Nottinghamshire County Council

Onshore oil and gas development in Nottinghamshire

February 2016 (updated August 2016)

Introduction

Oil and gas is important to our economy and as supplies of offshore reserves in the North Sea begin to decline, supplies of onshore reserves are becoming increasingly important. Around one third of our energy requirements are provided by gas for industrial purposes, energy generation and for domestic heating and cooking.[1]

Since 2004, the UK has been a net importer of gas. In 2014 45% of UK gas supply was made up of net imports. By 2030 the UK could be importing 75% of the gas we consume assuming new onshore reserves are not developed.[2]

Domestic oil production has also declined since reaching a peak in 1999. Currently net imports comprise around 40% of the oil we use. The Department of Energy and Climate Change, (now part of the Department for Business, Energy and Industrial Strategy), estimate that net imports could increase to 75% of the gas we consume by 2030.[3]

The Government believes that developing onshore gas reserves could help fill the gap alongside renewable and nuclear electricity, helping the UK reduce carbon emissions. It could also provide greater security of energy supply and improve energy resilience.

The National Planning Policy Framework expects Minerals Planning Authorities should when planning for on-shore oil and gas development, including unconventional hydrocarbons, clearly distinguish between the three phases of development – exploration, appraisal and production- and address constraints on production and processing within areas that are licensed for oil and gas exploration or production.

Since the 1940's Nottinghamshire has extracted oil from across the county and more recently has also extracted gas from disused mine shafts. There is the potential for other types of unconventional hydrocarbons such as shale gas to be extracted, however the extent of the viable resources are currently unknown.

This document has been written to identify the main types of oil and gas activities, the planning process involved and the existing and potential future onshore oil and gas developments in Nottinghamshire.

This document is not intended to set planning policy for hydrocarbons developments as this is covered by national planning policy and the emerging Nottinghamshire Minerals Local Plan.

This document will be updated as and when new information is available. Further information is available in the 'Frequently Asked Questions about shale gas development' and the Nottinghamshire Minerals Local Plan Hydrocarbons background paper both of which can be found on the County Councils website.

[1] DECC, Digest of UK Energy Statistics, July 2015

[2] DECC, Digest of UK Energy Statistics, July 2015

[3] DECC, UK oil and Gas production Projections, March 2015

Types of hydrocarbon development

There are two categories of hydrocarbons; conventional and unconventional. The main difference is the techniques used to extract the oil and gas.

Conventional oil and gas

Conventional onshore oil and gas refers to oil and gas resources located in relatively porous sandstone or limestone rock formations and that will begin to flow without additional stimulation. Conventional oil and gas resources can be found on-shore as well as off shore (i.e. the North Sea)

The oil and gas industry is well established in the UK, and over the last 50 years more than 2000 wells have been drilled onshore. The Witch Farm oilfield in Dorset, the largest onshore oilfield in Europe, dominates onshore oil and gas production followed by production in the East Midlands.

Mine gas

Mine gas refers to the methane that is released from coal seams during deep mining. When coal mining ceases and ventilation shafts are closed, this gas can fill the mineshafts and other voids and can escape to the surface where it can pose a threat to health and safety in the locality. This gas can be collected and burnt on site to generate electricity so making good use of a very potent greenhouse gas that would otherwise be lost to the atmosphere. Its collection can also help resolve health and safety issues that uncontrolled gas seepages to the surface can cause.

Unconventional gas

Unconventional oil and gas reserves are trapped within impermeable rock or coal seams. Unlike convention reserves, additional stimulation is required in order to enable the gas to flow. Hydraulic fracturing is one such method that can be used.

Like other conventional oil and gas extraction, a well is drilled down to the identified resource and several stages of metal pipes (“casing”) are set in concrete within the well, to seal it and prevent contamination of surrounding groundwater. A well for unconventional gas (excluding mine gas) will go down vertically to the coal seam or source rock before running horizontally along it.

Gas collected from an unconventional well is essentially the same as conventional gas i.e. mostly methane.

Coal bed methane

Coal bed methane extraction involves removing methane directly from the coal seam. The water contained in the coal seam is removed to reduce the pressure on the coal, enabling the gas to be collected. The industry is most developed in the USA, whilst in the UK and Europe it remains in its infancy. Interest is however developing and it could become a significant energy source for the future. Hydraulic fracturing is not required to release the gas.

