BUSINESS OUTLOOK 2022

OEUK OFFSHORE ENERGIES UK

The comprehensive outlook for
the UK's offshore energy resources

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

BUSINESS OUTLOOK 2022

Contents

Foreword

Deirdre Michie, OBE
CEO, Offshore Energies UK

When we began writing our *Business Outlook 2022*, we hoped to be describing the world's emergence from the pandemic.

Instead, we must focus on the war in Ukraine – the people being killed and the millions whose lives and livelihoods are being ruined.

These two catastrophes have had impacts far beyond those directly and tragically affected. National economies have been hit, global trade and travel have been curtailed, and energy security, the focus of this report, has once again become a key global concern.

Our world has changed faster than any of us might have imagined back in 2019 and most of those changes have been difficult to deal with. For those of us working in the UK's offshore energy industry, however, our response to these crises has been one of resilience, and continuity.

That's because, throughout all that turbulence, our industry has not stopped. Instead, it has adapted and coped – and kept the UK's energy flowing.

The thousands of workers living offshore, and the many thousands more supporting them onshore, have kept on supplying nearly half the nation's gas, plus oil equivalent to more than 80% of the UK's needs. Wind capacity has kept on expanding too – so fast that 2,300 offshore turbines are now producing enough electricity to power more than nine million homes. This report describes advanced plans to quadruple that capacity by 2030.

Our industry kept going, despite Covid's sometimes tragic impact on our colleagues and despite a pricing rollercoaster that saw oil and gas prices plummet in 2020 only to surge back to shockingly high levels in 2022. Out at sea and despite the lockdowns, our members and their teams of workers have carried on with complex maintenance tasks on installations and pipelines, all aimed at ensuring the UK's oil and gas supplies remained stable and secure.

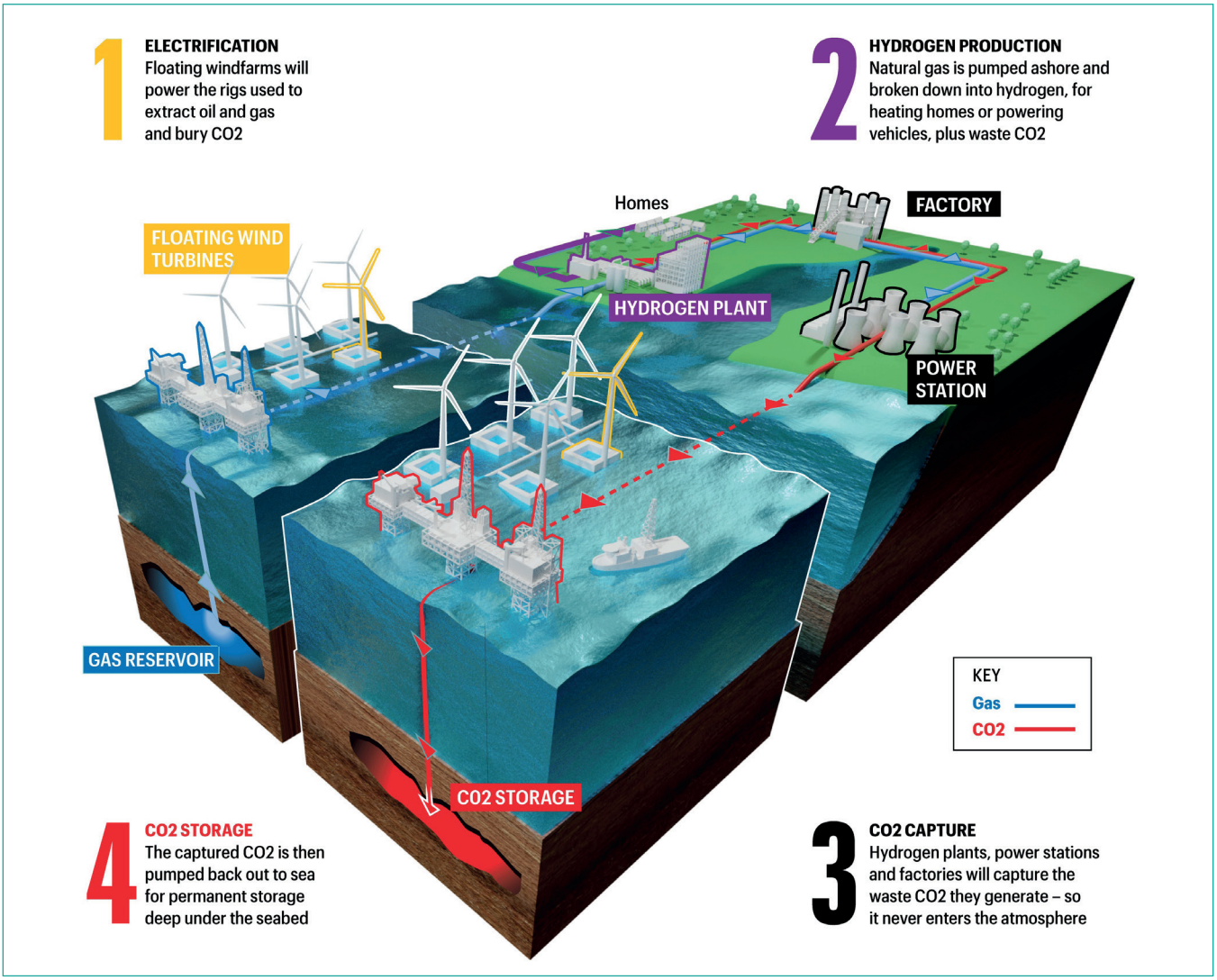
In the midst of the pandemic, we also signed and implemented the ground-breaking North Sea Transition Deal, aimed at harnessing the power of the oil and gas sector to support the UK in becoming carbon neutral by 2050.

