THE REASONS FOR EXTRACTING SHALE GAS

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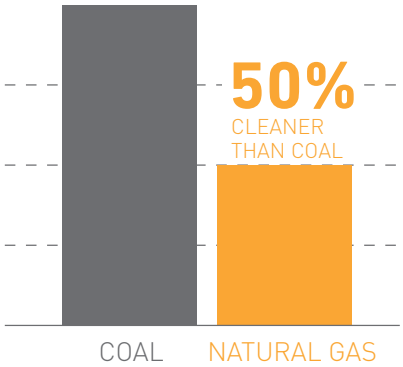
Gas is needed in the medium term to meet our energy needs responsibly. The UK is committed to reducing emissions by 80% by 2050 and has ambitious policies in place to promote renewables and nuclear, such as the Carbon Price Floor and Contracts for Difference.

Scotland in particular is rich in renewable energy sources and has made great progress in decarbonising electricity generation.
It will take a couple of decades, however, to fully transform how the UK generates electricity and heat, so in the interim we will have to use fossil fuels to meet our energy needs. As recognised by the IPCC, gas has around half the emissions of coal, so we have an environmental duty to use gas rather than coal during this period. Gas is necessary in the medium term to meet the UK's energy needs in the most environmentally responsible way.

EMISSIONS BY FUEL TYPE



GAS IS ESSENTIAL FOR THE MANUFACTURE OF CHEMICALS USED IN OUR EVERY DAY LIVES

GAS REPRESENTS ONE THIRD OF OUR ENERGY NEEDS

E&Y AND IOD ESTIMATE THAT MORE THAN 64,000 JOBS WILL BE CREATED BY THE SHALE GAS INDUSTRY

GAS IS NEEDED IN THE LONG TERM AS A RAW MATERIAL TO UNDERPIN MANUFACTURING

Gas is not just a fuel that we burn for energy. It is also a raw material used in the manufacture of chemicals that have application in a wide range of high-value products including medicine, clothing, buildings, vehicles, computers, and green technologies, such as wind turbines and energy efficient materials. We will still need gas to make these essential items once we have made the transition to low-carbon energy. It is vital, therefore, that the UK has a secure and competitive long term supply of gas to underpin the future of the manufacturing sector. This is particularly important in Scotland, where the petrochemicals industry is critical to the economy, providing thousands of direct jobs and generating significant tax revenue.

THE UK IS INCREASINGLY RELIANT ON IMPORTED GAS, WHEN IT WOULD BE BETTER TO USE OUR OWN

The UK is increasingly reliant on imported gas to meet its needs, which means that we have poor security of supply and other countries receive the economic benefits of extraction. We currently rely on gas to meet a third of our energy needs and we will continue to depend on gas in the medium term, especially given that 8 out of 10 homes use gas for heating. As North Sea reserves have declined, the UK has become a net gas importer and National Grid estimates that import dependency will reach 69% by 2018/2019. With the forecast closure of Longannet power station and two nuclear stations, Scotland is likely to become a net importer of electricity. As it stands, the UK will be exposed to shortages and price volatility over the next few decades, especially given Europe's wider reliance on Russian gas. We will also miss out on the investment, jobs and tax revenues that come with extraction.

SUCCESSFUL EXTRACTION OF SHALE GAS WILL HAVE SIGNIFICANT ECONOMIC BENEFITS

Extracting domestic shale gas to meet our needs, rather than relying on imports, would have significant economic benefits for the UK. A Department of Energy and Climate Change report estimates that 16,000–32,000 full-time jobs would be created in the gas industry and wider supply chain, while studies from Ernst and Young and the IoD estimate that the figure could be over twice this. Exploration is necessary to better understand the economics, but it is possible that shale gas could help reinvigorate and rebalance the economy. This could be particularly beneficial in Scotland, where shale gas extraction could replace jobs and tax revenues lost as North Sea oil production declines.

