# ECONOMIC REPORT 2022

OFFSHORE ENERGIES UK

A focus on UK energy security

OFFSHORE ENERGIES UK

An integrating offshore energy industry which safely provides cleaner fuel, power and products to everyone in the UK.

Working together, we are a driving force of the UK's energy security and net zero ambitions. Our innovative companies, people and communities add value to the UK economy.

**OEUK.org.uk**

# ECONOMIC REPORT 2022

## Contents

## Energy security and climate aims

**The UK and global economies are reliant on fossil fuels**

Even with net zero – oil and gas will still be the UK largest fuels for at least another decade

With demand recovering from the pandemic, the Russian conflict in Ukraine has sparked an energy supply crisis

The UK's offshore sector has helped protect the UK from these supply shocks

In 2021 UK oil and gas production was enough to meet **56%** of UK needs

**38% of gas**

**75% of oil**

The UK's gas production increased by **27%** in the first half of the year

Enough to meet half of demand in summer 2022

New investment is needed to manage this production – or imports will grow massively

The UK's offshore wind capacity has grown to **12 GW**, with plans to increase to **50 GW**

**50 GW**

UK ambitions is to have **10GW** of low-carbon hydrogen production and up to **30mn mt** of $CO_2$ stored per year by **2030**

**30 mn mt**

The transitioning oil and gas sector is crucial to achieving these plans

The skills and experience across the supply chain are driving projects forward

Oil and gas production emissions are down **20%** since **2018**

**20%**

The offshore sector has the potential to provide **60%** of the UK's emissions reduction needs

**60%**

## Energy prices

**The energy supply crisis has caused market chaos, with huge price rises**

**Gas prices in 2022 have averaged 200 p/th**

**4x** This is **4 times** the real terms average over the last **20 years**

Prices are likely to rise further – winter 2022 prices are trading at over **700 p/th**

Oil prices are the highest they have been for many years – but not unprecedented

**These are contributing to a cost-of-living crisis**

**80%** Domestic bills have grown by **80%** and are likely to rise further

Energy prices account for ½ of UK inflation

**The UK is heading for recession**

## Economic contribution

Oil and gas activity supports almost **214,000** jobs across the length and breadth of the UK

**90,000** in Scotland

**3,900** in Wales

**1,700** in Northern Ireland

**117,600** in England

The oil and gas industry is estimated to support **£28.4bn** of gross value-added

**£28.4 bn**

Providing **£2.1mn** of value for every **£1mn** spent

**£400 bn** Almost **£400bn** have been paid in oil and gas production taxes since 1970

**£7.8bn** estimated for **2022/23** and another **£5bn** in the first 12 months of the windfall tax

# Foreword

## Michael Tholen,
## Acting CEO, Offshore Energies UK

Our offshore energy sector continues to demonstrate it is a reliable and trusted partner to the nation. OEUK's 2022 Economic Report sets this out in detail.

The world is plunging deeper into a global energy crisis, rooted in Putin's horrific invasion of Ukraine and the faster than anticipated economic recovery from Covid-19. As we are seeing, the UK is not immune to the effects. There are critical concerns over energy supplies and the price of gas and power for the coming years. Having a sustainable, secure, and affordable supply of energy has never been more important and the UK's offshore energy sector continues to step up and play a vital role in ensuring this.

The first six months of the year saw UK gas producers boost supplies by 27% relative to the same period in 2021, meaning the equivalent of an additional 3.5mn homes are benefiting from energy produced domestically. By doing this the UK has been able to wean itself off Russian imported fuels, breaking energy links with a country at war with a UK ally.

Not only has our sector been working hard to provide energy security to the country, but it also continues to bring a wide array of economic benefits, contributing more than £13.8bn in oil and gas production taxes from April this year to next May, and supporting over 200,000 jobs. Committed as it is to the energy transition and delivering net zero, the sector has cut emissions, which are one-fifth down from 2018 and is showing how its vital skills and expertise can drive the low-carbon energy and emissions solutions needed for the future.

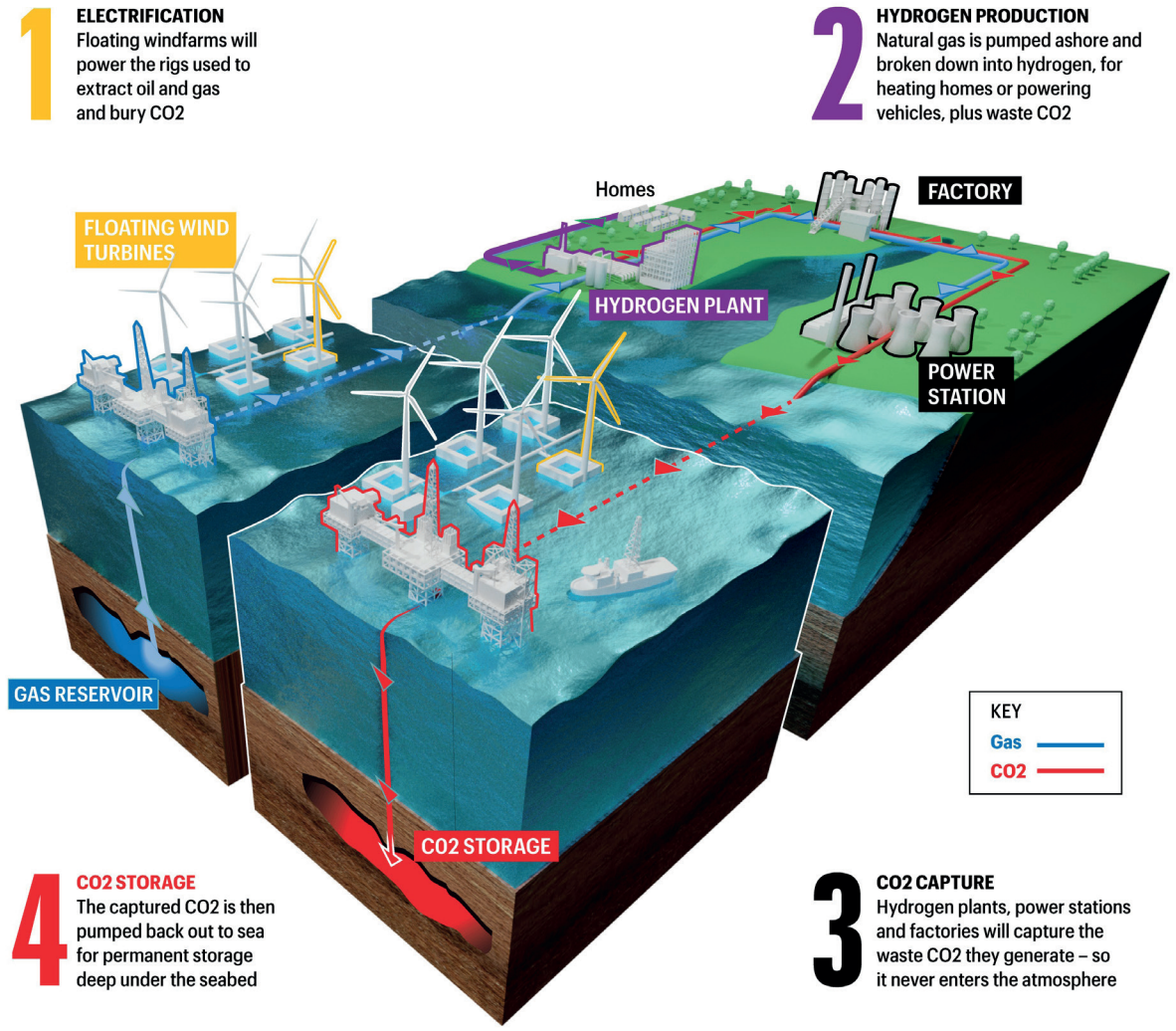
We're seeing that in action in the North Sea, through the start-up of power generation at Seagreen and the beginning of construction of the Dogger Bank project – two of the world's largest offshore wind farms which are both being led by companies with an oil and gas production heritage.

The UK needs secure and reliable energy to power and heat our homes, to fuel our industries and to run our cars, planes and trains. It's at the centre of almost everything we use and do in our everyday lives. And the reality is that without oil and gas these systems would grind to a halt. Gas provides 85% of our home heating and it makes our power system work by bringing the flexibility required to meet over 40% of our electricity needs, on average, and much more at peak times. And oil fuels 95% of our transport needs. We can't take these contributions for granted, but supply is becoming less affordable and more complex.

Inflation has already exceeded 10% – the highest rate in 40 years. Rising energy prices are a key part of this, and the effects are being felt already, with extreme and unsustainable hardships for millions of people. Many businesses believe the situation is as severe as, if not worse than,

## Offshore Energies

The UK's offshore operators are developing four key new technologies to help the UK achieve carbon neutrality




the pandemic, which this crisis comes hot on the heels of. This challenge is bigger than any one sector alone can solve. Renewed support for consumers will be needed, over and above that which is already being funded by the oil and gas sector's taxes. We also need to see reform of the electricity market to ensure that falling cost of renewable power is passed on to consumers.

Tackling these crises must be at the top of the agenda for Liz Truss, who will be the new prime minister by the time our report is published. But her announcements alone won't be enough. As the country moves from one crisis to the next, we need plans to be backed by politicians of all parties to ensure that they are effective and enduring.

As we have learned over the last year, energy is a precious resource which must be properly managed, in the short and long term. Our sector has many of the answers and through constructive work with governments and regulators, we can boost the UK economy, cut emissions, secure jobs and most important, heat and power homes and industries with energy produced here, for decades to come.

Commitment is needed to end the windfall tax by 2025, at the latest, and to work with the sector to rebuild investor trust. This will help ensure companies have the confidence to invest in developing our future, lower-carbon, energy resources. A new oil and gas licensing round is needed to help develop our untapped potential, and a refreshed commitment to the *quid pro quo* nature of the North Sea Transition Deal (the Deal) would give assurances that the UK wants to deliver a managed transition that doesn't place a heavier burden on consumers, but instead protects energy security and slashes emissions.

Speedy progress by the government to deliver the aims of the British Energy Security Strategy is crucial, and more on top of that will be needed if we want to strive for energy independence. We can't afford to see any more moves like the windfall tax, which damages the UK's reputation as a safe place to invest. With the development of the right conditions, we can attract the capital required to unlock our oil and gas resources and manage their output in line with changes in our demand profile. And through joined up and collaborative working we can up the pace of offshore wind developments and get moving with the shovel-ready hydrogen production and carbon capture and storage projects that will be delivered by companies driving the energy transition, while continuing to provide much needed and secure supplies of oil and gas.

This is the energy transition in action. Given the urgency of the energy crisis, it's time to work together to greatly accelerate its delivery.

# RELIABLE, RESPONSIBLE ENERGY – AN ACTION PLAN FOR THE UK

On September 6, we welcomed a new prime minister and a new cabinet.

As reliable, responsible partners, our industry has supported successive governments to produce homegrown secure energy to power the nation.

**This is a time of crisis. Through co-ordinated action with government and other industries, there are practical steps that can be taken to help, now and in the future.**

## Reliable, responsible partners

Domestic oil and gas production has fallen by two-thirds in 20 years. But the UK is in an enviable position when it comes to its energy resources. We ask government to:

- **Support UK oil and gas which is reliable and produced cleanly**
- **Prioritise reliable producers and minimise reliance on LNG, which has three times the emissions of UK gas**
- **Cement the UK's position as a responsible oil and gas producer, announcing the Climate Compatibility Checkpoint in autumn 2022 to enable new licences to be awarded as soon as possible**

## Support consumers

Electricity costs are driven by gas prices, even though 60% of power comes from other sources. It's time to sort this, recognising the scale of the challenge means it must be carefully considered. We ask government to:

- **Speed up electrification across society (e.g. transport and heating) in step with offshore wind expansion**
- **Reform the electricity market responsibly to reflect the actual cost of power generation**

## Reduce reliance on imports

UK gas production is rebounding post-covid. This means we have reduced reliance on imports this year, which helps manage pressures across international markets. We ask government to:

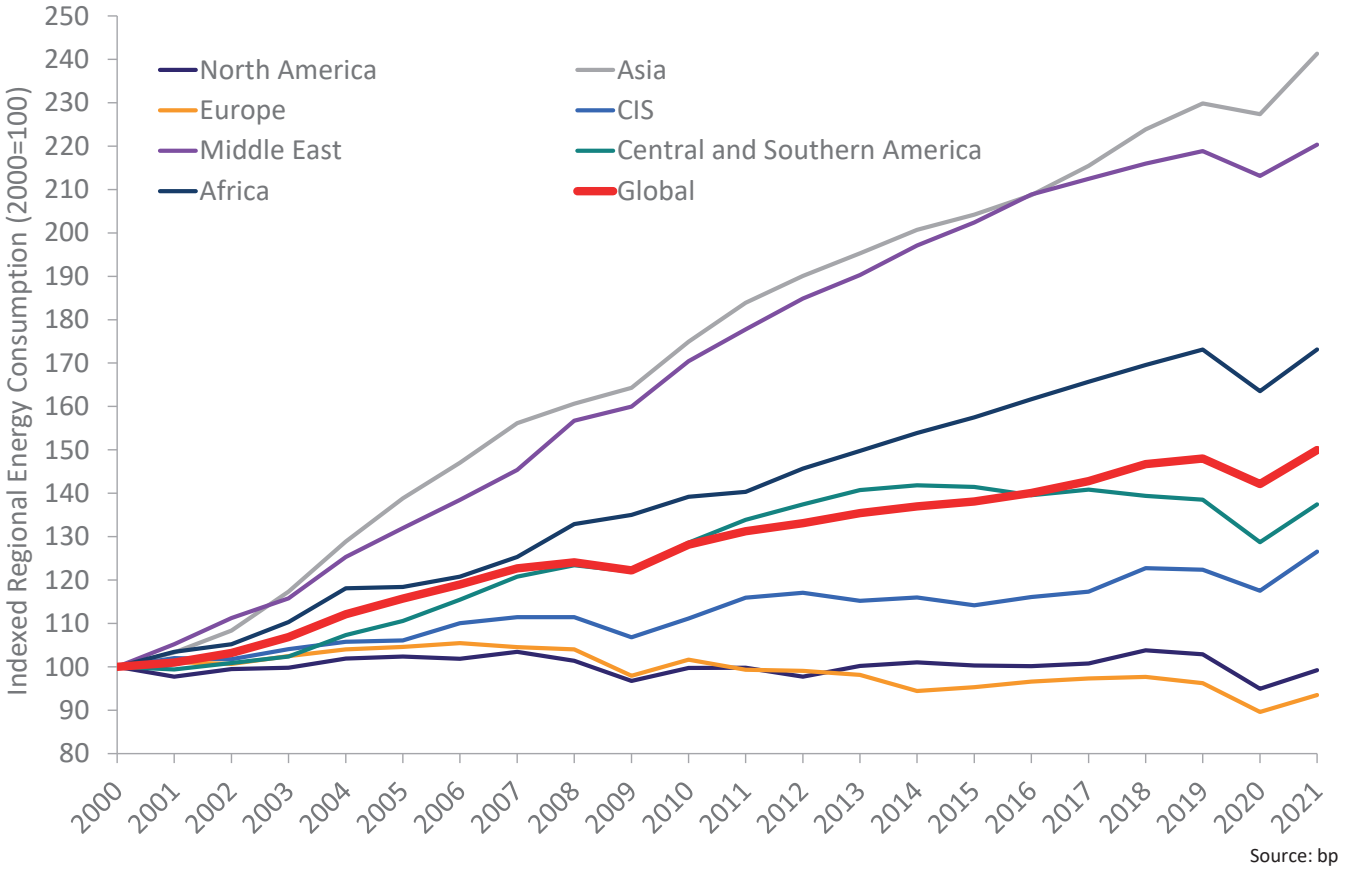
- **Boost existing supplies of UK gas by updating gas quality standards**
- **Confirm the 2022 licensing round and speed up approvals**
- **Unleash UK industry investments in domestic energy supplies with a return to a stable and predictable fiscal regime**