In the year since then, our industry has started work on building the low-carbon energy infrastructure for the UK's future. This includes technologies as diverse as floating wind turbines, facilities for the mass production of hydrogen from gas, and systems for capturing waste CO_2 and then burying it deep under the seabed. Indeed, this report describes our findings that the UK has the capacity to permanently store 78 billion metric tons of CO_2 – roughly equivalent to two centuries of UK emissions.

Our industry's hardiness, its ability to adapt and its success in keeping the nation's energy supplies flowing have many foundations. Perhaps the most important is that the nature of our industry means we must think long-term – over years and decades – and try to predict at least some of the future problems heading our way.

Offshore Energies

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



This report picks out some of those foreseeable problems. In particular, it highlights how the UK faces some very immediate choices about how to safeguard its future energy security.

Those choices stem directly from the fact that output from the UK Continental Shelf, the source of much of UK's oil and gas for the last five decades, is in rapid decline.

This report warns that production will fall by up to 15%/year unless there is rapid investment in new infrastructure. This decline is much faster than the predicted reduction in UK energy demand so, if there is no such investment then, by 2030, we will be reliant on other countries for at least 80% of our gas and 70% of our oil.

That gap will have to be filled by imports, meaning the UK will become ever more dependent on other countries. This is already happening. The report reveals how, for the first time, Norway has become the UK's primary source of gas – supplying us with more than came from our own continental shelf in 2021.

Norway is a good and reliable friend to the UK, but it has other customers that it is also committed to. If our needs increase, we will have to find other sources and suppliers.

The International Energy Agency has

proposed a 'no new investment' scenario, suggesting a global halt to opening new oil and gas resources. Our report warns that such a policy will make the UK and other countries increasingly reliant on Russia and Opec member states. It would push their share of the global oil supply market from 37% now to 52% by 2050. This has obvious implications for UK energy security

What this *Business Outlook* also tells us however is that all this can be avoided. There is still enough oil and gas under our waters to maintain supplies during the transition to net zero.

There is also a huge potential for wind. The government wants the current 10 GW of offshore wind generation capacity to expand four-fold – meaning we must install about 3,000 more new turbines by 2030.

Electricity, however, accounts for only a fifth of the UK's energy consumption. The UK has had some success in decarbonising power generation but the central roles of oil and gas in transport and heating have changed little since 2000. It means mass hydrogen production, plus carbon capture and storage, must also come of age, alongside other measures to decarbonise transport and industry.

All this brings us back to the need for long-term planning and preparation – and investment. Our industry is used to thinking in years and decades. We believe that, where energy is concerned, policymakers of all parties and countries need to do the same. In particular they need to create the right investment environment.