Shale gas

Large quantities of methane exist in shale deposits worldwide and recent technological advances have now made it economically possible to extract the gas. The technology and exploitation of shale gas is most advanced in the USA where it has gone through a period of very rapid development and is now exploited on a very large scale. The UK also has a significant, but as yet largely untested potential shale gas resource.

In the UK shale rock containing gas is found at depths between 1500 and 4200 metres much deeper than the UKs deepest coal mine at around 800m and conventional oil and gas reserves at around 1000m. (see figure 1)

In order to release the gas from the shale rock hydraulic fracturing is required. The process of hydraulic fracturing is set out below.

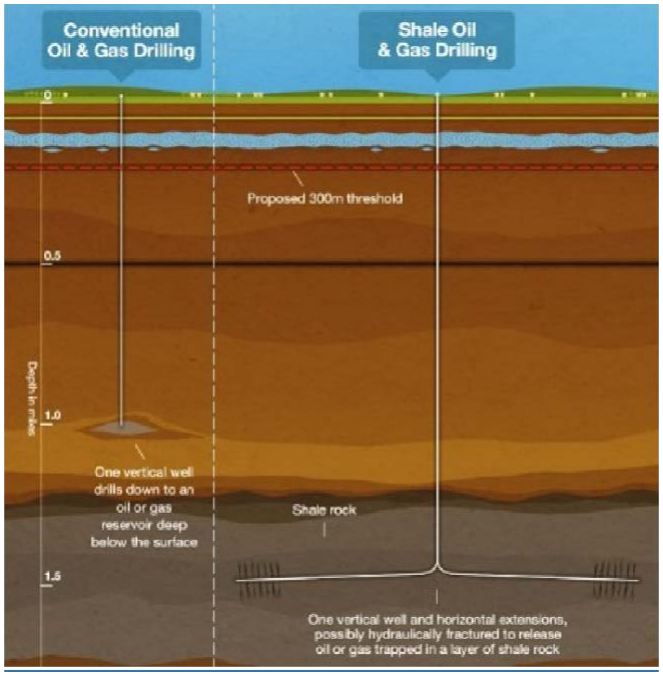


Figure 1: Depths of extraction (copyright: DECC)

The process involved in hydraulic fracturing

A mixture of water, sand and chemicals is pumped under high pressure into the well to fracture the shale rock to enable the gas to be released. This process is known as hydraulic fracturing or 'fracking'. The resulting fractures in the rock are only a few inches long but enable the gas to flow out of the rock. (See figure 2) The chemicals - around 2% - are used to provide lubrication for the drill to help to reduce friction, the sand is required to keep the fractures open. All chemicals used in the 'fracking' process require pre-approval from the Environment Agency.

Fracturing rock for shale gas and oil is likely to use large volumes of clean water, although the amount is not exceptional compared with other industrial or leisure activities.

The volume will depend on the site, but operating a shale gas well for a decade would typically use a similar volume to that needed to water a golf course for a month[4].

[4] United Kingdom Onshore Oil and Gas

Water companies will assess the amount of water available before agreeing to supply an operator. If the operator applies for a licence to extract water themselves, it will be granted by the environmental regulator only where a sustainable water supply is available. Water UK and industry have also agreed to cooperate on water demand, reuse and management.