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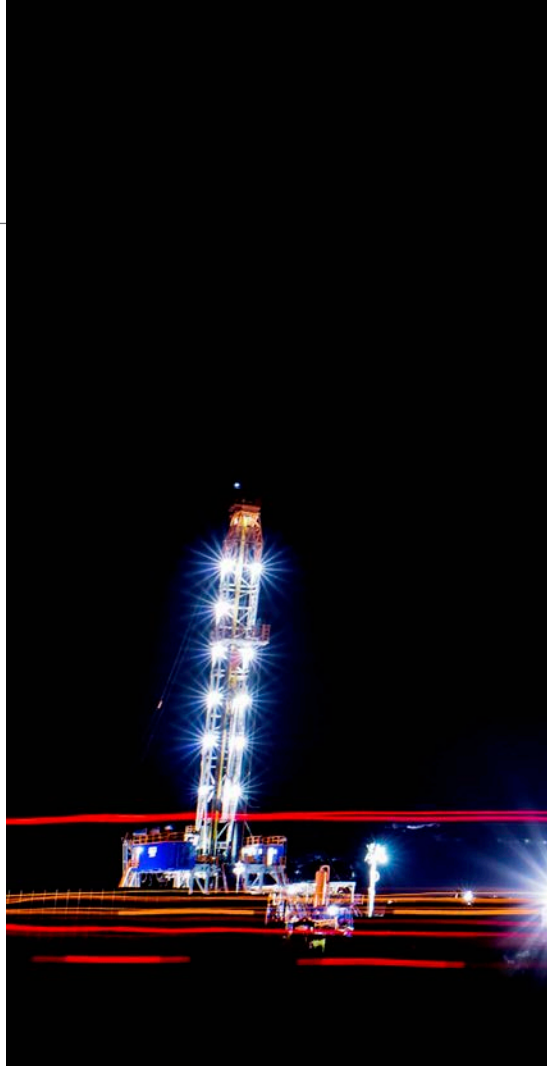


SUCCESSFUL EXTRACTION OF SHALE GAS WILL IMPROVE ENERGY SECURITY SIGNIFICANTLY

Shale gas is an opportunity to reduce our gas import dependence. The British Geological Survey estimates that the Bowland Basin in England contains 1,300 trillion cubic feet of shale gas and central Scotland contains 80 trillion cubic feet. Assuming that 10% of this can be extracted, this would produce enough to meet the UK's total gas needs for well over four decades (based on current consumption of around 3 trillion cubic feet per year). It is vital to undertake exploration to understand how much can be extracted, but it is a real possibility that shale gas could provide a secure supply of transition fuel and gas feedstock for the UK. Scotland, meanwhile, could play to its strengths, securing its position as an energy exporter.

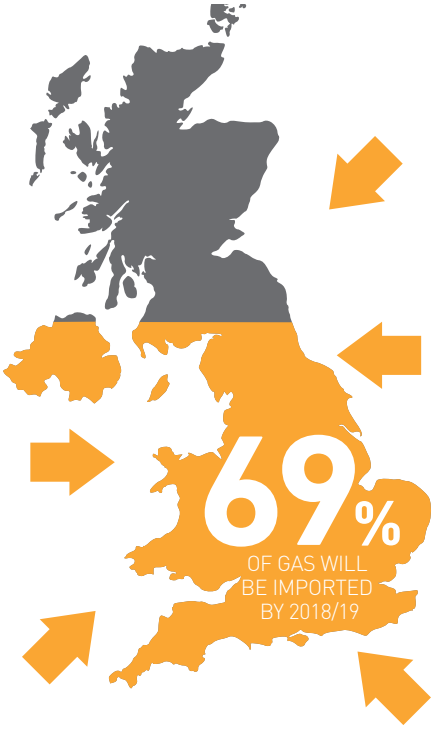
SUCCESSFUL EXTRACTION OF SHALE GAS WILL REJUVENATE LOCAL COMMUNITIES

Communities would benefit from significant investment, new jobs, and local tax revenue if extraction went ahead. Furthermore, they would receive a share of revenue from extraction, which could have a substantial impact on regional economies and local public services. INEOS has promised to share 6%. Four percent of this would go to homeowners and landowners in the immediate vicinity of a well and a further 2% to the wider community. Based on our estimates, a typical 10km by 10km development area would generate £375m for the area over its lifetime.