## UK gas can fuel our transition

Offshore wind is part of our future but the scale up will take time. UK gas will give us a bedrock of reliable, secure energy throughout the transition to cleaner energies.
We ask government to:

- **Recognise the importance of gas as a transition fuel in the new Energy Act**
- **Slash approval times for offshore wind projects**
- **Accelerate UK hydrogen production with clarity on investment models and regulations**

## Figure 1
## Indexed regional energy demand



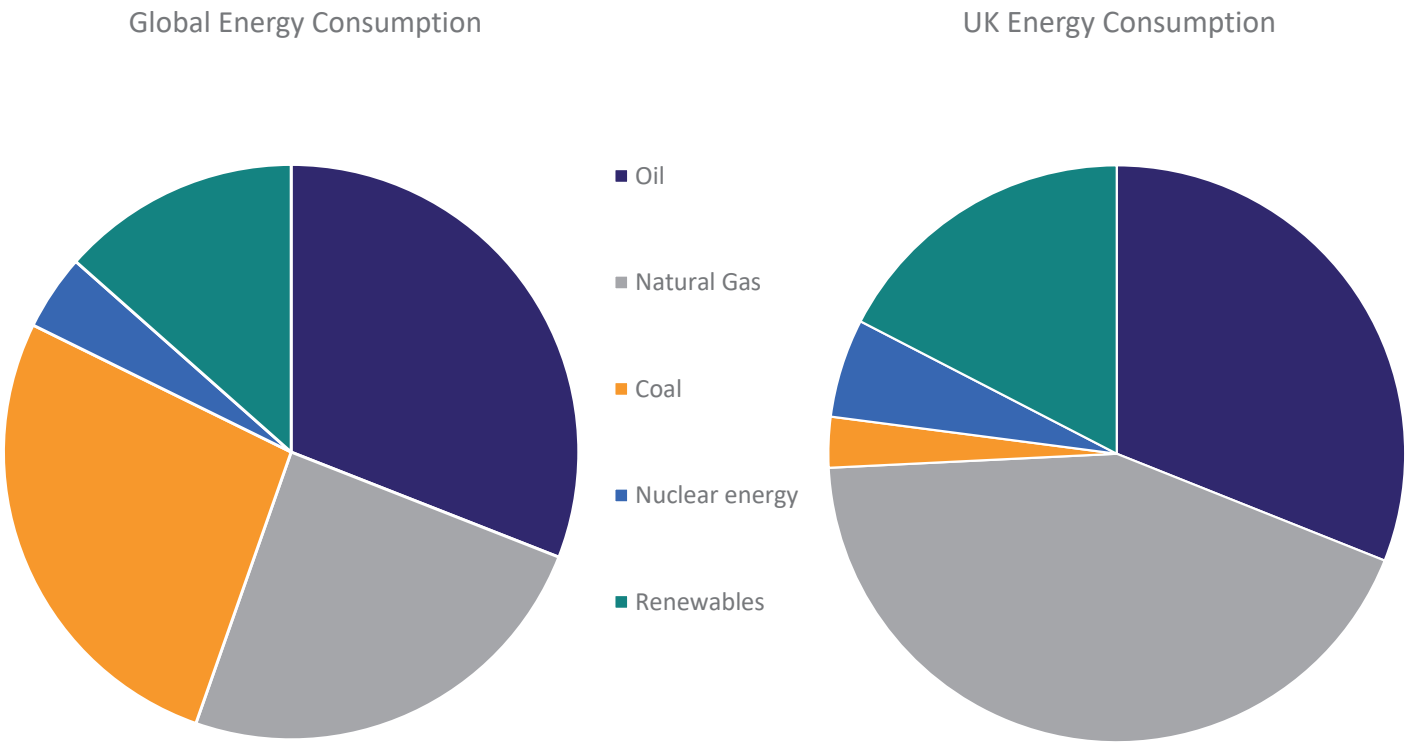

Source: bp

## International energy market dynamics

Energy is at the heart of the global economy, providing heat and light to homes, powering industries and fuelling transport. Global energy consumption has increased by 50% since 2000, enabling a doubling of gross domestic product (GDP). Most of this growth has come from non-OECD developing economies, such as China and India. Asia alone accounted for around 80% of this global rise in energy consumption (240% increase), whereas energy use in Europe fell by 6% and remained flat in North America.

The importance of energy to global economic systems means that energy market trends have a significant impact on their performance and outlook. These markets, particularly oil and gas, have seen extreme turmoil this year, as they struggle to reconcile changing demand patterns with significant uncertainty over supply. The impact of this is felt across society because fossil fuels are still by far the largest global energy source, and oil and gas are central to almost every aspect of our day-to-day lives.

## Figure 2
## Energy consumption by fuel

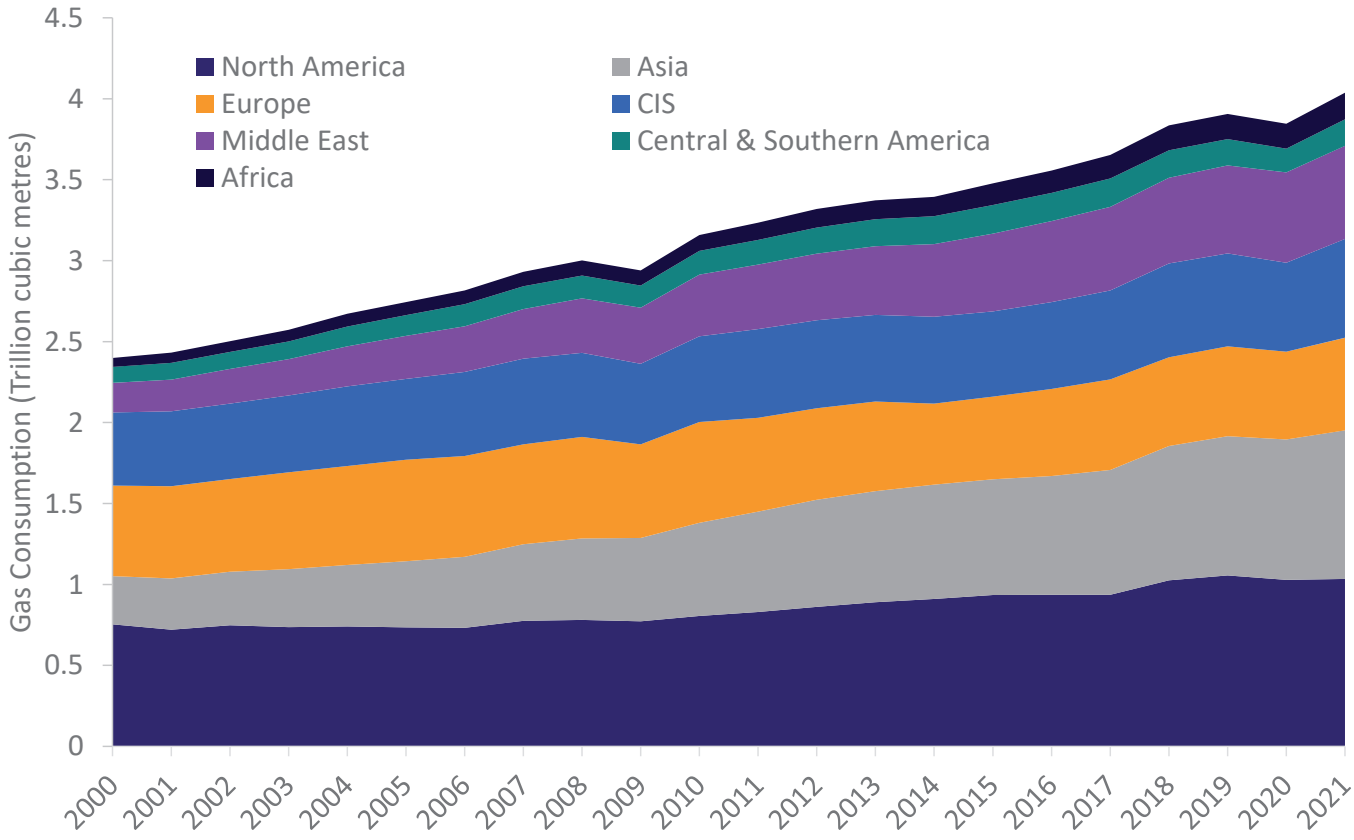



Source: bp

There is a range of scenarios outlining how energy demand may evolve in the coming years. The International Energy Agency (IEA) calculates that, based on current policies and trajectory, total energy consumption will be almost 10% higher in 2030 than it was in 2019, whereas in a scenario consistent with net-zero emissions by 2050, consumption should fall by almost 10% relative to that year. It is crucial that there is appropriate investment in energy production and supply routes to meet expected demand profiles.

The current rise and volatility of prices are driven by supply and demand tensions, primarily caused by Russia's war in Ukraine and the West's response in the form of economic sanctions and import bans. Russia is one of the world's most important energy producers, as the third largest oil producer (12% of global crude oil volumes, or 10.9mn barrels/day (b/d)) and second largest for gas (17% of global natural gas production, or 702 bn cubic metres (bn $m^3$). In context, this scale of output is more than 12 times more oil than produced in the UK last year and around 25 times more gas. A market share of this size means that the disruption of supplies is having a huge impact on oil and gas market prices.

## Figure 3
## Global gas consumption trends




Source: bp

## Gas markets

### Why are gas prices so high and volatile, and where are they heading?

Gas is the world's third largest energy source, with global consumption of just over 4 trillion m³ in 2021 (24% of total energy consumption), marking a 68% increase (1.6 trillion m³) since 2000. The biggest proportion of this increase has come from Asia, where demand has more than trebled (an increase of over 600bn m³) and North America, where use has increased by around 300bn m³ (a 37% increase). Overall use in Europe has remained relatively steady throughout this period.

Global consumption could fall slightly this year, mainly as Europe, and some other regions which are heavily reliant on gas imports, ration demand to protect critical supply and increase storage inventories as they seek out and develop new sources.[1] Despite this, the IEA estimates that global consumption will go on to increase by a further 140bn m³ by 2025 (around a 3% increase), which marks a downwards revision on previous estimates, given today's market dynamics.[2]

[1]. https://www.iea.org/reports/gas-market-report-q2-2022/executive-summary

[2]. https://www.iea.org/news/global-natural-gas-demand-set-for-slow-growth-in-coming-years-as-turmoil-strains-an-already-tight-market

Since 2000 Asian gas production has increased by one-third less than demand and European production has fallen by 10% despite relatively stable consumption. This has left these regions increasingly exposed to imports of gas from a relatively small number of countries. This increase in imports has mainly been met by Russia – where output risen by 165bn m³ (25%), despite its demand growing at around half that rate – and the Middle East, where output has increased by 500bn m³ (a 350% increase) while consumption has grown by less than 400bn m³. In both cases, LNG has played an important role in opening supply routes.

In this context, Russia has been the largest supplier of gas to the EU for the past five years, supplying 43% of EU imports in 2020. But reduced supplies have been seen in recent months. Flows to Europe through the Nord Stream 1 pipeline fell steadily to just 20% of capacity by late July, with Russia citing the impact of European sanctions. There is further concern over whether flows will ever return after a full planned outage in early September. Overall Russian gas exports were down 36% year on year, in the first half of 2022.

This supply uncertainty has led EU countries to agree to reduce gas use by 15% (relative to the average of the last five years) through to March 2023. The European Commission has also planned to boost storage to at least 80% of capacity by November. Price and supply concerns are also incentivising gas to coal switching in Europe, where coal demand could increase by 7% this year to ensure energy needs continue to be met.[3] This is likely to lead to a short-term increase in carbon emissions and it should be remembered that Russia is also one of the world's largest coal exporters (almost 18% of global coal exports in 2021).

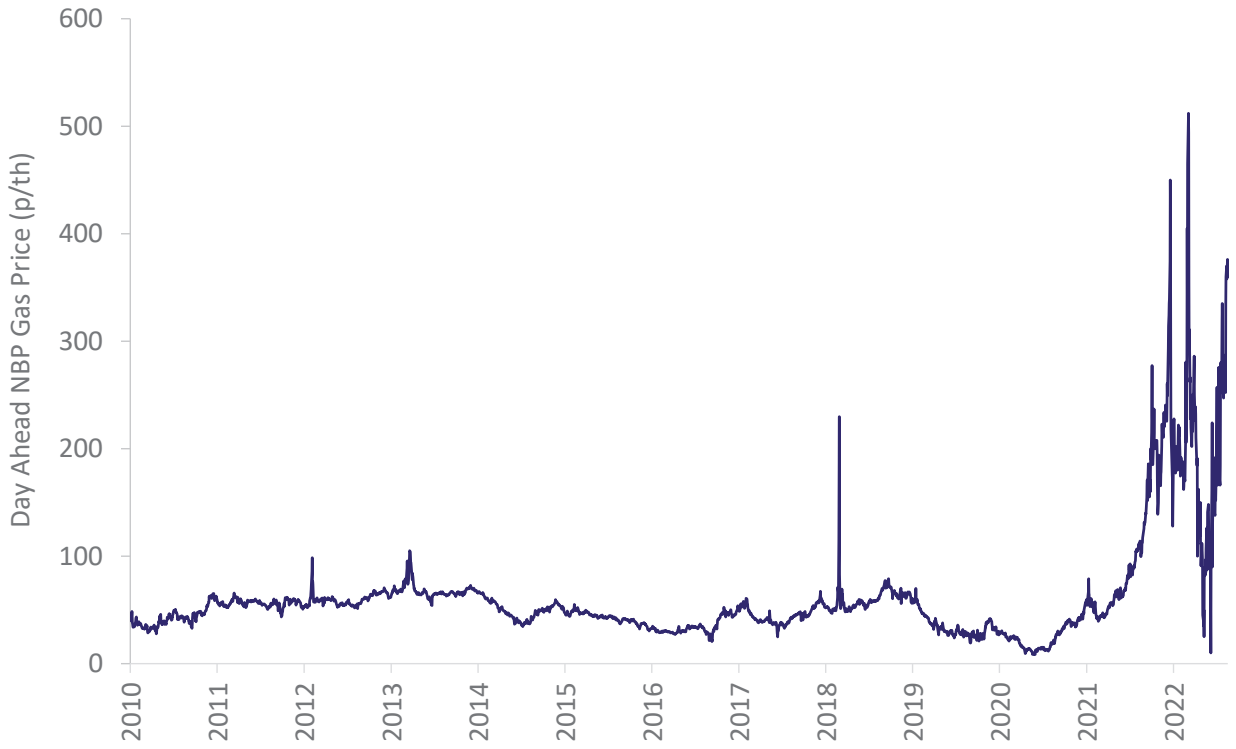
Although the UK itself has not been directly reliant on Russian gas imports, its connectivity to regional markets through pipelines, and its reliance on other import sources (such as LNG), mean that the risk surrounding access to supplies across Europe is being priced into the UK National Balancing Point (NBP), the wholesale market at which gas is traded and priced in the UK. This has led to substantial price increases and extreme volatility.

