strong, safe community and sharing in the prosperity of Wales.
- 6.27 To meet our climate change targets, our long-term aim is to remove fossil fuels from our energy mix whilst minimising economic impact and providing clarity for investors and encouraging them to invest in lower carbon alternatives. *Taking Wales Forward 2016-2021* set out the Welsh Governments continued opposition to fracking. The Environment (Wales) Act 2016 requires a system of 5 yearly carbon budgets and interim targets. These serve as stepping stones and ensure that regular progress is made towards this long-term target.
- 6.28 Our assessment, based on the evidence base and set out in the previous chapter, highlights a number of key issues. The evidence suggests that at a local level, the environmental and public health impacts of petroleum extraction can be managed through the appropriate running and regulation of sites – although there are gaps in the evidence base. The transport impacts of petroleum extraction are not considered to be significant although there would likely be localised impacts. The transport impacts of CBM extraction are considered to be larger than other types of petroleum extraction due to the de-watering requirements and the need to manage that additional wastewater.
- 6.29 However, the evidence also suggests that there are ongoing environmental and health risks, partly due to the lack of specific evidence relating to CBM extraction. The evidence suggests that there is limited economic benefit to Wales from supporting petroleum extraction – many of the drilling jobs are highly mobile in nature and the economic benefits are considered to be transitory – nor are there immediate financial benefits to communities from petroleum extraction.

6.30 Whilst extraction of petroleum does not result in significant additional emissions, the use of the extracted petroleum is likely to generate additional emissions and it will be very difficult to identify whether the extracted petroleum displaces imported petroleum. The further development of new petroleum sources broadly run counter to the ambitions identified in the Wellbeing Goals and our commitment to a low-carbon future.

## **7. Proposed Future Policy for Petroleum Extraction in Wales**

7.1 We do not believe that the evidence set out above, alongside the analysis, presents a compelling case that the benefits of petroleum extraction outweigh our commitment to sustainably manage our natural resources. Therefore our future proposed policy for petroleum (oil or gas) extraction is;

***We will not undertake any new petroleum licensing in Wales, or support applications for hydraulic fracturing petroleum licence consents.***

7.2 In doing this the Welsh Government will be taking a small, yet important step towards a decarbonised future in Wales and will be contributing to the global movement away from fossil fuels. Whilst noting the ongoing role of petroleum in the medium term, we believe that Wales' interests are best served by focussing on the further development and deployment of low carbon sources of energy generation to meet our energy needs, heat our homes and meet our transportation needs rather than developing new sources of petroleum extraction. We believe that such an approach will drive greater benefits for Wales and better support our Wellbeing goals.

7.3 Exceptions to this position will be considered where the recovery of oil or gas is required for mine safety or scientific purposes such as:

- Abandoned Mine Methane recovery to prevent gas that accumulates in abandoned mines from finding its way to the surface in an undesirable manner, or Methane which is recovered to ensure safe operation of a mine.
- Research studies where the recovery of oil and gas is purely for the advancement of scientific knowledge and not for commercial production.

7.4 Existing PEDLs will be considered subject to our decarbonisation commitments and the application of Welsh Government planning and petroleum policies in accordance with the law.



7.5 Planning policies can be found at;

<https://gov.wales/topics/planning/policy/?lang=en>

7.6 A statutory framework for decarbonisation will be published for approval by the National Assembly in late 2018. This will set out accounting framework and our trajectory, with interim carbon targets. Further information can be found at:

<https://gov.wales/topics/environmentcountryside/climatechange/emissions/?lang=en>

7.7 Definitions relating to the proposed Oil & Gas policy are;

- Any mineral oil or relative hydrocarbon and natural gas existing in its natural condition in strata (Petroleum Act 1998)
- Oil or gas extraction” means a development connected to the exploration, appraisal or extraction of oil and gas.

7.8 The principles and analysis set out in this consultation will also be relevant to the Welsh Ministers’ marine licensing decisions in relation to offshore petroleum extraction.

Questions:

**QU. 8 Do you agree with the proposed policy and why?**

**QU.9 Do you have any additional evidence to support your view?**

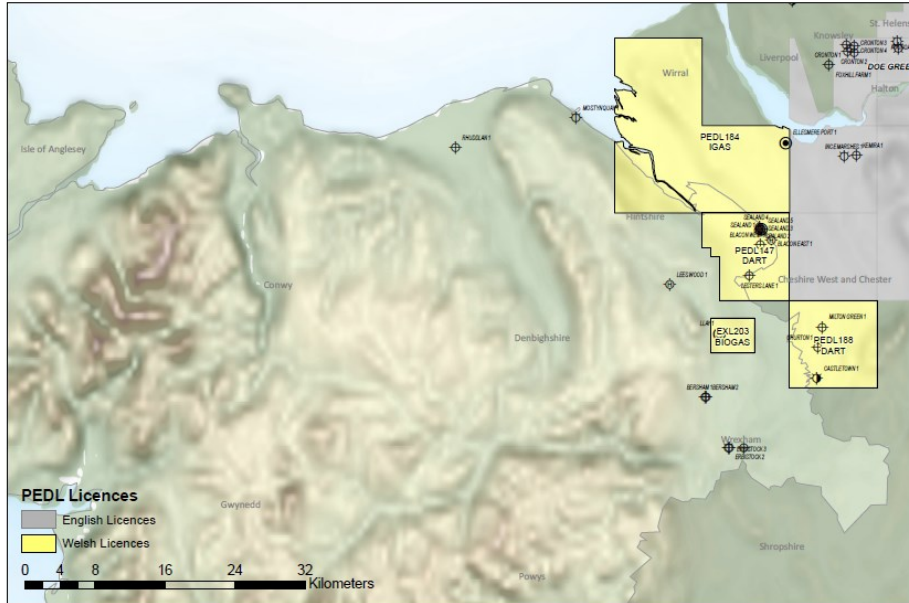
## **8. Next Steps**

8.1 Subject to the outcome of consultation, we plan to make an announcement before the end of 2018 on what Welsh Government policy will be for petroleum extraction.

# Appendix A

## Onshore PEDL Licences in Wales

### Onshore PEDL Licences in North Wales



### Onshore PEDL Licences in South Wales