Investment in the oil and gas sector has fallen from about £16 billion/year in 2014 to £5.5 billion in 2019 and a predicted £4 billion this year. The causes are varied but the UK's complex regulatory environment, plus the political disagreements around issues like climate change and windfall taxes are all factors deterring investment.

It's why, alongside the facts and evidence in this report, we also outline our plan for producing clean and secure energy. At the heart of that plan is the need for long-term consistency on energy policy across and between our four nations and their political parties.

Our industry is changing just like the country it serves. We are proud to have provided most of the nation's energy for the last five decades. We are also very proud to have paid £375 billion in UK production taxes alone over that same period. This report describes how, by 2027, this is forecast to rise to £400 billion. We also look forward to supporting the nation's transition to a lower-carbon future and providing safe and secure energy throughout that transition.

But that transition will only happen if our policymakers can create and sustain the right environment for long-term investment across all forms of energy production.

To achieve that we need stable long-term regulatory policies, clear and predictable fiscal policies and improved political alignment across all the countries and parties of the UK.

Download our energy security plan

www.OEUK.org.uk/energysecurityplan

RELIABLE AND RESPONSIBLE PARTNERS: A PLAN FOR CLEAN AND SECURE ENERGY

Short Term – a Partner for Security

Over the last five decades our industry has produced 4 billion tonnes of oil and 3 trillion cubic metres of natural gas from UK waters, contributing £375 billion in UK production taxes alone. Government figures show that Russian supplies account for just over a tenth of UK oil and petroleum product needs and 4 percent of UK gas supply. The removal of these resources will have a more limited impact on our energy security compared to other countries however, steps must be taken today to ensure the UK sector can continue to safely deliver cleaner, reliable energy supplies into the market.

We need to:

- Make the most of responsible and reliable energy partners
- Make decisions rapidly
- Widen gas specification, in the UK this is narrower than most countries in the European Union
- Ensure long-term fiscal stability and predictability

4 BILLION
tonnes of oil extracted from the UKCS since 1975

3 TRILLION
cubic metres of natural gas extracted

£375 BILLION
contribution in UK taxes

Medium Term – A partner for responsible change

This crisis reinforces the need to think long term and manage the UK's energy transition responsibly. The delivery of coordinated action in the medium term will decide the success of our collective efforts to meet the government's target of net zero carbon emissions by 2050.

We need to:

- Commit to a planned transition
- Strengthen resilience through increased storage
- Unlock £16bn investment in cleaner energy
- Turbo-charge the offshore wind revolution
- Maintain integrity of European energy markets

11%
cut in carbon emissions from offshore oil and gas production since 2018

£16BN
investment in cleaner energy

40GW
offshore wind by 2030

Long Term – A partner for clean energies

Through the North Sea Transition Deal, the offshore energy industry stands ready to plug hydrogen and wind as well as oil and gas into our energy mix in the coming decades. Our commitments already set out the private investment from our sector and the support from government required. There are steps the UK can take now to send clear signals to energy producers, as demand for oil and gas continues to decline.

We need to:

- Deliver new energy legislation
- Set an ambitious outcome for hydrogen
- Support the UK's world class supply chain
- Champion a local response to a global challenge

85% UK HOMES
rely on gas for heating and many for cooking too

33 MILLION
vehicles in the UK need petrol or diesel

1%
of global emissions and of global oil and gas production

FIND OUT MORE: WWW.OEUK.ORG.UK

Energy Trends

UK ENERGY SYSTEMS REMAIN RELIANT ON FOSSIL FUELS with oil and gas providing 75% of UK energy. These trends will evolve as lower carbon energy capacities grow but oil and gas will remain important for the foreseeable future.

COMMODITY PRICES HAVE RISEN SHARPLY first following the recovery from Covid and now with the war in Ukraine.

ENERGY PRICES ARE CONTRIBUTING TOWARDS SIGNIFICANT INFLATIONARY PRESSURES across the economy and there are no easy and quick fixes to this.

A STRATEGIC APPROACH TOWARDS THE DEVELOPMENT OF A DIVERSE AND LOWER CARBON ENERGY SYSTEM is crucial for energy security, affordability and reduced emissions.

UK Energy Landscape – Present & Future

Current Energy Use

UK energy demand has been falling for a long time, owing to the continued shifting nature of the UK economy towards services, and improvements in energy efficiency.