The NBP price had already been steadily going up last year as demand recovered quickly after the pandemic. Day-ahead contracts increased more than five-fold throughout the year, averaging 115 pence/therm[4] (p/th) as supply and storage levels remained tight. Prices and volatility have increased further this year, with a day-ahead average of 198 p/th to mid-August. This is 72% higher than the 2021 average and almost eight times higher than 2020 (25 p/th). The average real price across the decade 2011-21 was 57 p/th, reflecting relatively stable conditions for most of this period.

[3]. https://www.iea.org/news/global-coal-demand-is-set-to-return-to-its-all-time-high-in-2022

[4]. Therm is the unit at which gas is priced in the UK market. One therm is equal to around 2.6 m³ of gas. The average UK household uses just over 1,000 m³ (around 360 therms)/yr.

**Figure 4**
**UK NBP day-ahead price**



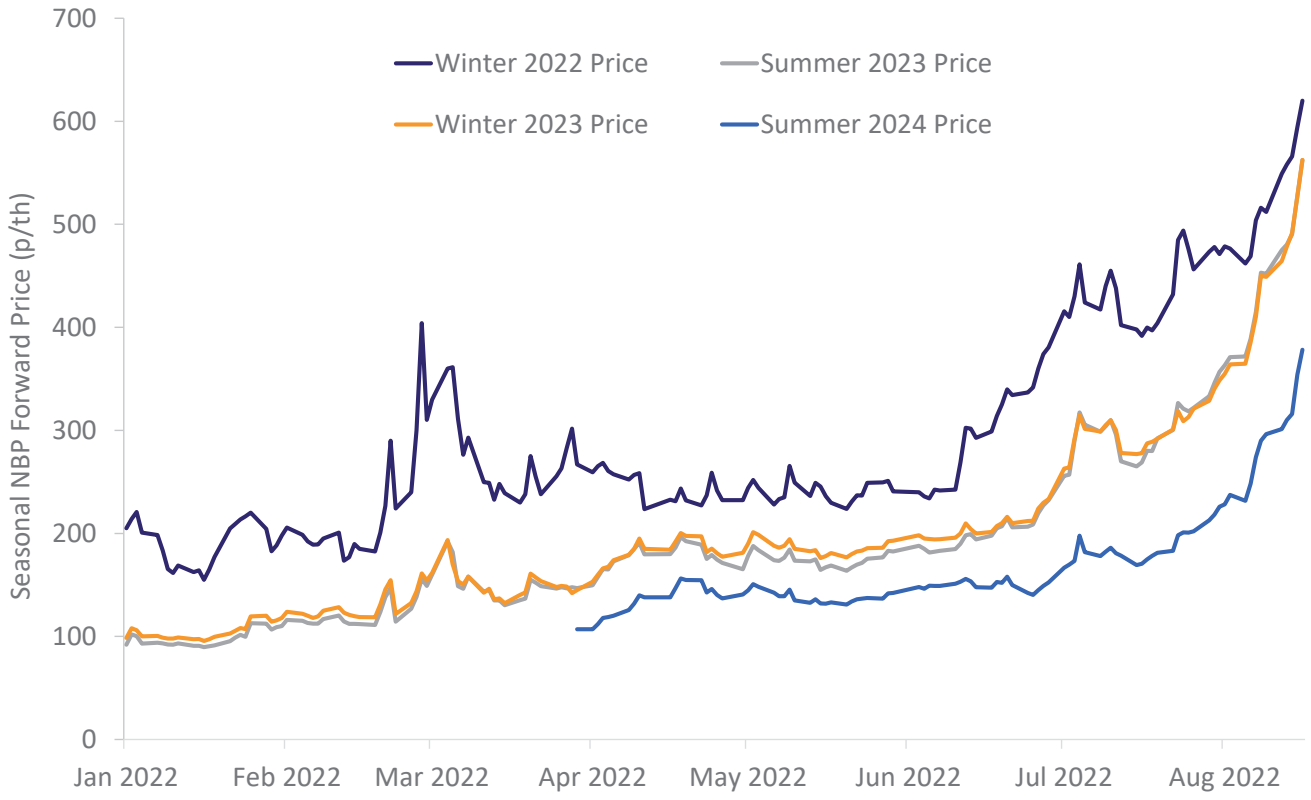

Source: ICIS

In oil equivalent terms this year's average day-ahead gas price is over $140/b, roughly 20% above the average Brent crude oil price for the same period. But peak gas prices exceeded 500 p/th in March for the first time on record, with some intra-day trades even reaching 800 p/th. For context gas prices of around 500 p/th are the equivalent to the Brent oil price reaching almost $400/b – almost three times higher than the actual record Brent price ($145/b).

Gas prices will rise even further in the coming winter period, with forward prices increasing throughout the year and rising significantly during the summer. Forward trades in late-August are more than four times higher than at the start of the year. The forward price curve for winter 2022/3 is showing trades of over 800 p/th, with winter 2023/4 prices over 700 p/th and remaining above 250p/th until 2025. This indicates that the market is becoming increasingly concerned about Russian exports this winter, and how they will then be replaced longer term once the European Union's import bans are in place.

The UK benefits from a strong and diverse range of gas supply sources including domestic production, piped imports (from Norway and the two-way Belgian and Dutch interconnectors) and significant LNG regasification capacity. During periods of lower domestic demand (such as summer months) this provides the UK system with

**Figure 5**
**Forward NBP gas prices**




Source: ICIS

the ability to process more gas than it needs domestically and can therefore redeliver gas to Europe.

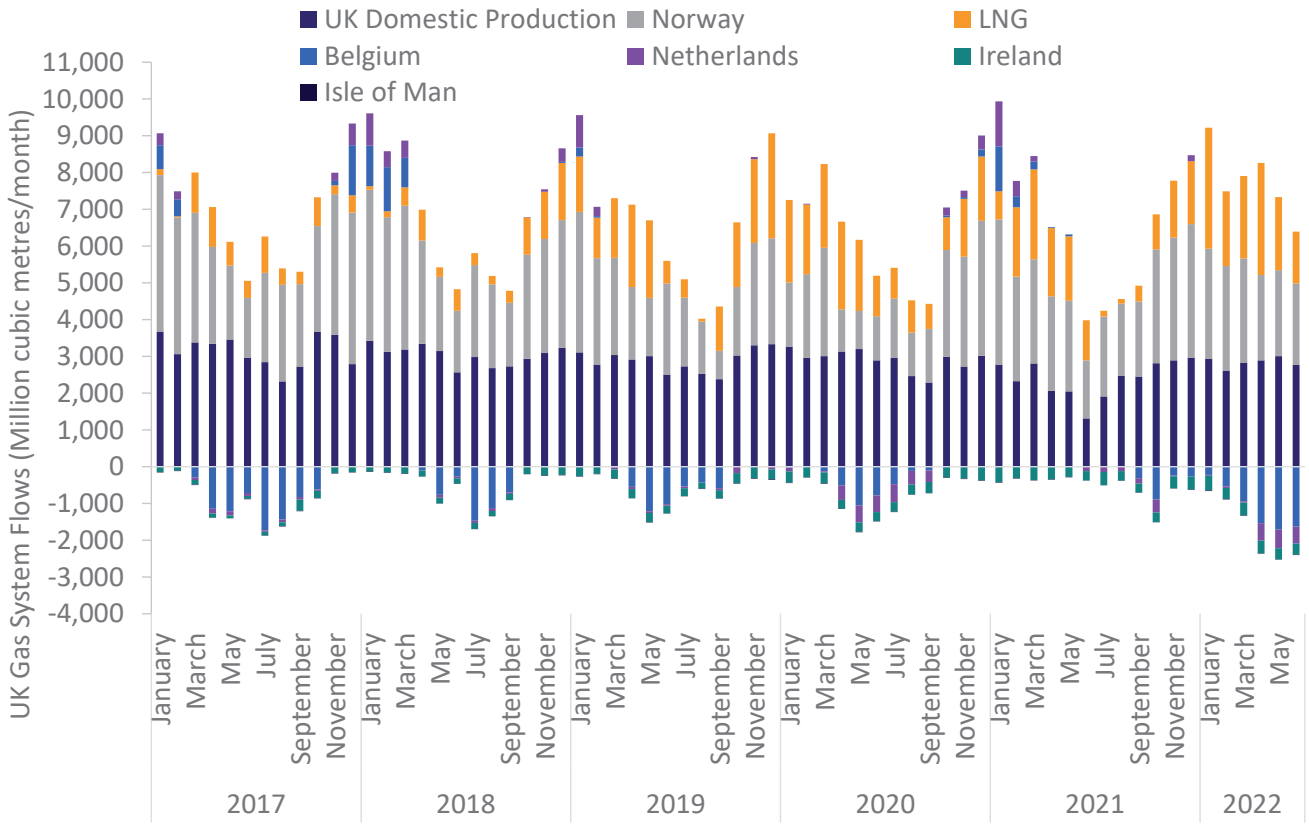
The UK's LNG regasification capacity has effectively been used fully this year, taking in cargoes mainly from the US and Middle East. Around the same volume of LNG was processed in the UK in the first half of 2022 (14bn m³, or around 77mn m³/d) as the whole of 2021, with this marking a 43% increase compared with the same period last year.

This trend has allowed the rapid upscaling of gas flows to the EU to the region of 70-100mn m³/d since early May. The UK is also the main source of gas to Ireland, meeting more than 70% of Irish needs last year via pipelines from the west coast of Scotland. Flows to Ireland increased by 9% year-on-year and have more than doubled since 2017, as domestic Irish supplies have fallen. This decline could be irreversible as the Irish government has set a ban on new oil and gas licensing. It estimates that by 2030 Ireland could be 90% reliant on gas imports.[5] The country is considering how to ensure energy security in this context, including the development of LNG imports as a part of its supply portfolio.

Although the use of UK infrastructure as transit is good for continental European

[5]. https://www.gov.ie/en/policy-information/f1ecf1-gas/#gas-security-of-supply

## Figure 6
## Monthly UK gas flows



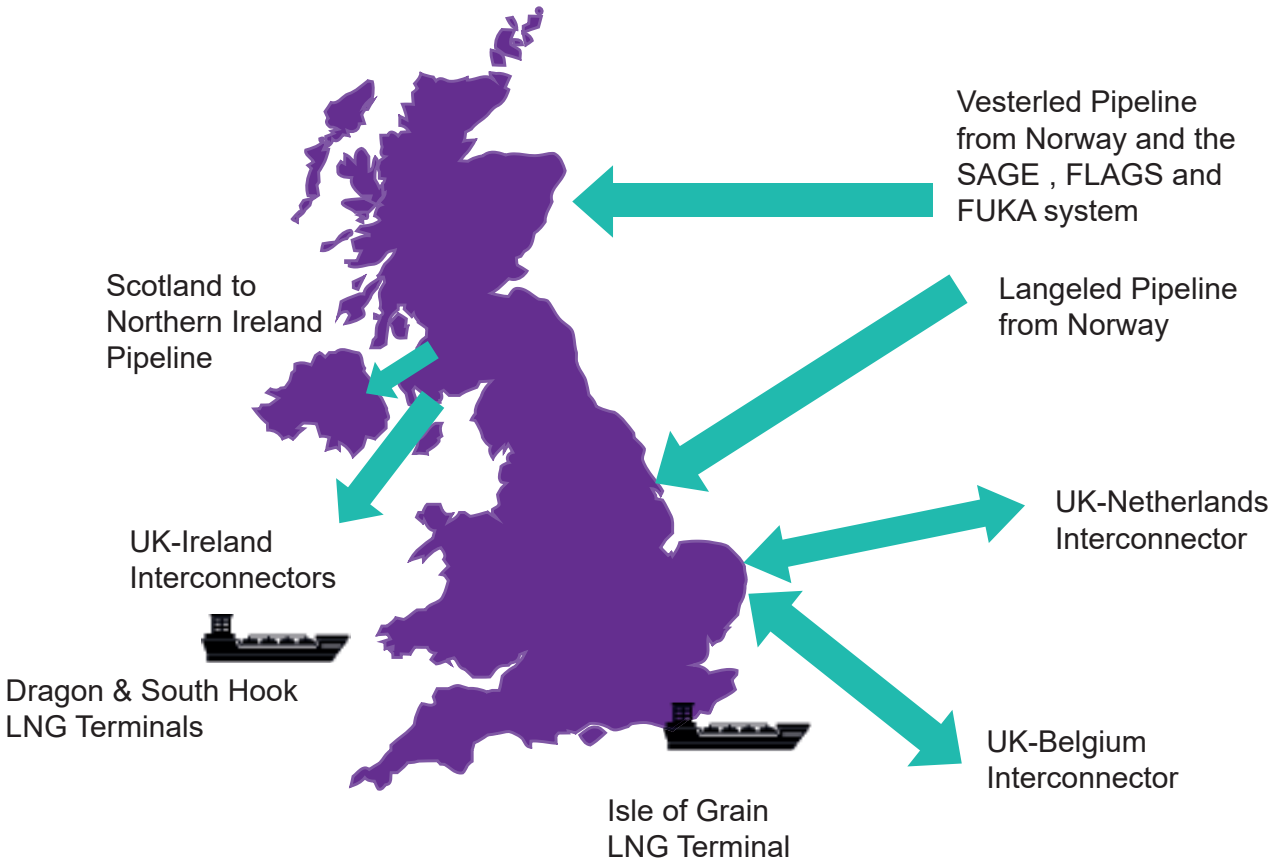

Source: BEIS

supply security, it has been a factor in some of the extreme price swings that have been seen in the NBP. There have been periods where the UK market has been oversupplied as the interconnectors have been at, or had reduced, capacity and the UK does not have much storage capacity relative to demand. During these periods day-ahead gas prices fell as low as 10 p/th in June and swung by as much as 800% across a two-day period.

The UK typically benefits from access to European storage supplies during winter months, when the interconnectors generally flow gas to the UK, demonstrating the benefits of connected energy networks. However, because of the increased LNG imports to the UK and slightly lower domestic demand, in winter 2021/22, the UK actually saw the reverse of this, with more pipeline gas flowing to the continent than from it.

The structural shifts taking place across gas supply routes have reignited calls for new UK investment in gas storage. Centrica Offshore has received consent to begin reinjecting gas at the Rough storage facility for the first time since 2017. Rough is a previously producing offshore gas field with two linked platforms in the southern North Sea, which was converted to storage after reaching the end of its productive life. This

**Figure 7**
**Great Britain and its import/export routes**




will increase the UK's gas storage capacity by around 50% this winter to 2.4bn m³ (this is the equivalent of around 12 days of typical UK consumption, or around five to six days days of winter demand) and, importantly, will help to manage price volatility in the market. A further doubling of capacity at Rough is expected by the end of 2023.

It would be prudent for the government to consider the further expansion of the UK's gas storage network, given the current market pressures.

Although the UK is in a relatively strong position thanks to domestic production and links to import sources, this cannot be taken for granted. The UK's main source of imported gas, Norway, is seeing increasing demand from mainland Europe, putting some strain on supply. For example, the new Baltic Pipeline, being constructed to connect Norwegian gas to Danish and Polish markets, will provide new options for some Norwegian exports. The UK's gas imports from Norway are generally pretty fixed, owing to supply and field export routes. But the development of these new supply routes could create additional competition for supplies to the UK, depending on prices and demand. In addition to this, after Brexit, the UK is no longer part of the

European single energy market. Although interconnector flows are part of the EU-UK Trade & Co-operation Agreement, there is some concern that a gas supply emergency in the EU would mean less gas flowing to the UK. This emphasises that while the UK does not directly import gas from Russia, the consequences of its actions nevertheless affect the UK gas market.

