



Infrastructure for Business

Getting shale gas working

SUMMARY DOCUMENT



Getting shale gas working

This document provides a short summary of the main IoD report, 'Getting shale gas working'. It should be read in conjunction with the main report, where all references, notes, explanations and acknowledgements are contained.

SHALE GAS: MODERN INDUSTRIAL DEVELOPMENT

Shale gas could represent a multi-billion pound investment, create tens of thousands of jobs, reduce imports, generate significant tax revenue and support British manufacturing. It could potentially meet a third of the UK's gas demand with a very small surface footprint, benefitting the environment at the same time.

This section includes the results of the IoD's detailed scenarios for a potential production phase.

Economic benefits

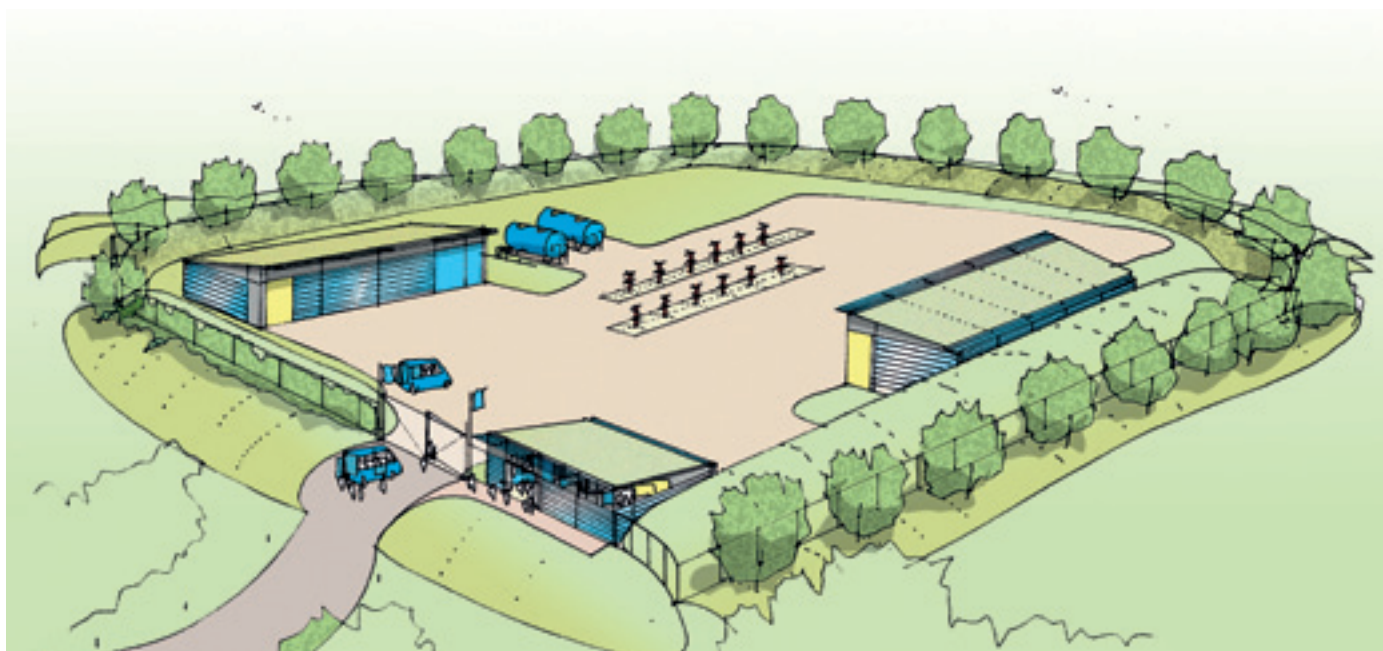
- UK shale gas **production** could peak at 853 billion cubic feet (bcf) per annum in the low scenario, 1,121 bcf in the central scenario and 1,389 bcf in the high scenario. For comparison, the UK's gas demand was 3,055 bcf in 2011.
- **Investment** (capex and opex) could reach £3.7 billion a year, supporting 74,000 **jobs**.
 - Geologists, engineers, construction workers, business analysts, truck drivers and public relations staff are examples of the people needed by the **industry**.
 - Cement and steel manufacturers, equipment manufacturers, drilling services companies and water treatment specialists would form important parts of the **supply chain**.
 - **Spending** by the employees of the industry and its supply chain would benefit local businesses, including restaurants, shops, pubs, theatres and hotels.
- Just as importantly, shale gas could support jobs in the **chemical industry and wider manufacturing** by providing secure energy and important feedstocks. This could help the UK to make more. In the US, PwC and Citi have estimated that at least 1 million **new manufacturing jobs** could be created over the next decade.
- Shale gas production, with tax rates of up to 62%, could generate significant **tax revenue**.
- In the central scenario, gas import dependency could be reduced from 76% to 37% in 2030, and the cost of net gas imports in 2030 could fall from £15.6 billion to £7.5 billion (2012 prices).