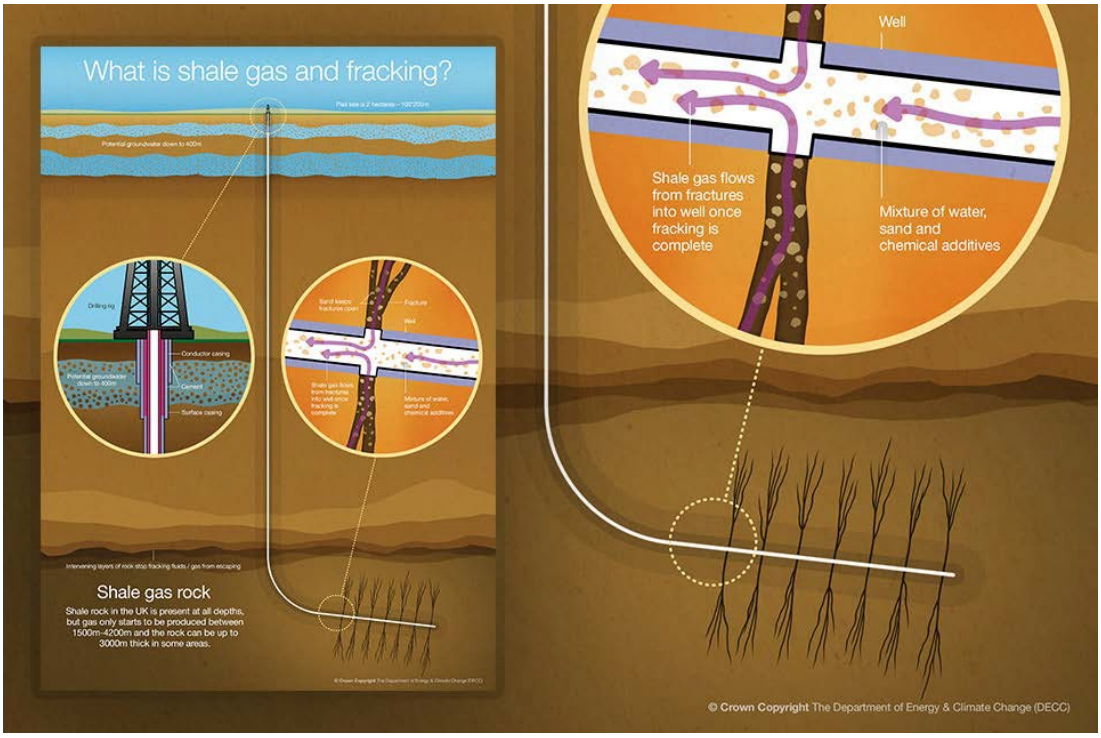


Figure 2: What is shale gas and fracking

Phases of oil and gas development

The extraction of shale gas involves three main phases: exploration; appraisal and production. Planning permissions and licences/permits are required for each stage.

Exploration phase: Seismic surveys are used to understand the geological structure in the area although they do not prove the existence of mineral resources. In most cases the initial seismic survey work can be completed under permitted development rights. Exploratory drilling is then used to determine whether hydrocarbons are present. Planning permission for any proposed drilling work is required. It is a short-term but intensive activity.

Testing and Appraisal phase: This phase may involve further drilling to establish whether the deposit can be economically exploited. It includes hydraulic fracturing and is usually a relatively short-term activity, typically between six months and two years.

Production phase: This involves the long-term production of oil or gas commercially and again includes hydraulic fracturing.

Regulatory bodies involved in the oil and gas licensing process

The process to secure permission for oil and gas development is strictly controlled in the UK and as well as gaining planning permission for the activity a range of regulatory bodies are involved in licensing and permitting new development. The regulatory bodies are set out below:

Oil and Gas Authority (an independent regulator)

The Oil and Gas Agency (OGA) issue Petroleum Exploration and Development Licences (PEDL). These give the licence holder exclusive permission to drill under the licence area once other permissions and approvals are in place. The OGA assess the risk of seismic activity caused by drilling, such as the risk of an earth tremor. They also grant consent for flares or vents – a safety device to burn off gases which cannot be used.

PEDLs are valid for a sequence of terms and are designed to comprise the typical life cycle of a field (exploration, appraisal and production). These can be summarised as follows:

- The initial term for a licence is usually an exploration period and is usually set for a period of six years; and
- The second term is intended for appraisal and is set for five years. Each licence expires automatically at the end of each term, unless the licensee has completed the working programme agreed with the OGA. A licence will expire at the end of a second term unless the Secretary of State approves a development plan. The third term is intended for production and is set at 20 years.

At present 323 onshore licences have been issued by the OGA nationally. Further rounds of licensing will be undertaken in the future so this number is likely to change. The most recent licensing round was undertaken in December 2015.

Minerals Planning Authority – Nottinghamshire County Council

Securing planning permission from the Minerals Planning Authority – the relevant local county council in 'two tier' local government areas – is required at each of the three stages of shale gas development – exploration, testing and production. Planning permission has to be obtained for any wells and well pads to bore into the ground to extract the shale gas. The planning process assesses applications against national and local planning policy taking into account any material planning considerations to establish whether the development is an acceptable use of the land. This involves assessing the application against a range of practical issues contained in the Minerals Local Plan such as:

- Land allocation in the relevant development plan, for example for industry or housing
- Impact on residential areas through lighting, dust and noise
- Landscape and visual impact
- Traffic and transport routes
- Heritage features and archaeology
- Wildlife and flora
- Water resources and flood risk
- Site restoration and aftercare once the works have been completed.