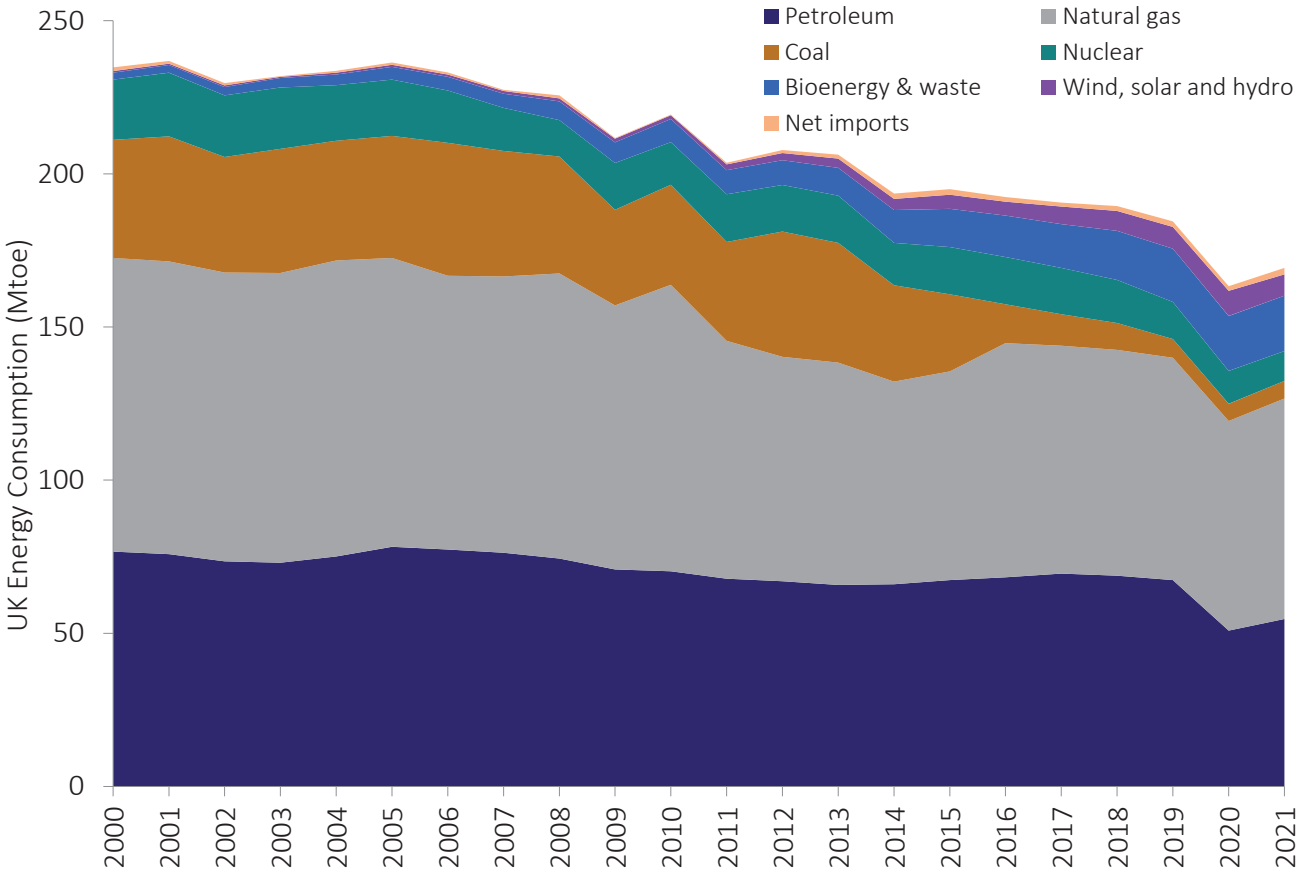
The UK used just over 169mn metric tons of oil equivalent (mtoe) in 2021. This was 4% more than 2020 but 8% less than 2019, reflecting the ongoing economic recovery from Covid restrictions. Energy use was 28% lower last year than in 2000, although levels continued to be influenced by the impact of Covid restrictions.