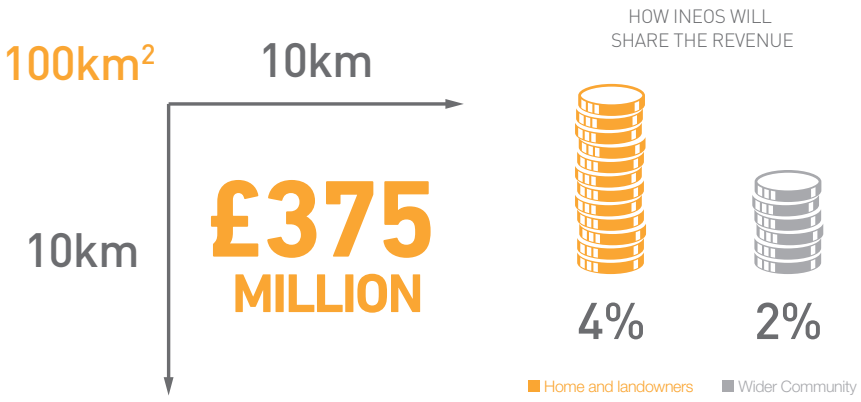
TO MEET UK NEEDS FOR

40

YEARS



AS NORTH SEA RESERVES HAVE DECLINED THE UK HAS BECOME NET GAS IMPORTER AND DECC ESTIMATES THAT IMPORT DEPENDENCY WILL REACH **69%** BY 2018/19.



SHALE GAS IS AN OPPORTUNITY THAT THE UK CANNOT AFFORD TO OVERLOOK

Extracting shale gas is an opportunity for the UK to reduce its dependence on imported gas while creating potentially tens of thousands of jobs and generating significant tax revenue and growth. It is especially important to the future of the UK chemicals industry, which is significantly located in Scotland, and could have sizeable benefits for local communities. Respected authorities such as the Royal Society and the Committee on Climate Change recognise that extraction can be managed safely while meeting our carbon reduction commitments. With the US and China extracting shale gas and Germany recently issuing a draft law to enable exploratory fracking, the UK cannot afford to overlook this opportunity and risk being left behind. This is why it is vital to undertake public consultation and exploration to better understand what shale gas could mean for the UK and demonstrate its safety in order to win a social licence.

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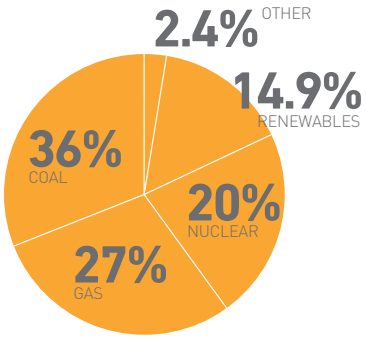
Natural gas is essential for the modern world, and many of the benefits it brings cannot be replaced by renewables.

80% OF PEOPLE USE GAS TO HEAT THEIR HOME



SHARE OF UK ELECTRICITY GENERATION BY FUEL (2013)

RENEWABLE ENERGY NEEDS A BACK UP

HEATING

Natural Gas is used for heating 22 million UK homes – that's 83% of all homes. (Figures Ofgem).

Without gas we would have to replace our gas fired central heating with electric heating. At a cost of around £2000 per household, this would amount to some £44bn.

Electric heating costs around 3 times as much as gas.

Gas is cheaper than coal, oil, nuclear or renewables.

It is 65% cleaner than coal and 25% cleaner than oil.

In 2012 the UK imported 43% of its gas, and this will continue to rise. National Grid estimates that import dependency will reach 69% by 2018/2019.