The control of drilling processes, health and safety issues including the effect on human health and site emissions are subject to approval from other regulators including the OGA, the EA and the HSE. The County Council is not required to delay a planning decision about shale gas exploration until the licenses from other regulatory bodies have been provided.

Environment Agency (EA)

The site operator has to demonstrate to the Environment Agency that they have taken steps to protect local water courses, including groundwater resources.

The EA is responsible for making sure that the site operator takes adequate steps to protect local water courses. Extraction will take place well below the water bearing rock – or aquifer – that provides drinking water, due to the depth of the shale resource. Close working with the Health and Safety Executive is also undertaken to make sure the drilling well is constructed to a high standard to protect aquifers and drinking water supplies.

Groundwater is protected in the fracking process by:

- Ensuring the casing around the well hole is of an adequate standard
- Ensuring adequate distance (and therefore rock) between the fracking activity and the groundwater
- Ensuring the chemicals used and the amounts used render it harmless, should they enter the water supply
- Controlling the storage and disposal of waste from the sites.

The risks posed by the operations will be assessed and a decision made as to whether they can be permitted. If groundwater contamination is possible, either directly by drilling fluids, fracking fluids or indirectly by a substance disturbed by the borehole or fracking, the Environment Agency may find the environmental risk unacceptable and not permit activity.

The water and shale industries have, through Water UK and the UK Onshore Operators Group, signed an agreement to work together to identify, watch and manage risks to water quality, including waste water processing.

The EA also make sure that the operator is treating and disposing of waste water properly and that any emissions into the atmosphere are controlled. The operator will also have to show how they will handle any naturally occurring radioactive materials.

Health & Safety Executive (HSE)

The HSE's main role in relation to oil and gas developments is to regulate the health and safety risks to people from these operations. In doing this, the HSE works closely with the Environment Agency and the Oil and Gas Authority to ensure that all material considerations are addressed. This includes all phases of extraction, in particular responsibility for ensuring the appropriate design and construction of a well casing for any borehole.

Coal Authority

Under the Coal Industry Act 1994, any well likely to enter or pass through a coal sea, for any purpose, will require the agreement of the Coal Authority.

Such agreements lay down stringent requirements for the entering of coal seams and the subsequent provision for the supply of information. This includes accurate plans and sections of all wells drilled relative to Ordnance Survey datum and full well logs, including the method of drilling and method of treating and sealing of wells and a record of equipment left in the well.

Current planning policy and guidance for oil and gas

The National Planning Policy Framework (NPPF) and National Planning Practice Guidance (NPPG) sets out national planning policy for all minerals development including for onshore oil and gas in England.

The NPPF (paragraph 147) states that: Minerals Planning Authorities should when planning for on-shore oil and gas development, including unconventional hydrocarbons, clearly distinguish between the three phases of development - exploration, appraisal and production - and address constraints on production and processing within areas that are licensed for oil and gas exploration or production.

Further national guidance on onshore oil and gas was issued in July 2013 in the Planning Practice Guidance. The National energy policy also suggests a broadly positive stance, subject to the necessary environmental safeguards.

In 2015 the Government published a consultation document which proposed to amend the existing permitted development rights so that development which consists of the drilling of boreholes for groundwater monitoring for petroleum exploration can take place as permitted development. The government confirmed at the end of 2015 that it intended to amend legislation to provide for these new permitted development rights. These changes are expected to come into force in 2016.

The national policy and guidance is interpreted locally in the Nottinghamshire Minerals Local Plan, which is under review as part of the consultation process to create a new, up-to-date Minerals Local Plan covering the period up to 2030.

Any application for oil or gas development would need to be considered against a range of relevant policies, including the existing 'adopted' Nottinghamshire Minerals Local Plan and the 'emerging' Minerals Local Plan which includes a policy on hydrocarbons including shale gas.

Any oil or gas development would need to be assessed against a wide range of issues including:

- Land allocation in the relevant development plan, for example for industry or housing
- Transport and routes to get to the site
- Wildlife and flora including any important habitats/protected species that might be disturbed
- Impact on water resources and potential flood risks
- Impact on any local residential areas.

Nottinghamshire Minerals Local Plan

As the Minerals Planning Authority, Nottinghamshire County Council is responsible for preparing the Minerals Local Plan, the blueprint for future mining and quarrying in the county including gas and oil. The latest Plan is in preparation and includes a draft policy on the extraction of hydrocarbon minerals which include shale gas.