Importantly the long-term downward trend has been achieved alongside continued growth in the UK economy, with gross domestic product (GDP) increasing by 34% since 2000, in real terms – meaning that the economy is becoming less energy intensive. Although some uncertainties persist concerning the forward trend for energy consumption post-Covid, it is likely that this year's demand will return to 2019 levels and then the long-term downward trajectory will continue.

Oil and gas supplied three quarters of

Figure 1: UK Energy Demand

Source: BEIS



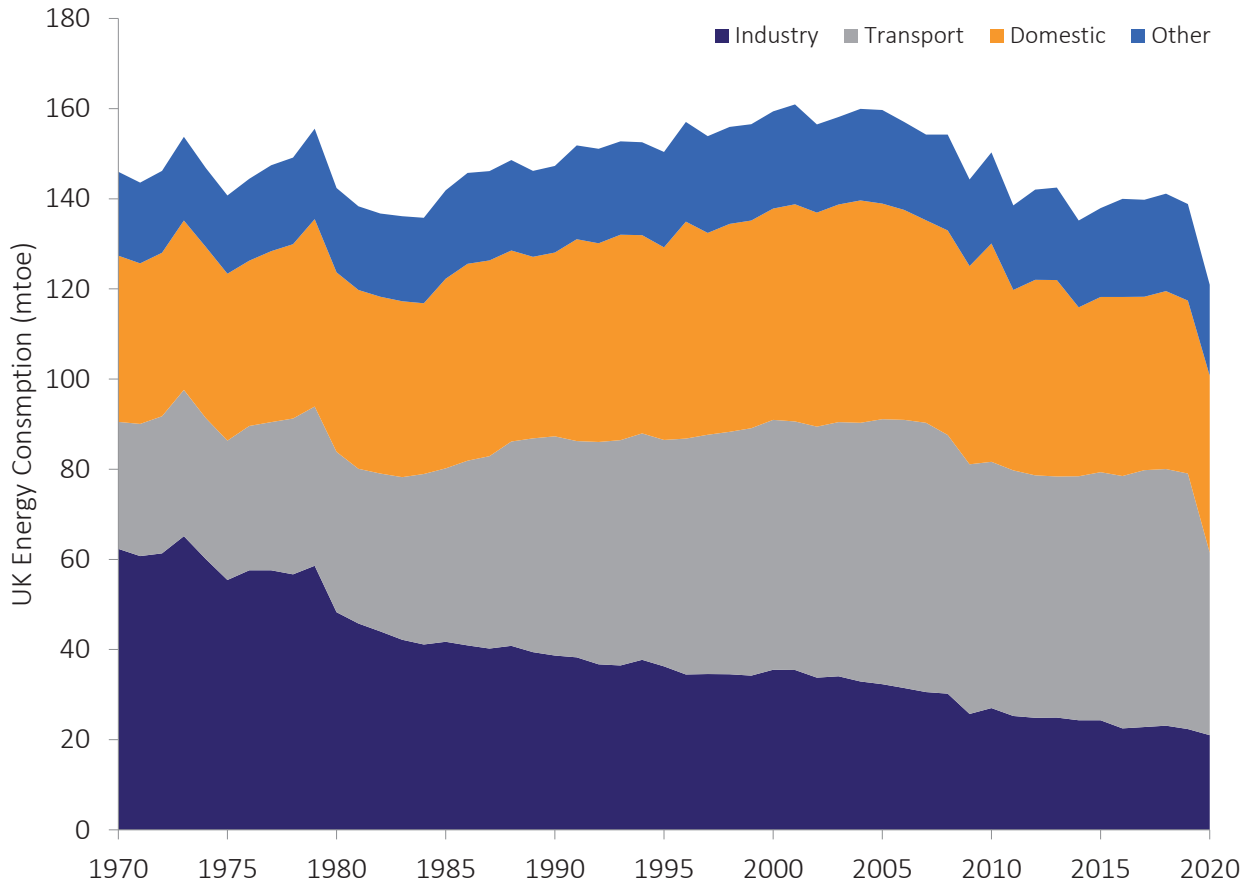
UK energy consumption in 2021. Gas continues to be the UK's largest energy source, supplying 43% of consumption last year, followed by oil, which supplied more than 32%.

Despite reductions in overall consumption, the relative importance of oil and gas within the energy mix has remained consistent since 2000, with an annual average of 33% for oil and 39% for gas.