We have huge gas reserves right under our feet that we can access safely.

UK ELECTRICITY MIX

Renewables (wind, solar, hydro) currently account for 15% of electricity.

By 2020 that will increase to 31%, with Gas 29%, Coal 22%, Nuclear 8% and Other 9%.

There are currently 30,000 wind turbines in the UK (Renewable UK). This would need to rise to at least 200,000 wind turbines to replace all other sources.

ARE RENEWABLES RELIABLE?

Wind turbines don't work when there is no wind or indeed too much wind.

Solar power only works during daylight.

If we relied on renewables, we would need to maintain all of our fossil fuel power stations as back-ups, and they would have to be used every day to deal with surges in demand and dips in renewable generation.

The national grid has to provide a stable electricity supply with a frequency of 50Hz. Otherwise the electric machines we all rely on – from computers to TVs, lights to motors to fridges – would fail. If we relied on renewables this would not be possible. There would be times of the day where there was too much demand and there would be power cuts, blackouts and shortages.

For the foreseeable future we will need fossil fuels to provide instant energy to ensure a stable electricity supply.

GAS IS ESSENTIAL FOR THE MANUFACTURE OF CHEMICALS USED IN OUR EVERY DAY LIVES

GAS IS USED TO MAKE CHLORINE SO WE CAN HAVE SAFE DRINKING WATER

GAS IS 65% CLEANER THAN COAL

AS A RAW MATERIAL, EVERYDAY PRODUCTS THAT WE WOULD HAVE TO LIVE WITHOUT IF WE DIDN'T HAVE GAS

Gas molecules are used as the raw material to produce thousands of essential products that we all rely on every day.

- Packaging, pipes, insulation, car parts, construction.
- Many types of footwear and clothing.
- Electronics – solvents that produce the screen for iPads, cleaning fluxes for circuit boards.
- Many pharmaceuticals, including HIV treatments and insulin.
- Medical devices – tubes, blood bags, catheters, false hips – anything with plastic.

INDUSTRY PRODUCES HUNDREDS MORE ESSENTIAL PRODUCTS THAT COULDN'T BE MADE WITHOUT GAS

Many products can only be produced with huge amounts of energy that wouldn't be possible without gas:

- Chlorine, used to provide safe, clean drinking water for 95% of the UK population.
- Steel.
- Glass.
- Cement.
- Bricks.
- Ceramics.
- Tiles.
- Paper.

Many renewables cannot be made without gas and oil. For example, important components in wind turbine and solar panels can only be made from fossil fuels:

- The blades of wind turbines.
- Lubricants in gearboxes.
- The production of solar panels.

Renewables are important but we won't be able to live without Natural Gas for decades to come. We will need gas for at least 15 years for electricity, 35 years for heat, and forever as a raw material. Gas is cheaper than coal, oil, nuclear or renewables and it is 65% cleaner than coal. Accessing shale gas is not about using more gas and fewer renewables; it's about using our own gas rather than relying on imports so that we also get the economic and security benefits.

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FURTHER FACTS:

- **SEPA:** www.sepa.org.uk/customer_information/energy_industry/unconventional_gas/frequently_asked_questions.aspx
- **Office of Unconventional Gas:** www.gov.uk/government/groups/office-of-unconventional-gas-and-oil-ougo
- **DECC website:** www.gov.uk/government/organisations/department-of-energy climate-change
- **UKOOG:** www.ukoog.org.uk
- **Frackland Blog:** www.frackland.blogspot.co.uk
- **No Hot Air:** www.nohotair.co.uk/index.php/library
- **ReFINE:** www.refine.org.uk
- **Frac Focus:** www.fracfocus.org
- **The Boom:** www.russellgold.net/books/the-boom
- **US EPA:** www2.epa.gov/hydraulicfracturing
- **PENN State University:** http://stateimpact.npr.org/pennsylvania/tag/fracking/
- **Range Resources:** www.rangeresources.com
- **CONSOL Energy:** www.consolenergy.com

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