Recognising that all resources, including shale gas, can only be worked where they are found, the County Council has adopted a criteria based approach.

This sets out that proposals will be supported provided they do not give rise to any unacceptable impacts upon the environment or local communities.

Policy MP12: Hydrocarbon Minerals included in the Minerals Local Plan Submission Draft consultation document states:

Exploration

1. Proposals for hydrocarbon exploration will be supported provided they do not give rise to any unacceptable impacts on the environment or residential amenity.

Appraisal

2. Where hydrocarbons are discovered, proposals to appraise, drill and test the resource will be permitted provided that they are consistent with an overall scheme for the appraisal and delineation of the resource and do not give rise to any unacceptable impacts on the environment or residential amenity.

Extraction

4. Proposals for the extraction of hydrocarbons will be supported provided they are consistent with an overall scheme enabling the full development of the resource and do not give rise to unacceptable impacts on the environment or residential amenity.

6. Where proposals for hydrocarbon development coincide with areas containing other underground mineral resources, evidence must be provided to demonstrate that their potential for future exploitation will not be unreasonably affected.

Restoration

7. All applications for hydrocarbon development will be accompanied with details of how the site would be restored once the development is no longer required.

Consultation on the Minerals Local Plan Submission Draft document open between 15th February and 29th March 2016. It is expected that the Minerals Local Plan will be submitted to the Secretary of State for independent examination in early 2017 prior to formal adoption later in autumn 2017.

Preparing a planning application for shale gas development

Before a planning application for oil and gas development is submitted, a valid Petroleum Exploration and Development Licence will need to be issued by the Oil and Gas Authority.

Companies involved in the exploration for hydrocarbons must obtain the relevant permissions or licences from the following key regulators:

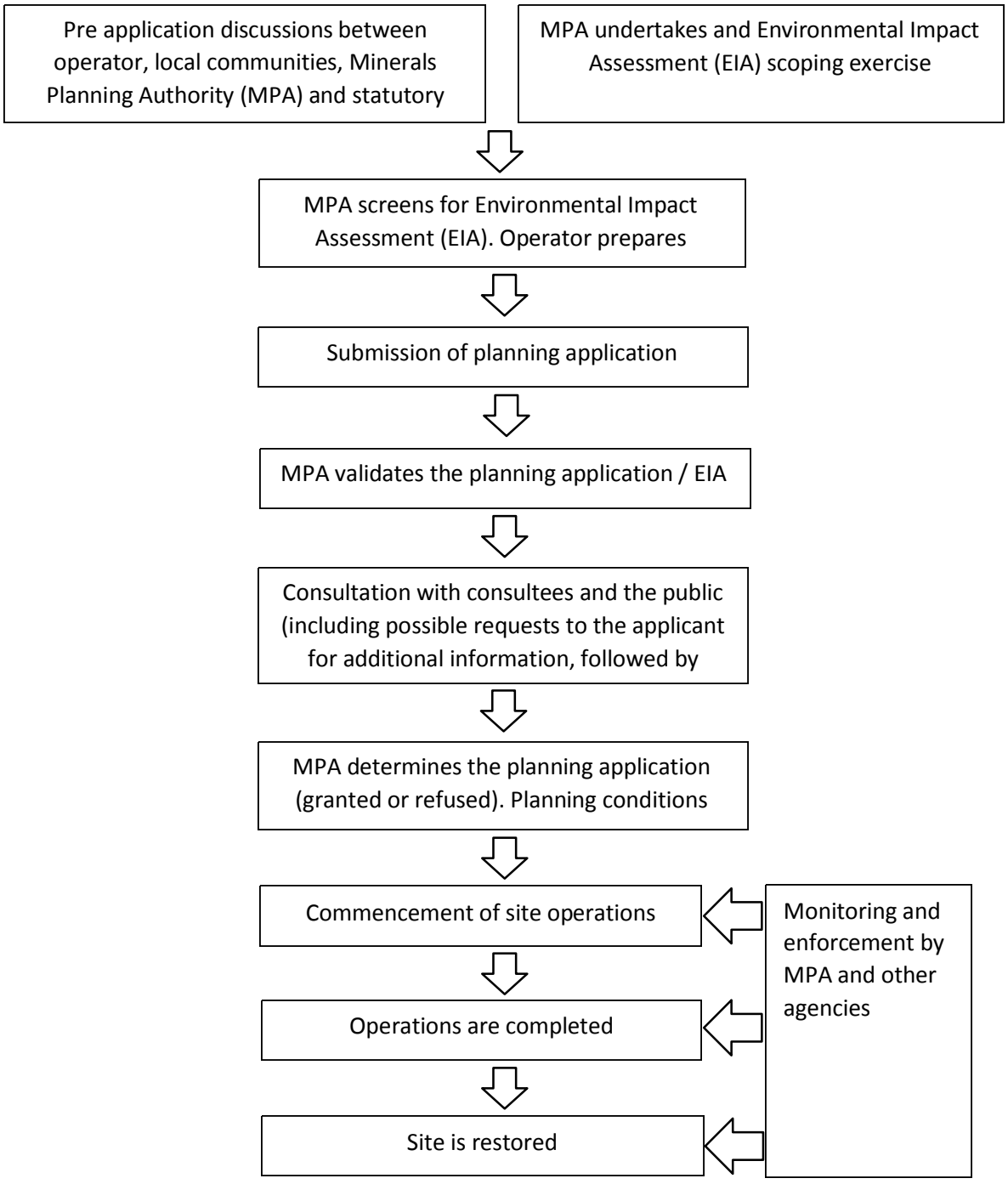
- Oil and Gas Authority (OGA)
- The Minerals Planning Authority. The Minerals Planning Authority for Nottinghamshire is Nottinghamshire County Council
- The Environment Agency (EA)
- The Health and Safety Executive (HSE)