Renewable energy capacity has risen almost six-fold since 2010 but from a low base. This means that renewables (wind, solar and hydro) still supply a relatively modest proportion of total UK energy consumption (4%). While much of the public debate focuses on electricity, it only accounts for around 22% of energy use, with domestic use (mainly heating) and transport the largest energy consumption sources (29% and 33%, respectively). Transport is almost entirely fuelled by oil products (94%), and more than 80% of UK homes rely on gas for heating.

Figure 2 – UK Energy Consumption by End User

Source: BEIS



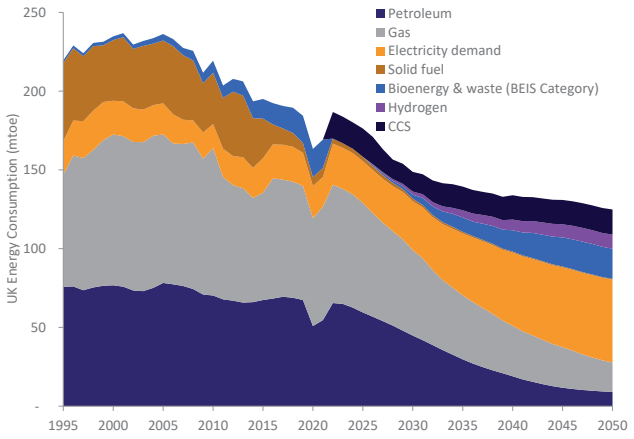
Energy supply, across all sources, is amongst the largest contributors to UK greenhouse gas emissions, accounting for 21% of the UK's total in 2020. The bulk of this comes from power stations. The production of oil and gas accounts for around 3% of the UK's total. Looking ahead, the energy mix will need to continue to evolve to support the UK's net zero emission aims, with the continued decarbonisation of supply important in achieving this. However, given that most emissions come from the use of fuels, rather than supply, these figures reinforce the need for two-pronged action to decarbonise both sides.

The energy transition needs to happen in a way that is fair for consumers and that promotes secure, reliable and cleaner supplies. The move to a more diverse and lower carbon mix also provides opportunities to manage the UK's reliance on energy imports as well as solidify the sector's role as a responsible producer for neighbouring and global markets. The UK offshore energy sector is committed to helping the country reach net zero emissions through the development of offshore wind capacity, hydrogen, as well as carbon capture and storage (CCS) projects for particularly difficult to replace/abate sectors and it is

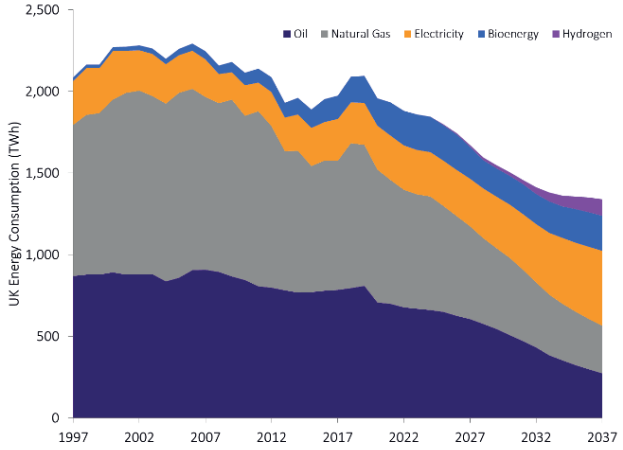
Figure 3: UK Energy Demand Outlooks

Source: Offshore Energies UK, BEIS, CCC

‘CCC Net Zero Balanced Pathway’



‘BEIS Net Zero Delivery Pathway’



committed to continuing to reduce emissions from oil and gas production.

Future Scenario planning

As new energy sources grow and the adoption of demand-side strategies take hold (for example heat pumps and hydrogen to replace gas for domestic heating, plus the scale-up of electric cars), oil and gas consumption should fall. There are varying estimates on the rate at which this might happen. Two key scenarios setting out potential net zero pathways for UK energy consumption are the UK Government Department for Business Energy and Industrial Strategy (BEIS) Net Zero Strategy Delivery Pathway; and the Climate Change Committee (CCC) Balanced Pathway. These outline the opportunity for the offshore energy sector to remain at the heart of the expanding energy mix. Scenarios such as these are also helpful for the UK’s energy supply chain companies in terms of planning investment and resource strategies, to ensure that they can take advantage of emerging business opportunities.