The best way for the UK to ensure stable gas supplies is through increased investment in its own domestic resources. Without that, the UK will be more reliant on imports sooner as production will fall at a faster rate than demand. This would increase supply competition across Europe and continue to keep prices high.

## Oil market

### Why are oil prices high, and where are they heading?

The benchmark Brent crude price saw steady gains throughout 2021, increasing from around $50/b at the start of the year to around $80/b by the of 2021 (roughly a 60% increase), with an average price of $71/b (70% up on the 2020 average of $44/b).

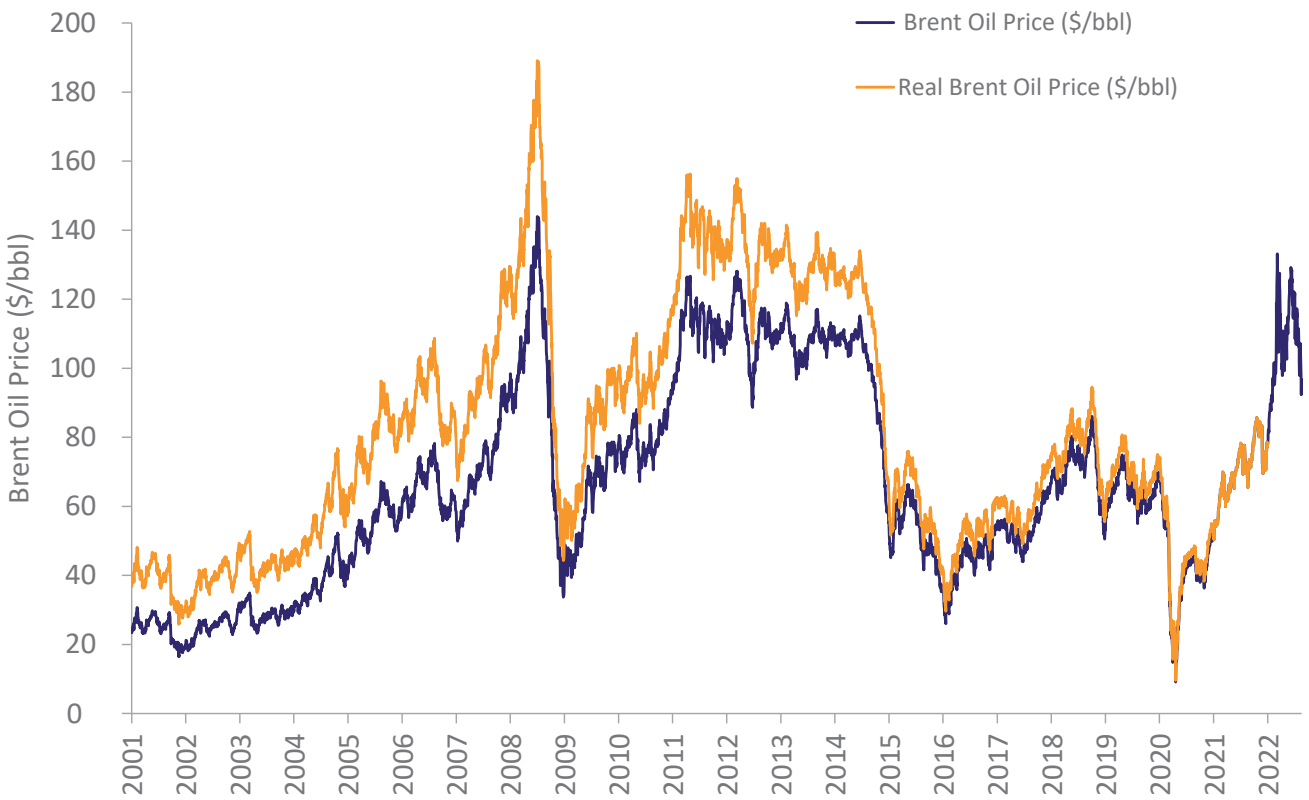
These gains were driven by demand, as Covid-19 restrictions were eased around the world. Opec reports that global oil demand rose 5.7% last year but supply failed to keep up, primarily owing to lower investment levels during the pandemic. Global supply only rose 1.4%, which was around 1.7mn b/d lower than demand, resulting in a tighter balance and draws on inventories (which fell from the equivalent of 102 days of demand across OECD countries in 2020 to 89 days last year and in Q1 2022).

The market has seen better balance so far in 2022. But fears that Russian supplies might fail to arrive have weighed heavily on market sentiment and supported higher prices. Brent averaged $107/b from January to the middle of August, but the geopolitical uncertainty has resulted in swings of up to $30/b within a single week (such as at the beginning of March), and a peak of $133/b. This compares with an average of $71/b across 2021 and $44/b in 2020. Across the period 2011-21, Brent averaged $75/b nominal, and $86/b in real terms.

Although they have been high, this year's prices are not unprecedented. In 2008, prior to the onset of the financial crash, Brent was trading at above $140/b. When adjusted for inflation this represents a real terms price of about $190/b. Prices also exceeded $130/b in 2013, on that same basis.

The longer-term outlook for Brent remains even more uncertain than usual thanks to a combination of supply and demand factors. EU countries are aiming to reduce oil imports from Russia by around 90% by the end of the year, representing around 2.2mn b/d of crude and a further 1.2mn b/d of oil products. This is a lot to replace at short notice from other import sources at a time when globally supply is already tight. A further tightening of supply would keep prices high, assuming that other demand

**Figure 8**
**Real and nominal Brent spot prices**




Source: IEA

remains stable. In response to this supply shortfall, Opec members (which represent around 30% of global production) agreed to an increase in output of 100,000 b/d from September. While insufficient to bring down prices much, the cartel is also keen not to bring on spare capacity only to see demand fall again if fears of a recession prove right.

Although the general consensus from organisations such as Opec, IEA and the US Energy Information Administration has been that demand will go up in 2023, the likelihood of a global recession, which would have a downwards impact on oil demand, is increasing. These concerns have begun to affect Brent prices, which fell by more than $20/b between mid-June and the end of July. The benchmark crude was trading at around $95/b in mid August – the lowest price since February – before recovering to around $100/b amidst concern that Opec countries were considering the reversal of previously announced production increases. A weaker demand outlook would normally be expected to lead to a relatively fast price response. But the extent of the impact, when balanced with prospects of even tighter supplies (which could effectively set a floor for prices), remains to be seen.

## What do the gas market conditions mean for the UK economy?

Gas prices are far higher than in the past, and although oil prices are not unprecedented, the impact of current market conditions has weighed more heavily on UK consumers than in previous high energy price periods. These trends matter so much because oil, and especially gas, are used so extensively in the UK. Gas is the UK's largest energy source, providing 43% of its energy needs last year, closely followed by oil, which met 32%. In the first half of this year gas and oil met 41% and 34%, respectively.

As well as space heating, gas remains at the heart of UK power generation and many industrial processes. It is the UK's largest electricity generation fuel, meeting 40% of supply last year and a monthly average of 38% of UK needs so far this year, with peaks far higher than this. Gas-fired capacity has the advantage of being able to respond very fast to spikes in demand and sudden variations in wind and solar output, for example. This is especially important in bringing flexibility, balance and stability to the system.

Wind has seen continued capacity growth, with offshore output growing more than tenfold over the last decade. But power generation remains intermittent, especially during prolonged periods of high pressure, such as this summer. Overall wind output (on and offshore) fell by about 15% last year, thanks to lower wind speed. Offshore wind saw a load factor (the level of output compared with installed capacity) last year of 49% in winter and around 26% in summer. So far this year wind has provided a high of 40% of electricity supply in February to a low of 19% in June. During these months gas provided 22% and 44%, respectively, reinforcing the need for flexibility in the system and the ongoing importance of gas in balancing our electricity supplies. As an example, on the morning of August 12 gas was providing 58% of UK consumption, including 75% in the north of Scotland network area and was as high as 89% of power in South Wales on August 15, primarily owing to low wind speeds.

Its role within the system means that gas-fired generation is almost always the "marginal" unit of production (i.e. the highest priced being dispatched in any period) and this is what sets the national price. As long as natural gas remains an important element of supply, electricity prices should reflect the value of gas being used. However, it is not necessary for electricity prices in their entirety to be based on the cost of natural gas, especially as other sources of generation increase their share. One proposal is for electricity provision to be split into two price bands, with a lower priced element largely reflecting the costs of renewables (and associated grid stability services), and a higher priced element covering the cost of dispatch of marginal units, such as gas. As the energy sector becomes more integrated, such questions around electricity market design are becoming increasingly relevant to upstream energy producers and industry continues to engage positively with government and regulators on this topic, including through

**Figure 9**
**UK wholesale electricity prices**


Source: OFGEM

the consultation on the Review of Electricity Market Arrangements which it launched in July and runs until October.[6]

The weekly average UK electricity price has increased by almost 500% since early 2021, from just over £50/megaWatt-hour (MWh) to £258/MWh at the end of June, and forward-looking prices for the coming winter are at a record £750/MWh. When these power costs are considered alongside the fact that 23mn, or 85%, of UK homes are heated by gas boilers, the result has been extreme increases in domestic energy bills. The Ofgem price cap was raised in April, resulting in average bills increasing by almost £700/year (to around £2,000/year) and they will rise by a further 80% to over £3,500/yr from October, to potentially over £5,400/yr from Q1 2023 and £6,600/yr from Q2 2023.[7] Based on the October rise alone, this means that total domestic gas and electricity spend will be around top £100bn next year, up from £35bn in 2021, but could then rise even higher. Increases as big as these could result in over half of UK households being in fuel poverty this winter, which would bring significant social and economic consequences.

In addition to this, it is important to note that businesses are even more exposed to changes in gas prices as there is no protective price cap in place for non-domestic energy use. Latest data for Q1 2022 shows that the largest business consumers had seen unit

[6]. UK launches biggest electricity market reform in a generation – GOV.UK (www.gov.uk)
[7]. Cornwall Insight comments on the announcement of the October price cap (cornwall-insight.com)
[8]. Where fuel costs represent more than 10% of household income.

price increases of 170% year on year for gas and 37% for electricity. Smaller companies had seen increases of almost 50% for gas and 30% for electricity.[9] Prices into Q2 and Q3 foreshadow even greater increases, however specific data is not yet available. If it was to be assumed that average spend this year was to treble (roughly the same rate of increase as the domestic price cap) then overall spend on electricity and gas by industry and businesses could rise to £108bn, from £36bn last year.

The government has put in place some support for some business customers through reductions in the carbon costs associated with their electricity supplies. It is also considering some additional measures such as increased exemptions to the renewable energy obligations.[10]

It should be noted that increased costs are already resulting in lower consumption, which would limit this rate of spend increase. Although the outlook is uncertain, in the first half of 2022 the UK actually saw an overall 13% year-on-year drop in gas consumption, to a similar level as the first half of 2020, when the Covid-19 pandemic struck. This fall was the result of slightly warmer temperatures, which reduced domestic demand, alongside higher wind output which slightly reduced calls on gas fuelled power generation. There is evidence of demand destruction taking place as industry reacts to high gas prices and this is likely to increase. For example, industrial gas use in the UK fell by 30% in June 2022 compared with June 2021.

Despite lower consumption, there are concerns over the ability to continue to balance gas and electricity supplies throughout the coming winter, especially in the event of further cuts to Russian exports to Europe. National Grid has recognised the need to take actions to reduce electricity and gas consumption to manage supply[11] and it has agreed the delayed closure of four coal-fired generating units (two at Drax and two at West Burton A) to add extra capacity. All things being equal, this will contribute towards a temporary slowdown in UK efforts to lower carbon emissions. National Grid is also examining a range of gas demand scenarios – ranging from a mild winter to an extreme event (such as 'the Beast from the East' of 2018) – to ensure it can continue to meet needs.[12] The prospect of even tighter supplies is likely to result in further upwards price pressures, with this being reflected in winter 2022 gas trades being priced significantly higher than current market levels.

## Oil market conditions and the economy

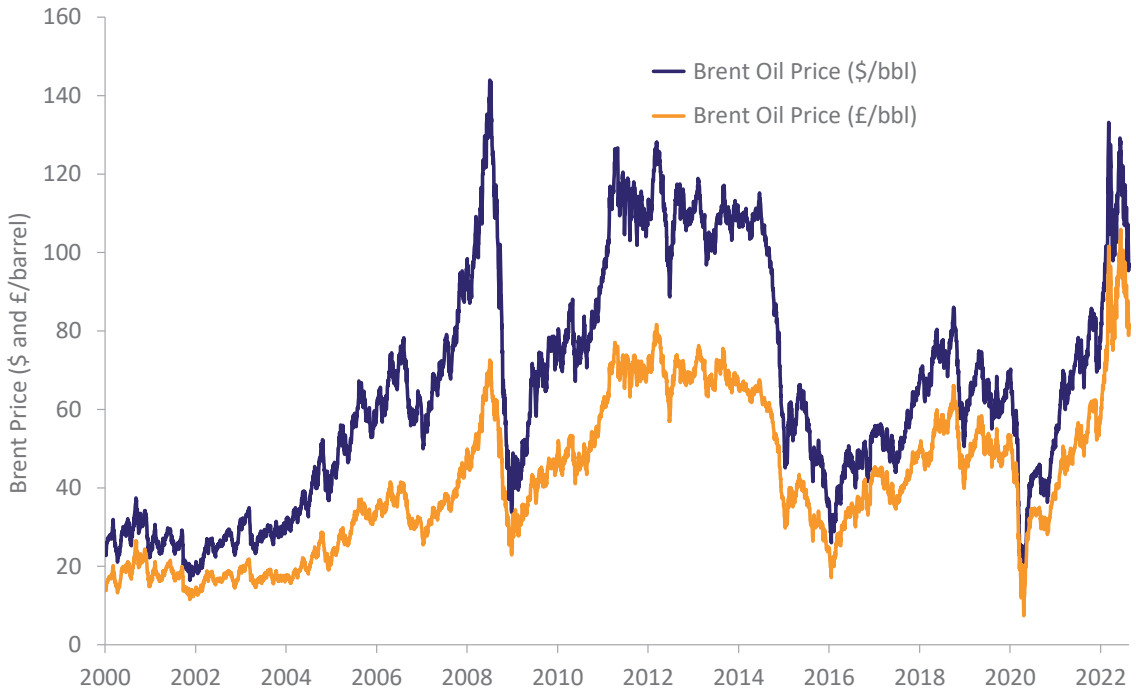
The UK used 19% more oil-based fuels in the first half of this year compared with the same period in 2020 and 2021. This demonstrates the scale of demand rebound following the easing of pandemic restrictions, but it is about 12% lower than the pre-pandemic level for the same period.

Transport is the main use for UK oil (accounting for 95% of needs) and for energy overall. It accounted for 34% of final energy consumption last year. Fuel costs therefore have a big effect on domestic and industrial consumers.