Other bodies such as the Coal Authority may also be involved. Permission will also be required from the landowner. Any firm wanting to extract oil or gas would need to demonstrate how their application addresses all the relevant planning considerations and policies before planning permission could be given by Nottinghamshire County Council.

The planning application process

Obtaining planning permission is one of the main regulatory requirements that oil and gas operators must meet before any oil or gas development can take place. Nottinghamshire County Council as the Minerals Planning Authority is responsible for deciding planning applications for minerals development and will determine whether the activity is acceptable in planning terms. Figure 3 sets out the planning application process. Further information is contained in the County Councils adopted Statement of Community Involvement.

Figure 3. Planning application process



Environmental Impact Assessment

Certain planning applications for significant developments in environmentally sensitive areas are legally required to be accompanied by an Environmental Impact Assessment (EIA).

An EIA is a formal and detailed assessment of the likely impacts a particular development is anticipated to give rise to and how such impacts may be avoided or appropriately mitigated. Although only legally required in certain cases, the shale gas industry has undertaken to voluntarily submit an EIA for shale gas applications irrespective of whether or not one is legally required.

The first steps of the preparation of the EIA involve the prospective applicant submitting a scoping request by the applicant to the County Council.

The scoping request identifies a proposed site, outlines the proposed development, highlights the main environmental impacts and invites the County Council to provide a 'scoping opinion' setting out the environmental topics and key issues that the prospective applicant should include within their EIA. This includes site issues like impact on water resources, noise, visual impact, transport and restoration of the site.

Providing a 'scoping opinion' is a technical exercise and the 'scoping request' is therefore shared with various specialists both within the County Council and external organisations, such as the Environment Agency, for their comment and suggestions as to any additional points the EIA should consider.

Feedback will be used by the applicant to inform their proposals in readiness for the submission of a full planning application and EIA to the County Council.

As a technical exercise, the scoping stage does not involve members of the public, but they will have the opportunity to comment on the proposals as part of any pre-application publicity staged by a prospective applicant and in response to the full planning application as part of the formal consultation process.

Consideration of key issues

The County Council can take certain issues into account. These issues include:

- Whether the proposal is an acceptable use of the site
- The visual impact of a new building or structure (location, size, and appearance) on the local area and on the wider landscape (including designated landscapes)
- The impact on neighbours and the surrounding area resulting from overshadowing, overlooking, loss of privacy, and disturbance caused by noise and lighting
- The impact on the local environment including dust and air quality
- Whether new roadways, accesses, and parking are adequate and the impact on highway capacity and road safety
- The impact on the rights of way network
- The impact on the historic environment, including archaeological and heritage sites or features
- The impact on ecology and biodiversity, including designated wildlife sites, and protected habitats and species
- The risk of contamination to land and impact on soil resources
- The risk of flooding
- Land stability and subsidence
- Site restoration and aftercare and
- Consistency with national and local planning policies.