Oil and Gas

The BEIS Delivery Pathway entails a 6% average annual decline in both oil and gas

demand over the next 15 years, whereas the Balanced Pathway puts it at an average annual decline rate of 6% for oil and 5% for gas. Despite declining consumption profiles, both scenarios reinforce the extent to which oil and gas will be used in future years. The BEIS Balanced Pathway envisages oil and gas meeting 65% of energy consumption through to 2037 (still supplying 20% and 21% in 2037, respectively) and around half of energy demand in the CCC scenario through to 2050 (a cumulative 15bn boe and oil still supplying 7% and gas 15% in 2050).

The use of oil and gas is predicted to fall at a faster rate than declines in overall energy consumption, leading to the reduced hydrocarbon intensity of the energy system. This will only happen if there is significant scale-up across alternative energy sources to fill the increased energy supply gap. Growth in electrification will be the primary means of achieving this, alongside methods to displace oil and gas consumption with decarbonised fuels such as hydrogen, which will build on the UK's existing offshore energy infrastructure.

Hydrogen and CCS

Hydrogen has an important role to play in both scenarios for displacing unabated gas within homes and power generation. It also has the potential for use in heavy transport. Hydrogen accounts for 8% of the energy mix according to the Delivery Pathway by 2037 and peaks at 7% in the Balanced Pathway. But some scenarios show that it could be significantly greater.

Some hydrogen is produced and used in the UK at present (around 27 TWh of supply), but in a way that produces emissions (grey hydrogen). The government has set an interim target of 5 GW installed low-carbon hydrogen production capacity by 2030, with each gigawatt of capacity having the potential to produce almost 9 TWh/yr of hydrogen. This would mainly be generated through steam methane reformation (SMR) with the associated CO^2 emissions being captured and stored (which is blue hydrogen) or through the use of renewable power in water electrolysis (green hydrogen). Given the cost challenges associated with green hydrogen production, the greatest nearer term opportunity lies in scaling up blue hydrogen production. It will be important to establish CCS capacity in line with blue hydrogen projects in order to enable net zero hydrogen production. Alongside this, CCS will play a central role in wider industrial decarbonisation, being the only viable emissions reduction technology for many sectors such as petrochemicals, cement and steel manufacturing. By the end of this decade, the UK is targeting to capture, transport and store 20-30mn mt/yr of CO^2, rising to 50mn mt/year by 2035. In the wider context, this 2035 target is equivalent to the annual CO_2 emissions of around 20mn UK homes. Overall it is estimated that total UKCS CO_2 storage capacity could be in the region of 78bn mt of CO_2 – or more than 200 years of emissions at current levels.

The transport and storage element of

the CCS project cycle offers the most opportunities in terms of offshore energy integration. The North Sea Transition Authority (NSTA, formerly the Oil & Gas Authority) Strategy outlines the obligation for the UK oil and gas industry to consider re-using and repurposing oil and gas infrastructure in projects such as CCS.

Along with investment and the repurposing of infrastructure, the transfer of skills and capability from the oil and gas sector will be crucial to the development of hydrogen and CCS capacity at scale in the UK. This gives the UK the opportunity to build early expertise in these areas which can then be exported around the world to support the wider decarbonisation of energy supply and industrial processes. The UK offshore sector continues to work closely with the UK government to unlock this opportunity through the North Sea Transition Deal.

Electricity

Electricity use is the largest growth area within both scenarios, increasing at an average annual rate of 3% to reach more than one-third of energy consumption by 2037 in the Delivery Pathway and 42% by 2050 in the Balanced Pathway. Based on these scenarios, electricity will overtake gas as the largest source of energy supply in the mid-2030s. This would mark a reverse in recent trends, which have seen electricity demand fall consistently since 2005 by 18% in total.

Gas was used to generate 42% of the electricity supplied in the UK last year, and when combined with CCS, it will continue to play an important role in bringing flexibility and balance to the system in the years to come. However, alongside new nuclear power stations, the greatest area of capacity growth will be in the scale-up of offshore wind. The UK has the world's second largest installed offshore wind capacity at 10.5 GW, and the government has set a target of expanding this to 40 GW by 2030, while the CCC recommends that this should then increase to 100 GW by 2050.