The price of petrol and diesel rose by 42% over the last year in the UK (June 2021-June 2022), with the average prices

[9]. Gas and electricity prices in the non-domestic sector – GOV.UK (www.gov.uk)
[10]. High energy usage businesses to benefit from further government support – GOV.UK (www.gov.uk)
[11]. https://www.nationalgrideso.com/document/264521/download
[12]. https://www.nationalgrideso.com/document/264521/download

## Figure 10
## Brent price and exchange rate impact




Source: OEUK, EIA

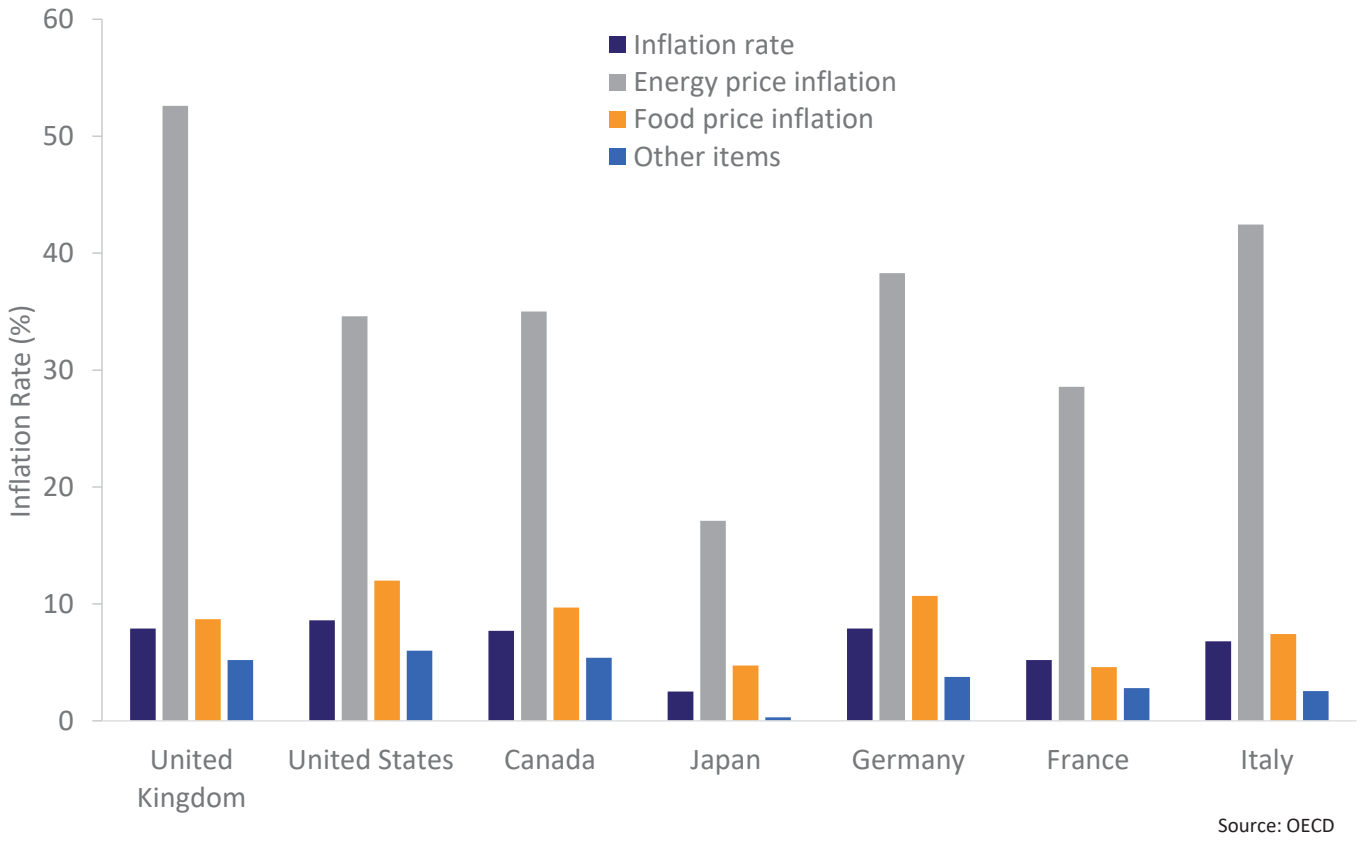
of unleaded fuel reaching record highs of over 191 p/litre before falling back to around 170-180 p/litre by mid-August, as oil prices have also fallen.

Although wholesale energy costs are at the heart of these petrol and diesel price increases, the weaker performance of sterling against the US dollar is having a significant effect. A Brent price of $100/b is equivalent to around £83/b at current exchange rates, whereas in 2013, $100 was the equivalent of £66/b and in 2008 would have been the equivalent of £50/b. This means that the cost of oil is significantly higher for the UK consumer now than in the past.

These high energy price increases are the key driver of high inflation rates across the UK and global economies.

In July, the UK Consumer Price Index (CPI), a standard measure of inflation, reached 10.1% – the highest since 1982 – and the Bank of England forecasts that CPI will reach 13% by the end of the year, before returning to the 2% target by the end of 2024. Some firms have forecast that inflation could escalate to 18%, or higher, next year. The Bank of England forecasts energy prices will be responsible for 6.5 points, or half the UK's 13% inflation rate and they will remain high throughout most of 2023. High energy price inflation is being seen across the G7 countries, but the level is largely determined by the countries' reliance on oil and gas. Japan and France have seen lower energy cost inflation largely thanks to their relatively high nuclear power capacity (Japan and France rely on gas for around 21% and 16% of their energy needs, respectively, whereas the UK sources over 40% of its needs from gas).

**Figure 11**
**Drivers of inflation in G7 countries**




Source: OECD

These inflationary pressures have heightened the prospects of a global recession. The World Bank expects global GDP growth to be 2.9% this year. But downside risks could push this to 2.1% and then 1.5% next year (both reflecting a downward revision from previous forecasts). This is also in line with projections from the International Monetary Fund (IMF). In the UK, the economy started to shrink in the second quarter and is now expected to enter a recession (two consecutive quarters of shrinking) which will last throughout 2023. When combined with inflation rates, this will place severe pressures on real incomes.

## The offshore energy sector – energising the UK, now and in the future

Offshore oil, gas and wind provided almost three-quarters of the UK's total energy production last year and estimates from the NSTA show that harnessing the integrated potential of the offshore sector could contribute around 60% of the UK total emissions abatement requirements by 2050.[13] As a result of this, offshore energy production is one of the UK's largest and most important industrial sectors, now and in the future. As well as energy security


and emissions reduction potential, it brings a wealth of benefits to the country: employment, direct economic and fiscal contributions; industrial feedstocks for petrochemicals; and industrial capabilities.

The pandemic reduced the sector's overall contribution, as investment was scaled back and offshore activity decreased. But there are some positive signs that this is now recovering. It should be stressed though that this contribution will be defined by the sector's ability to invest in new projects. This requires supportive and competitive business conditions.

The UKCS has a rich ecosystem of companies involved in energy production, with a range of financial and corporate structures underpinning them. This diversity in both the operator and supply chain companies has been at the heart of the UKCS' success over the past 50 years. Harnessing the strength of experience across the basin will be key for managing the production decline and accelerating net-zero opportunities to deliver clean energy to the UK in the future.

## Supporting the UK today

*Gross value-added*

OEUK estimates the oil and gas sector contributed around £26.5bn in terms of gross value-added (GVA) to the UK in 2021, representing around 1.3% of the total . This is lower than prior to the pandemic, when the sector was estimated to support around 1.6% of GVA – indicating that other areas of the economy have seen a faster rate of economic recovery. Based on expectations around the prospects for some increase in investment and expenditure this year, OEUK estimates that the sector's GVA contribution

[13]. https://www.nstauthority.co.uk/the-move-to-net-zero/energy-integration/

could increase to around £28.4bn; however, it could be greater because of higher commodity prices. Overall, it is estimated that every £1mn the sector spends leads to £2.1mn of value across the economy. This is a crucial economic contribution given the expected recession.

### *Tax payments*

Latest Office for Budget Responsibility (OBR) figures show that production taxes raised £3.1bn in 2021-22. The OBR forecasts the oil and gas sector will contribute around £7.8bn this financial year, with an additional £5bn in the year following the introduction of the Energy Profits Levy (EPL) in May. The enduring high commodity prices mean that the actual payments may turn out to be higher than these forecasts.

These contributions will likely push the total tax contribution from the oil and gas sector, since 1970, above £400bn.

### *Employment*

OEUK estimates that the oil and gas sector supported 200,800 jobs across the UK in 2021. This could rise to almost 214,000 in 2022, depending on activity and investment. The scale and complexity of the sector mean that it supports employment from a wide range of industries, with 35 tracked by OEUK, ranging from construction and steel manufacturing through to transport, catering and professional services. These are jobs that span the length and breadth of the UK.

### *Energy security*

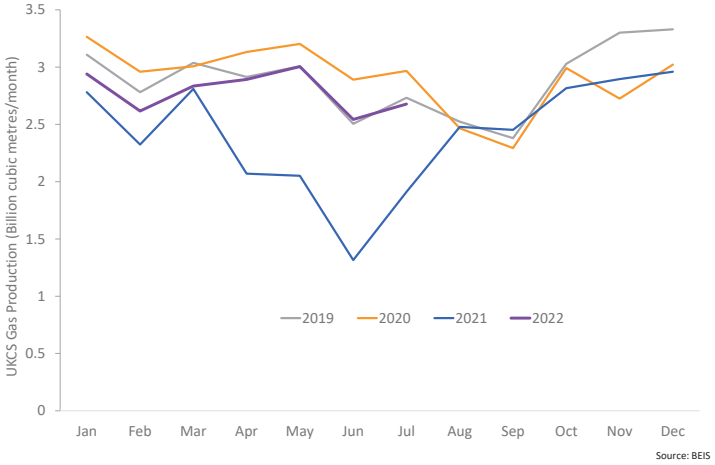
Gas and oil make the UK's energy system work by bringing flexible volume. Most other sources provide baseload as they are relatively fixed in their capacities. Oil and gas also meet the needs of sectors where the immediate alternatives are in their infancy (such as electric vehicles and heat pumps) and represent considerable costs to consumers.

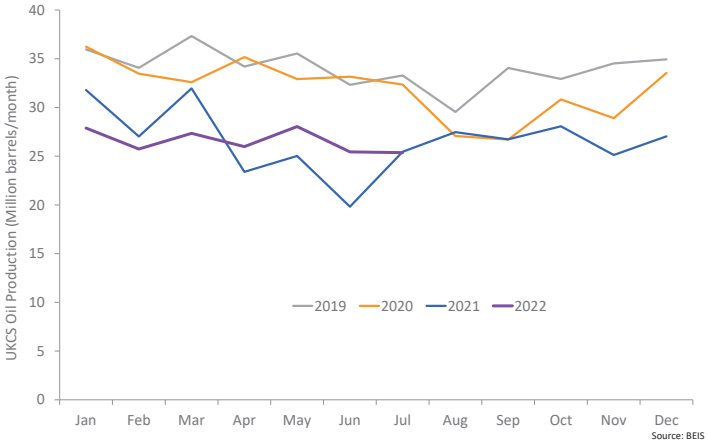
Last year the UKCS produced enough oil and gas to meet 38% of our gas and 75% of our oil product use. The importance of the offshore oil and gas sector within the energy system has increased even further so far this year. The UKCS produced enough in the first half of the year to meet 43% of gas consumption and 69% of oil. For gas, this is a significant step-up on the same period last year. Then, domestic resources only met 30% in that period.

Updated figures show that an additional 3.7bn $m^3$ were added to the market from UK gas production in the first half of the year, 27% more than in the same period in 2021 (17bn $m^3$ compared with 13.35 bn $m^3$). Provisional figures show that this trend is likely to increase to 29% for the first seven months of the year (to 20bn $m^3$).

This marks a return towards pre-pandemic levels and has been driven by the start of new fields in the southern North Sea, such as Tolmount and the Saturn Banks project. There has also been much less planned shutdown activity, partly owing to the extent of work completed in 2021 and partly because companies have focused on keeping plant running in response to energy supply fears and persistently high prices.
The first-half increase in supply is roughly equal to around 6% of typical UK annual gas demand. Overall domestic gas production was equivalent to 43% of demand, exceeding 50% in May and two-thirds in June – as

## Figure 12
## UK monthly gas and oil production




demand fell in the summer months. This improved output means that the UK's gas import dependency was correspondingly lower, which also eases the supply-demand balance across Europe as a whole at a time of crisis.

Oil production has not changed since 2021, which is lower than pre-pandemic output. However OEUK would expect to see an uplift in output in early 2023, driven by the expected start-up of a number of new fields, such as Penguins and Seagull.

## Supporting the UK in the future

The UK's reliance on international energy imports has been largely driven by the long-term reduction in domestic fuel production, rather than an increase in energy use.

Production of primary energy in the UK has been steadily decreasing over the last 20 years, largely reflecting the decline in oil and gas output from the UKCS. Overall primary energy production has decreased by almost two-thirds since 2000, while demand has dropped just 28%. This means that since 2004 we have moved from being self-sufficient to heavily import-reliant. During much of this period, filling the energy gap with imports has been a relatively cheap (with an average real terms NBP day-ahead gas price of 54 p/th and Brent of $87/b between 2004-21) and secure option. But it has also led to an element of complacency with our energy supply. The current market dynamics have shifted this to a position of real concern across society, as imports have become considerably more expensive and less reliable. For example, the cost of fuel imports to the UK in the 12 months

## Case Study: Spirit Energy, maximising recovery

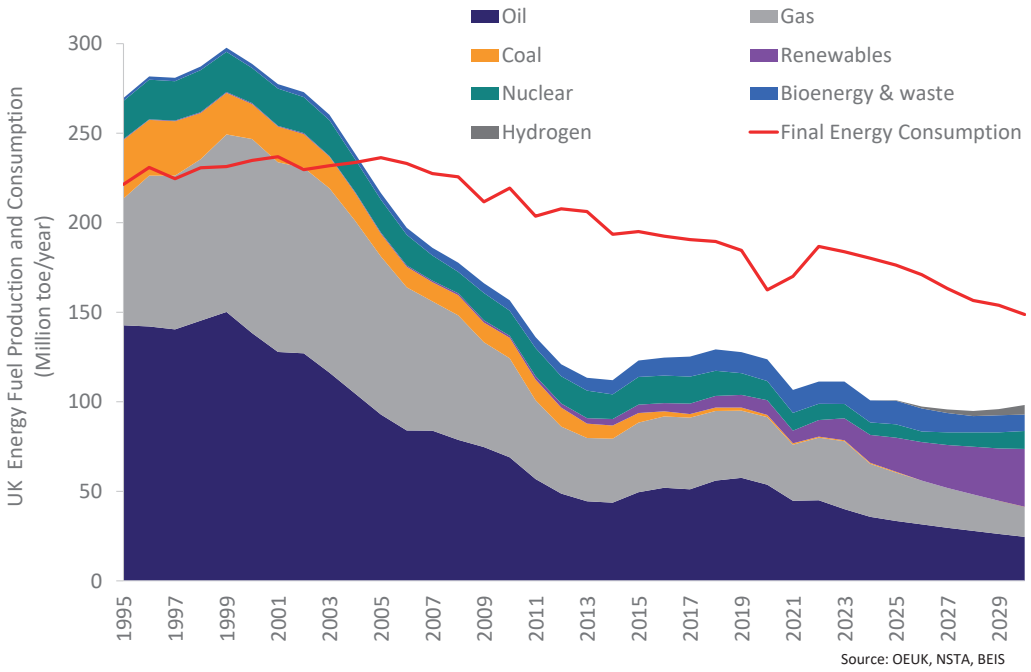
The southern North Sea York field began production in 2013 and was planned to produce until late 2019. Due to a life extension project, economic production has now been extended to early 2024.