Environmental benefits

- According to the Committee on Climate Change, if production is well regulated, shale gas can have **lower emissions** than imported LNG. A recent report for the European Commission also reached the same conclusion.
- To the extent that UK shale gas supports the production of chemicals and other goods **in the UK** rather than overseas, emissions will be lower, as UK industry is more energy-efficient than in most countries.
- Natural gas has great potential as a **transport fuel**, particularly for HGVs and buses. Using Compressed Natural Gas in place of diesel could reduce CO₂ emissions and improve air quality. In the US, 19% of municipal buses run on natural gas, and the Chief Executive of FedEx has predicted that up to 30% of US long-distance trucking will be fuelled by compressed or liquefied natural gas over the next 10 years.

Surface footprint

- A **two-hectare site** could potentially support a 10-well pad of 40 laterals, representing an investment of £514 million and supporting 1,104 jobs at peak. It could produce 126.2 bcf of gas and, at peak, power 747,000 homes. It could use 544,000 m³ of water and see 11,155-31,288 truck movements over 20 years, depending on whether the water comes from a mains connection or is trucked in. Assuming truck movements are concentrated in the early years of drilling activity, this averages out at 6.1-17.1 per day over five years.
- A production phase of 100 such pads, as used in the IoD's scenarios, would require just 200 hectares, or **two square kilometres**. The pads would of course be scattered, and additional land would be needed for gathering stations, compressors and water treatment plants. Overall, however, shale gas development would not need vast tracts of land.
- The UK's **water** resources are not unlimited, but around 11,000 million m³ of water is abstracted from non-tidal sources each year. Water use for shale gas could reach 5.4 million m³ a year, around 0.05% of the total.



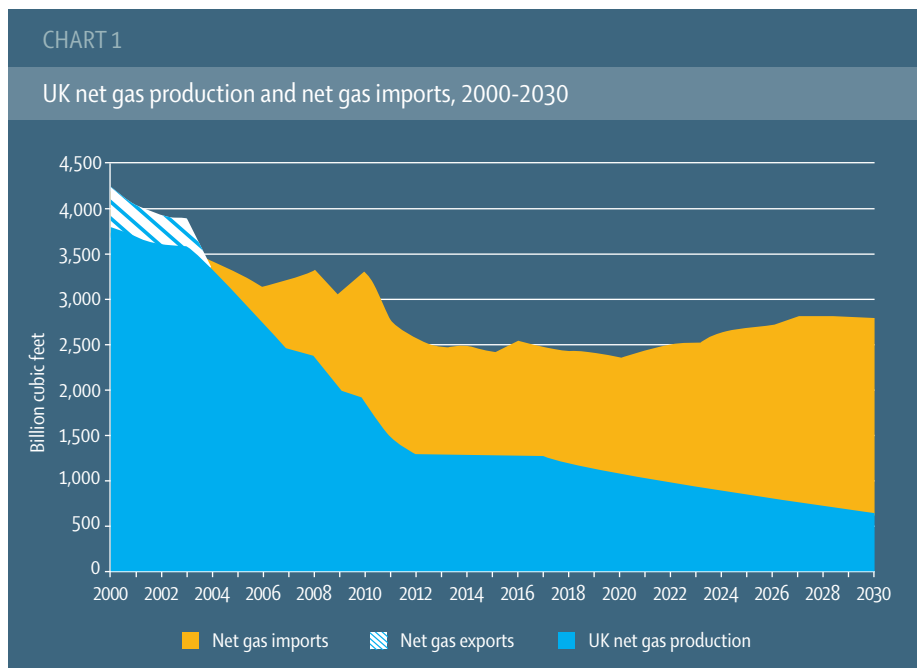
Artist's impression of a completed 12-well shale gas pad. Source: Cuadrilla Resources Ltd