The County Council cannot take into account issues that are not legitimate considerations of the planning process. This includes:

- The number of letters or petitions received about an application as a reason to refuse permission
- The demand for, or alternatives to, onshore oil and gas resources
- Emissions, control processes, or health and safety issues that are matters to be addressed under other regulatory regimes
- Loss of views
- Boundary and other disputes between neighbours, for example, private rights of way or covenants or
- Loss of property value.

Public consultation on oil and gas applications

In line with the County Councils adopted Statement of Community Involvement any planning application for oil and gas development would be publicised by placing a press notice, erecting site notices and writing directly to people who live close by.

The County Council encourages people to submit their views in writing - preferably by email or via the County Council's on-line comments system - about any planning applications that might affect them. The publicity arrangements specify the relevant period within which written comments should be made.

During its consideration of the planning application, the County Council may consider that the applicant needs to submit further information to enable informed views to be reached on particular issues. Any additional information would be formally requested as part of the Environmental Impact Assessment and would be subject to further publicity and consultation. Interested parties would therefore have the opportunity to express views on the additional information and any changes to the proposed development.

In addition, the shale oil and gas industry has set out its own Community Engagement Charter. This includes commitment to engage with communities early at each stage of the planning process.

Role of the planning and licensing Committee

Most major planning applications, including those for oil and gas development accompanied by an Environmental Impact Assessment in Nottinghamshire are determined by the County Council's Planning and Licensing Committee.

The Committee makes decisions based on facts using the information presented by applicants with commentary and analysis from Planning Officers taking into account responses from technical consultees and the views expressed by other interested parties.

The Minerals Local Plan provides a framework through the policies it contains to support decision making by the Planning and Licensing Committee along with national policy and other planning guidance.

All decisions are made impartially by members of the Planning and Licensing Committee. The Planning and Licensing Committee acts in a quasi-judicial capacity. This means it makes decisions on an impartial basis taking into account the relevant facts and applicable law.

Both objectors and supporters may, with prior approval, speak at a meeting of the Planning Committee before a planning application is determined, although rules apply as to registering and there are limits on the numbers of speakers and duration.

Existing oil and gas extraction in Nottinghamshire

Nottinghamshire has reserves of oil in the north-eastern, central and southern areas of the county and during World War II, oil extraction started from land at Eakring. Since then, further oil fields have been identified mostly in north Nottinghamshire but ranging as far south as Rempstone near the county boundary with Leicestershire. In the 1970s, Nottinghamshire was the biggest producer of onshore oil in the UK.
The oil recovered in Nottinghamshire is high quality and is mainly used in the plastics and chemical industries, rather than as fuel. The majority of oil is taken by rail from the central collecting station at Gainsborough to refineries at Immingham in Humberside.

Oil

At the moment there is only one permission for oil and gas exploration in the county. This is at Radcliffe-on-Trent and involves conventional drilling, not shale gas exploration.

Ten wells are already producing oil from sites across the county including:

- Beckingham
- Bothamsall
- Eakring

Mine gas recovery schemes

Given the large number of coal mines in Nottinghamshire that have closed over the last 30 years, there is a large number of disused mines. As a result mine gas has been extracted for around 10 years, currently there are nine operational mine gas recovery schemes. A further two planning applications have been submitted but have yet to be developed.

Coal Bed Methane

Nearly all of Nottinghamshire overlies a potential coal bed methane resource but the most promising prospects are believed to be in the eastern half of the county due to the geological formation. Four planning permissions have been granted for exploration however currently there are no operational sites.

Shale gas

In Nottinghamshire, potential shale gas resources are thought to exist in deeply buried Bowland shale deposits found in the south and north of the County. To date one planning application for shale gas exploration has been received. The County Council has also undertaken EIA scoping for a second site.

An update list of oil and gas planning applications can be found at on the County Council website:

www.nottinghamshire.gov.uk/planning-and-environment/fracking-and-shale-gas-development/fracking-and-shale-gas-development/latest-news

Petroleum Exploration Development Licences

Due to the existing oil extraction in Nottinghamshire, the county has 27 Petroleum Exploration Development Licences issued by the Oil and Gas Authority. Further rounds of national licensing will be undertaken in the future so this number could change.

Further information is available from the Oil and Gas Authority website at: https://www.gov.uk/government/organisations/oil-and-gas-authority

Figure 4. Nottinghamshire hydrocarbons – current activity