The York wells were included in Spirit Energy's 2020 plug-and-abandonment contract. In early 2019, however, an idea was conceived to drain the reservoir using low pressure compression at the Dimlington Terminal. After technical due diligence by subsurface and facilities teams, a project was initiated and funded. The life extension work comprised both onshore and offshore activities, including a walk to work campaign. The project included re-routing the York gas to the Dimlington Gas Terminal, accessing its onshore gas compression facility, moving from its previous export route via the Easington Gas Terminal.

Thanks to the joint efforts and determination of Spirit Energy, Perenco, Centrica Storage and supply chain partners, the project was successfully completed during the coronavirus pandemic, with production returning, after a short pause for the project, in April 2021.

It's expected that York will produce an additional 12bn $ft^3$ of gas, which would have otherwise been left undrained. Additionally, the life extension enabled a deeper evaluation of the area, potentially unlocking some of the marginal gas fields. York's infrastructure can also be instrumental to the energy transition as hydrogen and carbon storage projects develop in the Humber area. This project illustrates how collaboration and a shared goal of maximising the economic recovery of the UKCS can achieve value.

## Figure 13
## UK monthly oil and gas production




Source: OEUK, NSTA, BEIS

to April 2022 was £64.7bn, up £42.6bn on 2021 levels.[14] Norway was the biggest source of this, with trade figures showing a £20.3bn spend on these gas imports during the period,[15] and increasing to £32bn in the year to May.

The UK is in the fortunate position of having a diverse range of energy resources. But new investment, at significant scale, is required to develop them to their full potential.

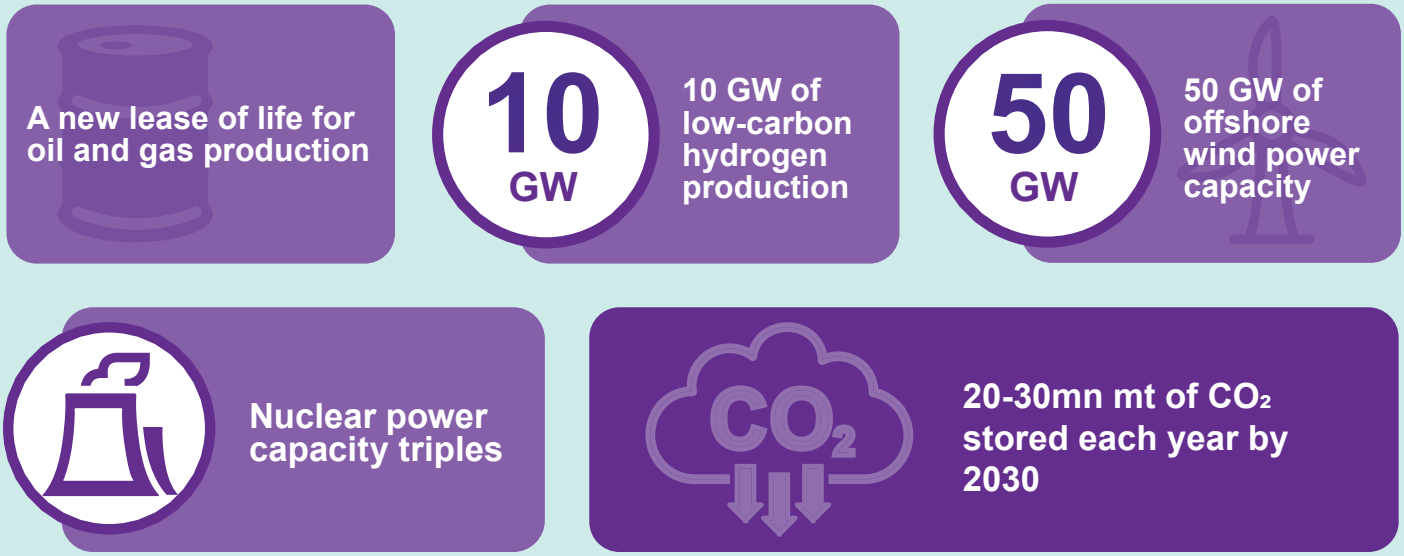
The government's Energy Security Strategy[16] outlines a plan to boost energy independence by making the most of the country's energy resources – from oil and gas through to the further expansion of offshore wind capacity, more nuclear power output and the development of low-carbon hydrogen production.

However, it is important that the change in our energy supply happens in step with anticipated changes in overall, and specific fuel, demand. For example, if increased electricity output is to effectively offset reductions in gas production, then the country must invest in large scale electrification, otherwise the import dynamic will not improve. It is also important that the UK develops demand for low-carbon hydrogen and creates the business models for investment in storage. This also must be underpinned by ongoing support for the development of Carbon capture, transport and storage capacity.

OEUK estimates that achieving the Energy Security Strategy targets would only stabilise domestic energy production as the growth in renewables for the remainder of the decade effectively offsets the expected declines in oil and gas. Overall, OEUK estimates that the UK's net dependence on energy imports is likely to decrease only slightly by 2030, compared with last year (33% compared with 38%) with most of this being demand driven, meaning that we will continue to be reliant on international markets – especially for enduring and

[14]. https://www.ons.gov.uk/economy/nationalaccounts/balanceofpayments/articles/trendsinukimportsandexportsoffuels/2022-06-29
[15]. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1098435/norway-trade-and-investment-factsheet-2022-08-19.pdf
[16]. https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy

## British Energy Security Strategy



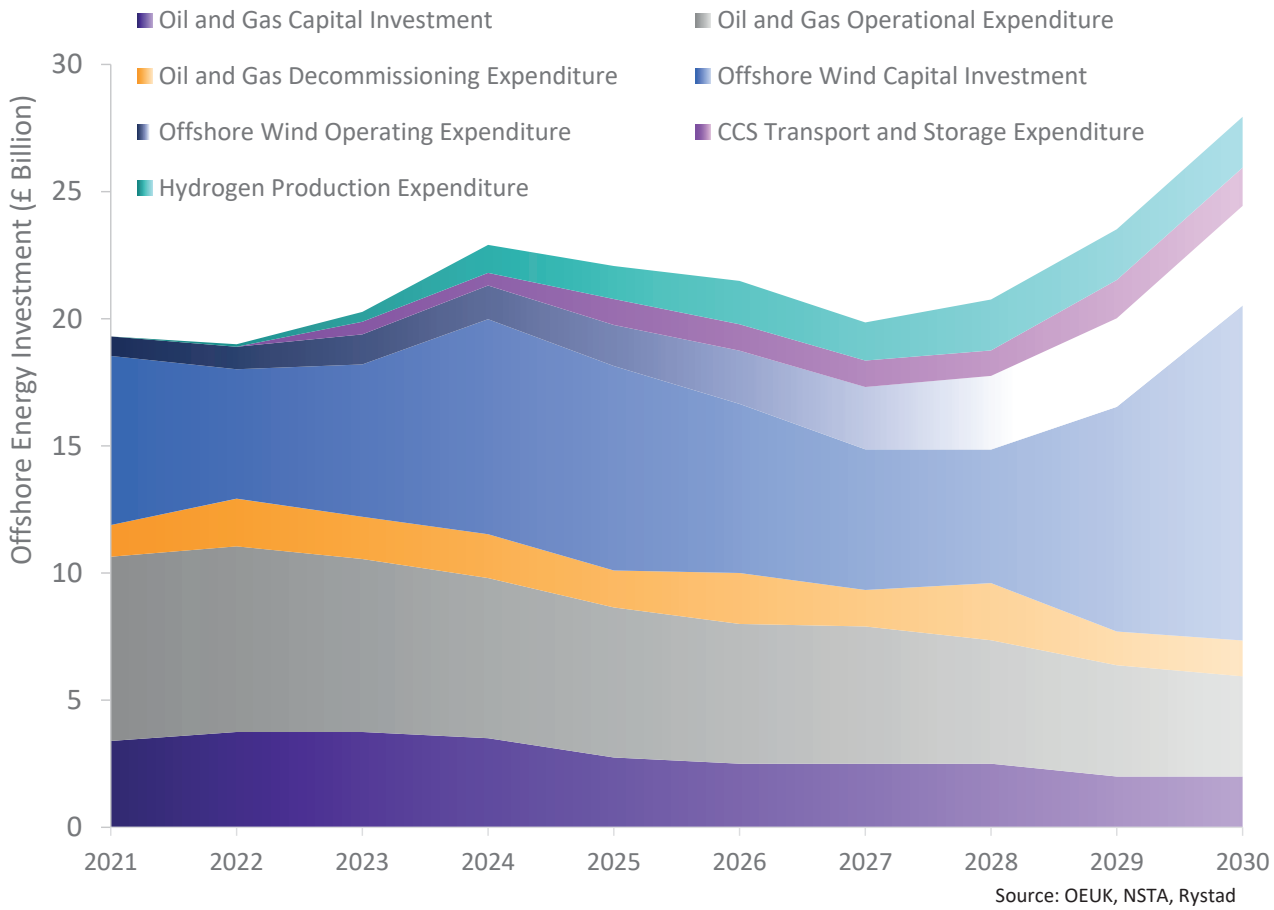

vital oil and gas needs such as transport and domestic heating. It takes time to build energy capacity, so it is important to focus on existing assets by encouraging investment in these in the short term. That buys time for the UK to build lower carbon capacity for the future.

The transitioning offshore sector is at the heart of the country's energy future, with the skills and experience of the people and companies in the oil and gas sector crucial to the success of scaling up development of new energy projects. The North Sea Transition Deal[17] sets out the steps required to unlock the oil and sector's potential across a number of these areas. Key to this is the creation of stable and competitive business conditions to attract investment.

OEUK estimates that in the remainder of the decade, the UK offshore energy sector will spend over £200bn on oil and gas, offshore wind, hydrogen production and the transport and storage of $CO_2$. Striving for energy independence in the 2030s will cost even more than this, demonstrating the scale of challenge, but also the opportunity for energy developers and supply chain companies. Attracting this level of investment will require a clear focus from all industry stakeholders on developing and maintaining attractive business conditions. It is also important that companies across the sector are open to new and innovative contracting models to unlock efficiency opportunities and to ensure that a strong, sustainable and well-resourced supply chain is in place to deliver projects.

[17]. North Sea Transition Deal – GOV.UK (www.gov.uk)

## Figure 14
## Offshore energy expenditure forecast




Source: OEUK, NSTA, Rystad

## Realising the UK's remaining oil and gas potential

As well as being the UK's largest source of energy consumption (three-quarters of total use), oil and gas are also the country's largest source of primary domestic fuel production, accounting for 71% of the total last year. Although domestic production has risen this year, OEUK expects output to decline in the medium to longer term, the rate of which will be defined by investment levels. As the basin matures and the development of low carbon and renewable fuels increases, it is important that the UK continues to support oil and gas investment for security of supply and other benefits such as employment and taxation.

The North Sea Transition Authority (NSTA) estimates that (as of end-2020) there were almost 15bn boe remaining on the UKCS, spanning reserves in producing fields (4.4bn boe), known investment opportunities (6.8bn boe) and mapped exploration plays (3.7bn boe).[18] But it is important to

## Case Study: Wood & supply chain flexibility

Challenging traditional supply chain models in the UK North Sea can allow clients and contractors to achieve greater efficiencies by working in true partnership.

Prior to the onset of the pandemic, bp and Wood set out to do just this – recognising that by breaking down barriers to collaboration, we can unlock solutions that neither could achieve in isolation. Using agile methods, teams from both businesses were integrated and co-located to develop a framework for an effective partnership. By sharing our collective capabilities and experience, we tapped into unobvious pools of expertise and accessed diverse thinking.

For example, being able to leverage Wood's reliability specialists in the mining sector to combine surveillance data from different service providers has made it possible to create a clearer view of system-level vulnerabilities.

With this momentum, we have realised a step-change in how we approach, plan, and prepare for work offshore, supported by the myriad data that has been rejuvenated to create digital twins for several North Sea assets.

By leveraging the data insights, the maintenance backlog was reduced by 30,000 hours and immediately reduced the volume of mobilisations required for site surveys by 50%. The results we are seeing are a direct result of the trust we have built–where bp is comfortable with presenting its challenges in full, and Wood is empowered to present the full extent of its capability and experience to help develop those new, impactful solutions.

note that not all these opportunities will go on to be developed for technical and economic reasons. As part of this, there are some opportunities through changes to the National Grid gas entry specification (Wobbe Index), that could increase flows for some fields. This is a change which the government could make relatively quickly.

To ensure that opportunities have the best chance of progression in a timely manner, it is crucial that there is a new licensing round as soon as possible after the announcement of the Climate Compatibility Checkpoint. This could also help to spur an increase in exploration and appraisal activity which has remained at record low levels in recent years. Just five exploration wells were drilled last year, which was the lowest since the North Sea sector was opened up almost 60 years ago. It is expected that there will be a similar level of activity this year. As of mid-August, wells at four exploration sites had started drilling – Edinburgh, North Eigg, Diadem and Orlov. The Edinburgh well was reported as not having encountered commercial hydrocarbons, but the partners are continuing to evaluate the wider potential within the licence. At the time of writing, operations were continuing on the North Eigg and Diadem wells. The Pensacola well is also expected to be spudded this year and there will be appraisal work at the Isabella. Looking into 2023, the Benriach and Selene exploration wells are being planned and the Leverett prospect will be appraised. Exploration, and subsequent progress through to production is crucial to achieving the UK's oil and gas potential and reducing the energy import gap.

OEUK has sight of around £26bn of capital investment opportunities at various stages by 2030. If all are progressed, this could deliver more than 4bn boe of oil and gas (37% gas and 63% oil) by the end of the decade. For context the Climate Change Committee's (CCC) Balanced Pathway estimates that the UK will consume about 8bn boe of oil and gas during this period – meaning that the UK would likely remain reliant on international net imports for about half of its needs during this period, even in a full investment scenario. If new opportunities are discovered through exploration this gap could narrow.

However, less than a third of the known potential investment (£8.5bn) is considered sanctioned. In a scenario of no further investment approvals, it is likely that production would go on to decline at an average rate of around 15%/year for the remainder of the decade. A full investment case would still be expected to result in a longer-term production decline of around 5%/year, which is around the same rate that the CCC expects demand to drop by. The faster rate of decline would leave the UK dependent on international imports for around 80% of gas needs and around 70% for oil.