SOLVING LONG-RUNNING PROBLEMS

The UK faces three problems that shale gas could help to solve: an energy security problem, a tax problem and a jobs problem.

Energy security

- In 2000, the UK was exporting gas equivalent to 14% of UK gas demand. By 2011, net **imports** had risen to 45% of demand and by 2030, net imports are expected to increase to 76% of demand. This represents a large **import bill** – £7.2 billion in 2011, and £15.6 billion (in 2012 prices) in 2030.
- The UK is not expected to engage in a “dash for gas”. According to the Department of Energy and Climate Change’s (DECC) central forecasts, overall **natural gas demand**, for heating and industry as well as electricity generation, is projected to remain roughly at today’s level over the next two decades. These gas demand projections are consistent with DECC’s central forecasts for **greenhouse gas emissions**, which project the net UK carbon account to fall, relative to 1990 levels, by 37% by 2020 and 45% by 2025.



Source: Department of Energy and Climate Change, Production projections, extracted 15 March 2013 <https://www.gov.uk/oil-and-gas-uk-field-data>. NB: Figures given in billion cubic metres are converted to billion cubic feet.

Tax

- Declining North Sea oil and gas production and more efficient car and truck engines will lead to a fall in **tax revenues** from Fuel Duty and the North Sea, opening up a tax gap of around 1.25% of GDP over the next two decades.

Jobs

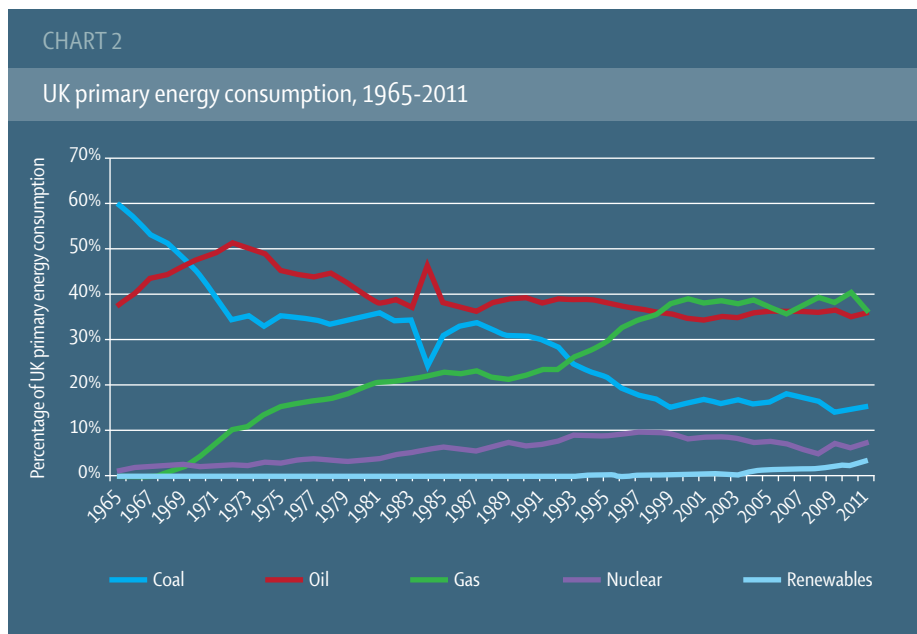
- **Regional economic divides** show few signs of closing. Over the last 20 years, the UK unemployment rate has averaged 6.9%. In the North East, the region with the highest unemployment, the rate has averaged 9%. By contrast, in the South East, the unemployment rate has averaged just 5.1% over the same period.
- In 12 **local authority areas**, including Blackpool, the proportion of working-age people claiming at least one out-of-work benefit has averaged 20% or more over the last 10 years.