So far this year, two new UKCS fields have received regulatory consent for development: Jackdaw and Abigail. The NSTA has also provided regulatory consent for the Tommeliten A development, which spans the UK/Norway border – but the vast majority of this field lies in Norwegian waters. A further seven are going through the environmental review process, which is among the latter stages of the regulatory process: Murlach, Talbot, Affleck, Victory, Rosebank, Teal West and the second phase of the Captain Enhanced Oil Recovery project. The investment required to develop these fields is over £4bn and would provide

[18]. https://www.nstauthority.co.uk/media/7764/rr-report_final-22-september-2021.pdf

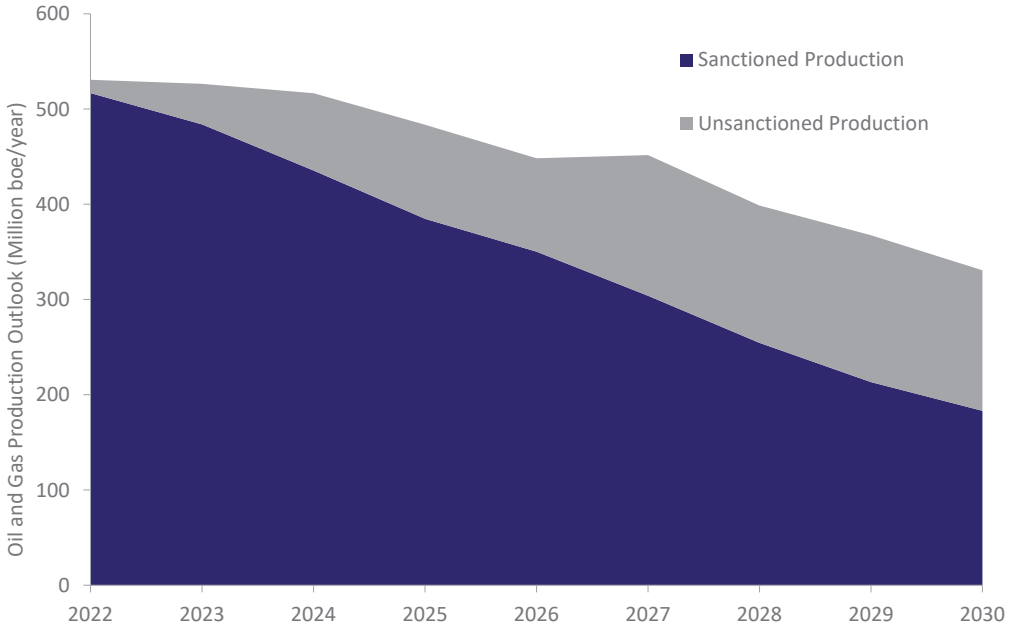
## Oil and gas investment


around 550mn boe across their productive life. This is only around 10% more than one year of current UKCS output. Some of these fields will not begin producing until late 2026 and peak flow from them will not be until 2027 – demonstrating the importance of a continuous flow of new project approvals to provide secure supplies. The NSTA has identified more than 30 projects at various stages of the consenting process, which could contain around 1.3bn boe of new recoverable resources. It is important to note that these possible developments are included in the sector's emissions reduction targets.

When companies make investment decisions, they need to balance several risks and factors. The nature of the risk and the importance attached to it, will be specific to that company's strategy and operations. These include operational risk, economic risk, financial risk and reputational risk, among others, While individually companies will be impacted by each risk to varying degrees and in different ways, ultimately companies need to feel confident to invest. Domestic politics, global market conditions and stakeholder expectations all play a part in creating a secure investment environment.

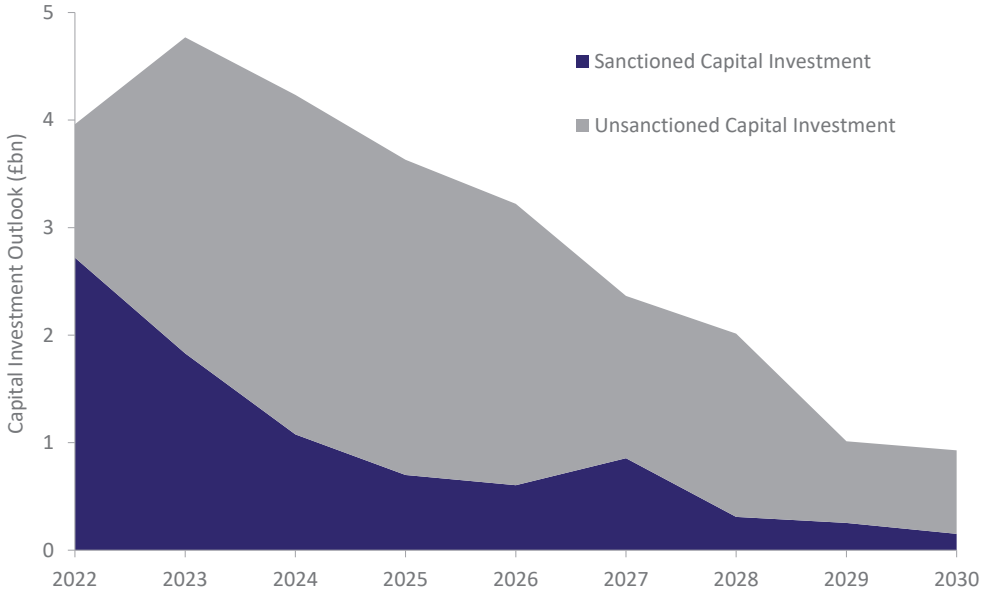
This May, the government introduced the Energy Profit Levy (EPL), estimating that it will raise £5bn in its first year, in addition to the £7.8bn in tax payments already being paid under the existing regime for financial year 2022/23. This measure has significantly impacted investor confidence, and risks handicapping long–term UK investment. The change in the fiscal regime will have a varying impact on several investment

## Figure 15
## UKCS oil and gas production




Source: NSTA, OEUK

## Figure 16
## Investment opportunity 2022-2030




Source: NSTA, OEUK

risk factors including economic, financial and operational.

The EPL increased the ring-fence corporation tax rate to 65%, which is the highest rate that the sector has seen and is almost 3.5 times higher than companies operating in the rest of the economy. In addition to the increase in the tax rate, the EPL also constrained the costs that can routinely be offset against revenues. This means the EPL in practice acts more like a revenue tax. While many companies continue to analyse the impact of the EPL on their portfolios, although there is a new investment allowance included in the tax,

## Company investment risks


for the majority this will have an adverse effect on current and future projects. OEUK continues to urge government to work with industry to rebuild competitiveness and position the UK as a competitive basin, with a stable and predictable fiscal regime, that can attract capital.

Over the past 50 years, there have been several changes to the tax system, almost all of which have led to less investment . Every time, the UK government has had to backtrack in some way as it recognises the importance of upstream production for energy security and revenues.

As well as fiscal considerations the cost of developing and operating projects is at the centre of a company's decision making. Consultancy Wood Mackenzie estimates that, globally, conventional offshore projects are likely to see cost inflation between 10% and 18% as raw material costs go up (for example a 42% increase in rolled steel prices this year, alone) and capacity constraints across supply chains following the significant challenges they have faced in recent years. Higher carbon prices on the emissions trading schemes also give companies cause for concern, with the UK carbon price sitting at over £90/mt in mid-August (double the price 12 months ago). This adds costs and could therefore deter an investment in a project as well as affect the viability of existing operations. However high prices can also stimulate investment in

## The fiscal regime for oil and gas

The UK Ring-Fence Corporation Tax is a specific regime for oil and gas companies. It separates those profits from the rest of the economy and applies a specific corporation tax regime to them. This ring-fence regime is made up of three specific taxes and a number of sector specific allowances.

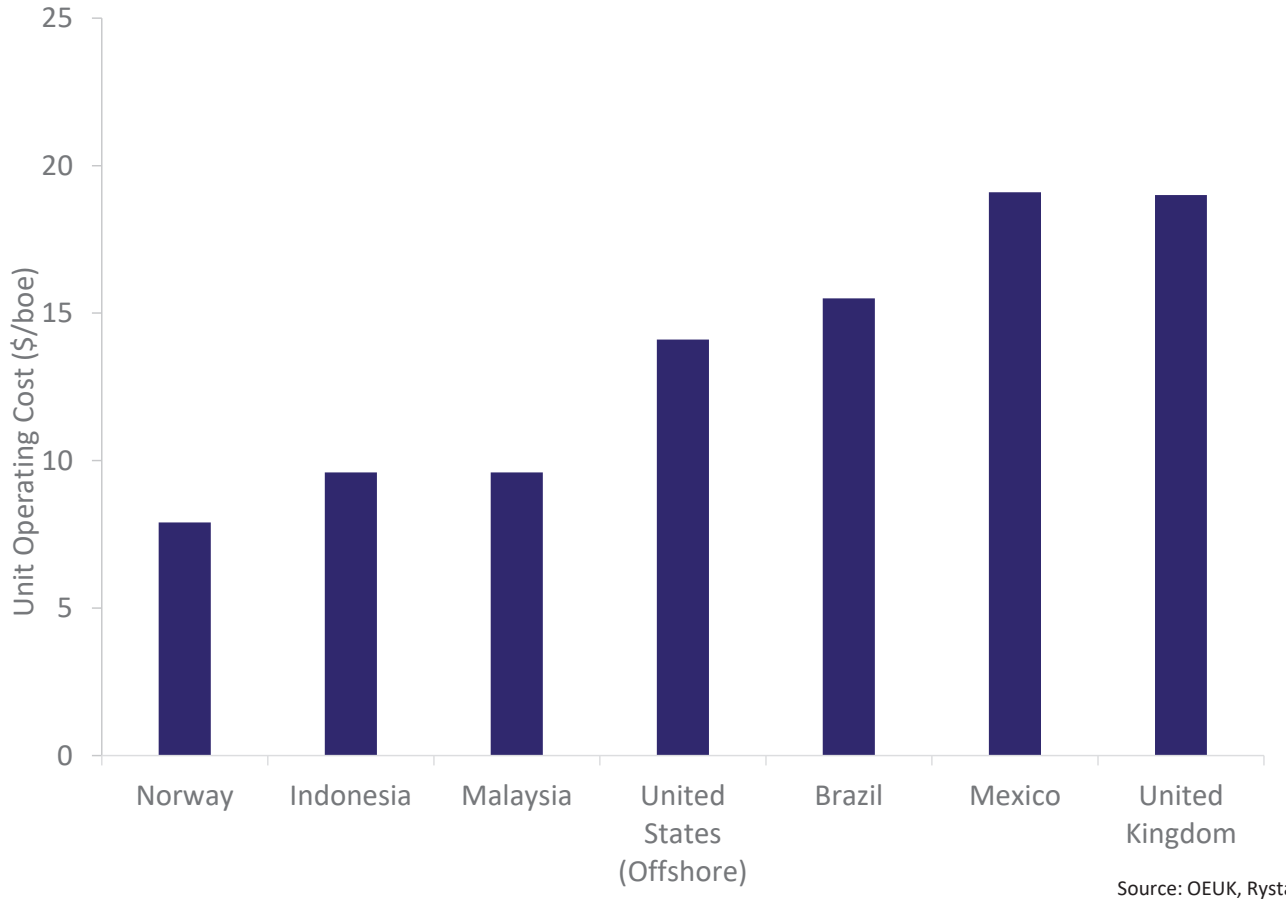
1. Ring Fence Corporation Tax (RFCT) is a 30% tax on company profits, similar to the normal corporation tax regime for the wider economy. It includes a 100% first-year allowance and different treatment of losses. The RFCT is designed to reflect the long life-cycle and front-loaded capital-intensive nature of oil and gas projects.

2. Supplementary Charge (SC) adds 10% corporation tax on company profits. It works similarly to RFCT except finance costs are not deductible. There is also a basin-wide investment allowance that is activated when fields start producing and can offset a proportion of a company's SC liability.

3. Energy Profit Levy is a 25% levy on top of RFCT and SC until the end of 2025. Finance and decommissioning costs are not deductible but there are restrictions on bringing losses forward. The EPL also has an investment allowance of 80% and is available to the companies at the point of investment. This is akin to the "super deduction" introduced into the wider fiscal regime in 2021.

4. 100% first year Capital Allowances mean that almost all investment expenditure incurred can be deducted immediately against the three taxes. For RFCT and SC only, any expenditure not used can be carried forward indefinitely.

**Figure 17**
**Unit operating cost comparison**




Source: OEUK, Rystad

emissions reduction projects, which could support industry's progress towards its 50% emissions reduction target by 2030. The industry has cut its emissions by 20% since 2018 (from 18.88mn mt $CO_2e$ to 15.03mn mt$CO_2e$ last year), with this mainly being driven by operational improvements and reductions in output and activity during the pandemic. Achieving deeper reductions, in line with the North Sea Transition Deal, will require significant investment in areas including electrification of platforms and gas flaring recovery systems. These investments would help reduce emissions, and their associated financial cost through the emissions trading scheme, ensuring that the infrastructure remains in place to continue to provide energy into the future.

These inflationary pressures are feeding through into UKCS unit operating costs UOC.[19] OEUK forecasts these could be around $18-20/boe this year, up from the $15/boe of recent years. Despite cost inflation across other regions, this remains relatively high in relation to comparable basins. To unlock new opportunities and ensure a strong and competitive UK supply chain, it is important the industry retains its focus on efficiency by continuing to look for collaboration opportunities to optimise value. Operators should also provide as

[19]. Unit operating costs are the average cost of producing a barrel of oil or gas, not including capital and development expenditure. This measure includes expenditure which is required to run and maintain the infrastructure associated with oil and gas production.

much visibility and certainty of upcoming work scopes as they can so supply chain companies can plan and invest with greater confidence. This is essential for the success of future projects, as companies will be competing against other regions and other parts of the energy system for access to resources.

## Expanding the UK's offshore wind capacity

The UK already has the world's second largest installed offshore wind capacity, at around 12 GW, and aims to increase it to 50 GW by 2030, of which at least a tenth is to take the form of floating wind farms. Although there is a strong pipeline of new projects at various stages of development, this scale and pace of capacity installation is very ambitious, and it will require improvements to the regulatory and permitting process. Success will also depend on significant co-ordination between energy developers and supply chain companies. For context, it has taken the UK two decades to reach today's capacity and achieving the aims of the strategy means adding a further 4-5 GW/yr of operational capacity until the end of the decade. This means installing more than one turbine every day for the rest of the decade.

As of late August, OEUK knew of around 40 projects planned through to 2030 at various stages of the development cycle. Based on this pipeline, the Energy Security Strategy target is potentially achievable, but it is important to understand the associated project uncertainties and risks. Of the potential capacity additions before 2030, 46% (almost 18.5 GW) is only at concept stage, while 54% (almost 22 GW) is approved or under construction.

History shows that it takes around 13 years to progress from concept and application stage through to operations, meaning that the UK's 50 GW ambitions will only be achieved if this can be sped up.

## The Energy Security Strategy aims to halve this time by:

- Reducing consent time from four years to one year;
- Streamlining the environmental assessment process;
- Encouraging greater cross-regulatory integration and alignment through the Offshore Wind Acceleration Task Force;
- Establishing a 'fast track' route for priority projects, which meet required standards; and
- Providing funding for R&D and infrastructure and supply chain support.

**Figure 18**
**Potential offshore wind capacity additions by year**


Source: Rystad, OEUK

As well as bringing clean power capacity, the expansion of offshore wind generation provides opportunities for integration with offshore oil and gas production, to help reduce emissions from asset power generation, and through the production of low carbon hydrogen, which can help displace some gas use across the economy – both core elements of the deal.

In August, Crown Estate Scotland launched the Innovation and Targeted Oil and Gas offshore wind leasing process.[20] This allows energy companies to apply for the rights to develop offshore wind projects (up to 100 MW capacity) to provide electricity to oil and gas assets. This means less gas or diesel is used to power platforms offshore, which would result in significant emissions reductions. It is expected that the results of the leasing round will be announced before the end of Q1 2023.

The level of project activity that is expected in the coming years represents a significant opportunity for supply chain companies, with the potential for almost £80bn of capital investment through to 2030. However it is important to ensure the supply chain is well positioned, in terms of capacity, to deliver this – especially in the context of plans to increase capacity in other countries. The IEA Net Zero scenario calculates that around 80 GW/year of offshore wind capacity will have to be built globally by the end of the decade. In line with this, plans to ramp up capacity

[20]. https://crownestate-newsroom.prgloo.com/news/intog-leasing-for-offshore-wind-opens-for-applications-to-encourage-innovation-and-decarbonise-north-sea

are emerging around the world. The US has set an ambition to achieve 30 GW by 2030 and China could add over 70 GW of new offshore wind capacity by 2030. Germany, Netherlands, Denmark and Belgium are also aiming to reach a combined 65 GW of capacity by 2030.

With supply–chain companies looking internationally for business, it is important that the UK keeps pace in terms of project progression to secure the supply chain resources that its ambitions require. Warning of possible bottlenecks, a study by the US National Renewable Energy Laboratory (NREL)[21] said that it is unlikely that international suppliers will have the capacity to meet the combined ambitions of countries and project timelines across Europe and the US, reinforcing the need for timely development of domestic supply chain capabilities.

The UK benefits from the skills of a well-developed domestic energy supply chain, built up over 50 years of oil and gas production, and many companies are increasingly diversifying their business strategies to capture value from developing areas like offshore wind. Along with this, the Offshore Wind Sector Deal[22] has set out the ambition for at least 60% lifetime local content, with a focus on driving up the proportion of capital investment phases.

Following on from the award of 7 GW of future capacity in Leasing Round 4, in January 2022 Crown Estate Scotwind announced the results of the Scotwind leasing round, with almost 25 GW of capacity announced across 17 projects. More recently, in August three new offshore wind projects were announced following from Crown Estate Scotland's Scotwind clearing process. The area off Shetland was made available to applicants who were not selected for their location of choice but who did meet the required standards. Taking these new projects into account, that adds up to 27.6 GW of capacity from Scotwind, with over 60% of the awarded capacity allocated to floating solutions. Although there may be the opportunity to advance these projects through the ambitions of the Energy Security Strategy, most will not be operational until the 2030s, which will build towards the UK's longer-term ambitions – with the CCC recommending in the Sixth Carbon Budget a target of 100 GW of offshore wind capacity by 2050.[23]

Across the initial 17 projects announced within the Scotwind leasing round, early indications from energy developers suggest that over £36bn (just over half of the committed spend) in contracts will be awarded to UK companies, with the ambition of increasing this of over £49bn (two-thirds of the possible spend). The levels of investment captured by UK supply chain companies will ultimately be determined by its competitiveness and the availability and capacity of critical infrastructure, such as ports and assembly facilities.

---

21. https://www.nrel.gov/docs/fy22osti/81602.pdf
22. https://www.gov.uk/government/publications/offshore-wind-sector-deal/offshore-wind-sector-deal
23. https://www.theccc.org.uk/publication/sixth-carbon-budget/#:~:text=UK%20electricity%20production%20is%20zero,100GW%20or%20more%20by%202050

## Case Study: Bilfinger UK, EnergyPods

Bilfinger UK has partnered with Netherlands-based Amphibious Energy to provide renewable energy generator units capable of saving (a minimum of) 50 $mtCO_2e$ per unit per year for operators in the offshore oil, gas and wind markets.

Prior to decommissioning in 2021 Ithaca's Jacky installation was powered by wind and solar energy after installation of an "EnergyPod." The EnergyPod is an autonomous, 100% renewable energy generator that combines wind and solar power with storage, in a compact and transportable manner. It provides a green substitute to diesel generators, and some of the more advanced models can also provide accommodation.

Bilfinger has exclusive rights in the UK and a number of European countries to install, commission, maintain, decommission and remove EnergyPods.

EnergyPods can provide power in late life operations and lighthouse mode as oil and gas assets are prepared for decommissioning. In the offshore wind market, the generators support auxiliary power requirements during wind farm construction and commissioning, and during outages where turbines are unable to run but require power for their systems to remain operational. They feature a patented nautilus wind turbine and solar panels, with a battery storage unit ensuring autonomy for up to 240 hours.

## Developing low-carbon hydrogen and carbon capture and storage capacity

Both the CCC and the UK government recognise that both low-carbon hydrogen production and carbon capture and storage capacity are essential to the national climate ambitions, and both are key aspects of the Deal. They also provide the opportunity to capitalise on the UK's oil and gas sector, in terms of its supply chain, infrastructure, resources and the ability to decarbonise gas, along with the supply chain companies who will execute the projects. Reflecting this, all the core cluster projects are being driven forward by members of OEUK, who are broadening their investments from oil and gas. It is important that the government supports the sector to move forward with new projects at pace, reflecting the benefits that a first mover advantage can have for supply chain opportunities, both in the UK and for international exports.

## Hydrogen

The Energy Security Strategy has set the ambition of developing 10 GW of low-carbon hydrogen production capacity in the UK by 2030, with at least half of this from electrolysis (green hydrogen) and the rest from carbon capture, use and storage (CCUS) using gas as the feedstock (blue hydrogen). Longer term it is envisaged that the continued scale-up of hydrogen could support something in the region of 20%-35% of UK total energy demand by 2050. As part of this capacity development, up to 1 GW green hydrogen and up to 1 GW blue hydrogen capacity is to be operational or in construction by 2025. This will help provide a new reliable and flexible energy source at a time of wider supply concerns, while enabling greater penetration of renewable power and providing a mechanism for energy storage, in the case of green hydrogen.

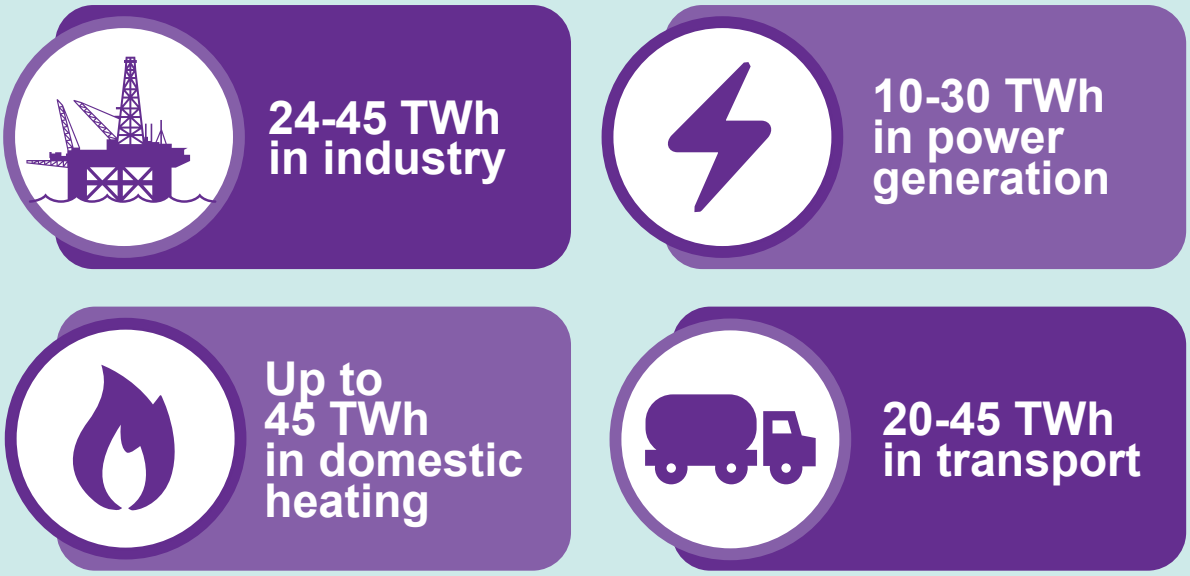
Different hydrogen production methods mean different production costs. Grey hydrogen (which is produced from unabated natural gas) has historically been the cheapest form of hydrogen, however the high natural gas input costs have changed this dynamic, with insight from ICIS indicating that grey production costs have exceeded £6/kg. Today's high price of natural gas (needed as a feedstock for blue hydrogen), could favour the expansion of green hydrogen.

Over the past couple of years, green hydrogen has been produced worldwide for roughly £2-5/kg, with electricity costs accounting for most of this and therefore dictating production costs. Although wholesale electricity prices have been increasing, green hydrogen producers can agree a power-purchase agreement or a negotiated direct sale, from the power generator – both of which will be likely to yield substantially lower prices than the wholesale market can deliver. This also ensures that the electricity used is renewable, whereas power from the grid may not be, so that it can be assured by the Low Carbon Hydrogen Standard.[24]

The UK Hydrogen Investor Roadmap[25] identifies 40 projects that could develop 20 GW of capacity by 2037 and outlines the potential for £9bn of investment through to 2030. To achieve this, it is important that the government works with industry and energy regulators to ensure the right conditions are in place to secure the required project investment. The Energy Security Bill[26]

[24]. UK Low Carbon Hydrogen Standard: emissions reporting and sustainability criteria – GOV.UK (www.gov.uk)
[25]. https://www.gov.uk/government/publications/hydrogen-investor-roadmap-leading-the-way-to-net-zero
[26]. Energy Security Bill overarching factsheet – GOV.UK (www.gov.uk)

## How will low-carbon hydrogen be used in the UK?




will help in this regard. It is important that this stimulates and develops demand for low carbon hydrogen, establishes the right regulatory framework and creates competitive business models.

There is no scale of demand for low carbon hydrogen across the economy, with the government having committed to a number of initiatives to stimulate this. These include: examining the possibility for up to 20% hydrogen blending in the UK national transmission system; launching trials for hydrogen fuelled transport hubs; looking into the readiness of combustion power plants to adopt hydrogen technology; and providing £315mn for new hydrogen equipment deployment in industrial processes.

The government plans to have hydrogen production business models in place by the end of 2023, with the first model contracts awarded in mid-2023. This will then be followed by the design of the hydrogen transport and storage business models, by the end of 2025. These will provide revenue certainty upon which companies can build their investment case. Industry is currently working with government on this. It is important these are also underpinned by a supportive and robust regulatory regime, covering both economic and non-economic issues which support the growth of hydrogen capacity.

In August 2022, the government announced that four hydrogen projects, linked to the East Coast and HyNet industrial clusters, had been shortlisted for support as part of the sequencing process.[27] These are Saltend Hydrogen to Humber project, H2NorthEast, bpH2Teesside and the HyNet Hydrogen Production Project. These projects would provide large-scale production capacity in some of the UK's most industrial regions, offering significant emissions reduction potential, and will now move forward to the more detailed, due-diligence stage. It will be important to maintain momentum with this process, and to also outline details of support for future projects, to provide increased energy resilience and emissions reductions.

[27]. Cluster sequencing Phase-2: shortlisted projects (power CCUS, hydrogen and ICC), August 2022 – GOV.UK (www.gov.uk)

## Case Study: PX Group, Saltend blue hydrogen project

px owns Saltend Chemicals Park in Humberside where Equinor plans to build a 600-MW hydrogen plant, with carbon capture, to convert natural gas to hydrogen, the anchor project of the Zero Carbon Humber (ZCH) consortium (px is also a partner in the ZCH project). The hydrogen plant will be coupled with new low carbon chemical production and will integrate into existing Saltend infrastructure, utility distribution networks and the existing industrial processes.

**px's role is as follows:**

- Delivery of site utilities, services and infrastructure at Saltend;
- OSBL, feed through to EPC – utility connections, $CO_2$, hydrogen pipelines;
- Site preparation, development and optimisation (demolition, ground clearance and remediation);
- Support for Comah safety report including consultation and interface with other Saltend Comah businesses;
- Definition of land boundary and development of business case for Freeport.

As a result, emissions from Saltend Chemicals Park will reduce by nearly 1mn mt $CO_2$/yr in the initial phases but increasing in time.

The whole ZCH project is expected to protect 55,000 existing jobs in the Humber and create 49,000 new ones, while supporting skills, apprenticeships and educational opportunities across the region.

## Carbon capture, use & storage

As well as being critical for the decarbonisation of industry, CCUS is an important technology for continued development of the UK's energy security, as the enabler for blue hydrogen production and for the development of power-to-CCUS (where power generation, such as gas-fired, is combined with CCUS technology).

The government has committed to supporting the development of four CCUS hubs by 2030. These clusters will provide the infrastructure required for the transportation and storage of $CO_2$, at scale. Linked to this, in June the NSTA launched the UK's first-ever carbon storage licensing round which could make a significant contribution to the government target of capturing and storing 20-30mn mt$CO_2$/yr by 2030.

There are six active carbon storage licences on the UKCS which could store up to 40mn mt/yr by the mid-2030s (around one-fifth of estimated storage needs) if they reach their maximum proposed potential. The current licensing round builds on this by offering licences in up to 13 areas in which prior interest had been expressed. It is expected that new licences will be awarded in early 2023, with the potential of the first $CO_2$ injection coming four to six years after licence award. This round marks positive progress, but it must represent the first of many as it is estimated that around 100 $CO_2$ stores would be required to meet net-zero 2050 commitments.

The first two CCUS cluster projects, HyNet and the East Coast Cluster, have secured funding and aim to begin transport and storage operations from 2025, with the Scottish Cluster announced as a back-up project. A further two projects will receive development support to help them become operational before the end of the decade.

Linked to the initial two clusters, 16 power and industrial CCUS projects (in addition to the four hydrogen projects) have been shortlisted for progression. Overall, 40 projects were identified as being eligible for support, reinforcing the demand for future carbon transport and storage infrastructure. It will be important that all the proposed cluster projects around the UK receive support if the UK's ambitions are to be achieved.

Harnessing, and building on, the experience and expertise of the UK's existing oil and gas supply chain will be a key enabler in the delivery of the potential CCUS clusters by 2030. Existing expertise, capabilities and insight from the oil and gas supply chain is a notable advantage, where by CCUS could be worth £20bn up to and including 2030 rising to £100bn by 2050. The UK can lead and competitively position itself globally with the existing transport infrastructure that can be repurposed as well as maximise

existing skills that can be easily transferable to support, deploy and develop the required technologies and solutions need for CCUS.

As outlined in OEUK's CCS Supply Chain Report 2022,[28] traditional oil and gas companies are taking the lead on the development of all the UK's cluster projects and supply chain companies transitioning from a sole focus on oil and gas will be crucial for their implementation. Although $CO_2$ transport and storage is the element which maps best to the existing skills in the oil and gas sector, there are opportunities across the CCUS project cycle, as the table below shows.

Certainty on the future timeline of projects, increased standardisation across projects and targeted government support for UK fabrication capacity will be amongst the key levers which will ensure the supply chain is as well resourced as possible to maximise UK content across CCUS projects.

## CCUS investment opportunity to 2030

| | Carbon capture | | | | Transport & storage | |
|---|---|---|---|---|---|---|
| | Design and engineering | Major plant fabrication | Equipment design & manufacture | Construction & commissioning | Pipework supply and installation | Storage-wells, subsurface and reservoir |
| Proportion of Capex | 10%-15% | 15%-25% | 15%-20% | 25%-35% | 10%-15% | 5%-10% |
| Est. share of £20bn Investment (£bn) | 2.0-3.0 | 3.0-5.0 | 3.0-4.0 | 5.0-7.0 | 2.0-3.0 | 1.0-2.0 |

Source: OEUK

[28]. CCS Supply Chain Report 2022 – Offshore Energies UK (OEUK)

OFFSHORE ENERGIES UK

OEUK.org.uk

info@OEUK.org.uk

@OEUK_

Offshore Energies UK

Working together, we are a driving force of the UK's energy security and net zero ambitions. Our innovative companies, people and communities add value to the UK economy.

Join us today and help strengthen the UK offshore energy industry and your business.

**membership@OEUK.org.uk**