THE NORTH SEA: A SUCCESSFUL EXAMPLE

The UK has done it before. In the 1960s, Aberdeen welcomed the development of a new offshore oil and gas industry, and the city grew to become the energy capital of Europe.

Energy and environment

- Between 1981 and 2005, the UK produced more oil than it consumed. Between 1970 and 2007, UK production was able to meet at least 75% of a growing and then roughly constant level of **natural gas** consumption.
- In 1965, before North Sea gas production began, **coal** accounted for 60% of the UK's primary energy consumption and natural gas less than 1%. In 2011, coal's share had fallen to 16%, and the share of **natural gas** had risen to 36%, reducing carbon emissions and improving air quality.



Source: BP, *Statistical Review of World Energy*, June 2012 <http://www.bp.com/sectionbodycopy.do?categoryId=7500&contentId=7068481>. NB: Consumption figures converted to comparable units.

Economy

- North Sea **tax revenues** have been considerable, accounting for more than 5% of total government receipts for much of the 1980s and averaging £6.7 billion a year (2011-12 prices) since the first tax revenues were received in 1968-69.
- Within the offshore oil and gas industry, **average wages** stand at £64,000, well over twice the national average. Overall, the oil and gas industry supports around 440,000 **jobs** across the UK.

Aberdeen

- Offshore oil and gas production could have been centred in other cities in Eastern Scotland, but **Aberdeen** City Council and the North East Scotland Development Authority actively courted the oil and gas sector.
- Aberdeen City and Shire has the second highest **Gross Value Added per head** of any region in the UK, after Inner London. The oil and gas industry, its wider supply chain, and induced activity support around 60% of the total **employment** in the region, while a third of the top 50 Scottish-based companies are located there.

MAKING IT HAPPEN

Shale gas development will be a two stage process. Firstly, exploration must continue to assess the size of technically and commercially recoverable resources. Secondly, if the exploration and appraisal stage is successful, government and industry must collaborate to enable production to go ahead. Our key recommendations are designed to address the main barriers.

Planning and permitting

Barrier: *The planning and permitting regime involves four agencies, and two public consultations are needed to drill and fracture one exploration well.*

Recommendation: Clear guidance should be provided for planning and permitting. The national agencies – DECC, the Environment Agency and the Health and Safety Executive – should sign off the sub-surface drilling and fracturing process, and the local Mineral Planning Authority should concentrate on the surface impacts, including truck movements. For a production phase, planning permission should be given for all potential activities on a pad, rather than covering each well – otherwise it would be akin to needing a separate planning application for each turbine in a wind farm. A National Policy Statement should be drawn up, making clear that shale gas developments are part of the UK's nationally significant energy infrastructure.

Finance

Barrier: *Local authorities and communities need to benefit financially from hosting nationally important shale gas production sites.*

Recommendation: Local authorities should receive a share of the gains from shale gas development in their area. Allowing them to keep 100% of the business rates for shale gas pads is a sensible option. Community benefit schemes must be flexible and money should be spent on locally-determined priorities.

Reputation

Barrier: *The industry itself needs to develop a “social licence to operate”. Although 50% of residents of Blackpool, Fylde and West Lancashire support exploration in their region, more needs to be done to gain the confidence of local communities.*

Recommendation: Each pad needs to be accompanied by full disclosure of the chemicals used in the fracturing fluid, as set out in the guidelines issued by the UK Onshore Operators Group. Residents should also be told how many trucks will be visiting the site, how much water will be used and what will be done with it afterwards.

Skills and supply chain

Barrier: *Skills shortages are a problem for offshore oil and gas production, and skilled people will be needed for onshore shale gas production.*

Recommendation: Partnerships to improve skills and support the supply chain should be developed. A skills action plan should be drawn up and “Project Pathfinder”, which provides real-time data on upcoming projects for the offshore supply chain, should be replicated.

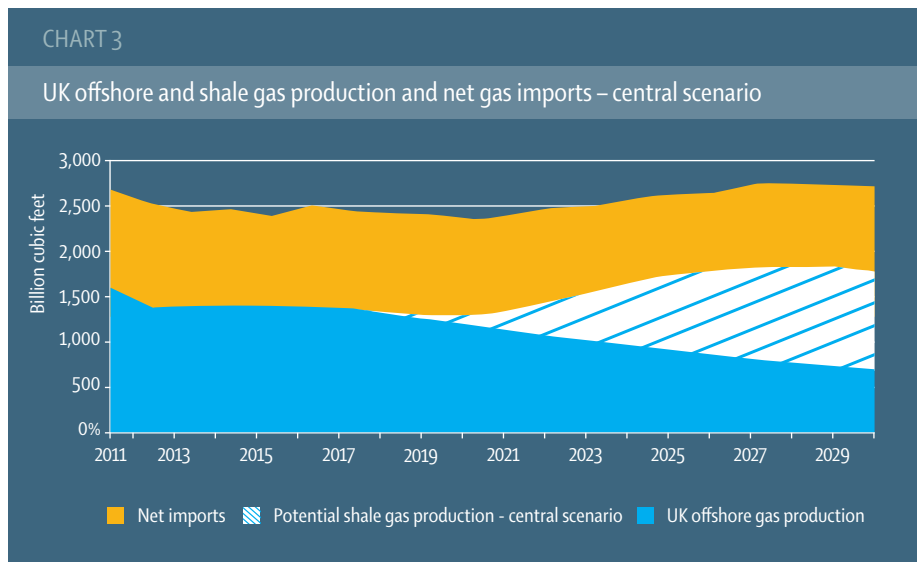
Grid connections

Barrier: It currently takes 3 ½ years to obtain a grid connection, involving three separate processes, which is far too long.

Recommendation: The Office for Unconventional Gas and Oil (OUGO) should propose measures to reduce significantly the time it takes to obtain a grid connection.

Government leadership

Recommendation: Government leadership has been sorely lacking, but the establishment of OUGO is an opportunity to provide the leadership that the industry needs. OUGO should be accountable to a single Minister responsible for the Office. It should draw together the various planning and permitting guidance into a single document, setting out the entire process of gaining consent for exploration and production activities. And as the main report explains, the Oil and Gas Task Force, which then became PILOT, provided strong leadership and partnerships for the offshore industry at a critical time. OUGO could bring together the key government and industry stakeholders in a similar body to deliver actions to ensure that shale gas production proceeds in a timely manner.



“If we get this right, in future I believe the world could look to the UK as the gold standard for a well regulated and safe shale gas industry that benefits local communities and the nation.”

Dan Byles MP, Chair of the All Party Parliamentary group for Unconventional Oil & Gas and member of the Energy and Climate Change Select Committee

Infrastructure for Business

Infrastructure for Business is a series of papers by the IoD looking at the key energy, transport and technology infrastructure developments that would help the UK regain competitiveness and encourage a thriving private sector.