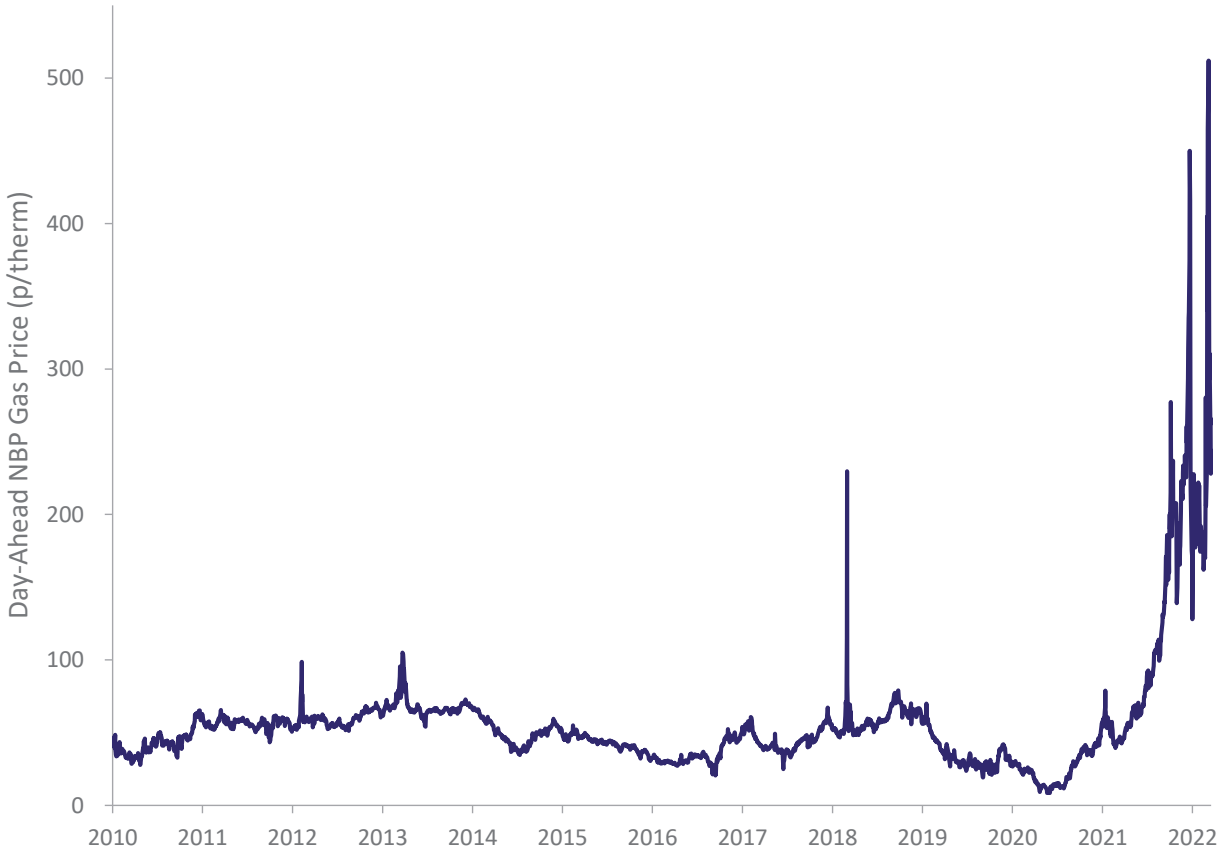
The ambitions for hydrogen, CCS and offshore wind power, along with projections for oil and gas supplies will only be realised with the support of the North Sea Transition Deal. It is also crucial that there are predictable and long-term commercial and regulatory frameworks in place to attract the required level of capital investment in each of these energy areas.

Energy Markets

Sustained energy price growth was in evidence before the Russian invasion of Ukraine. Economies around the world were returning to growth as Covid restrictions were eased. This, combined with tighter supply as a result of lower levels of investment in recent years, has driven up prices. Given the scale of use of oil and gas, this price growth has widespread economic and societal impacts.

Figure 4: Day-Ahead NBP Gas Price

Source: ICIS



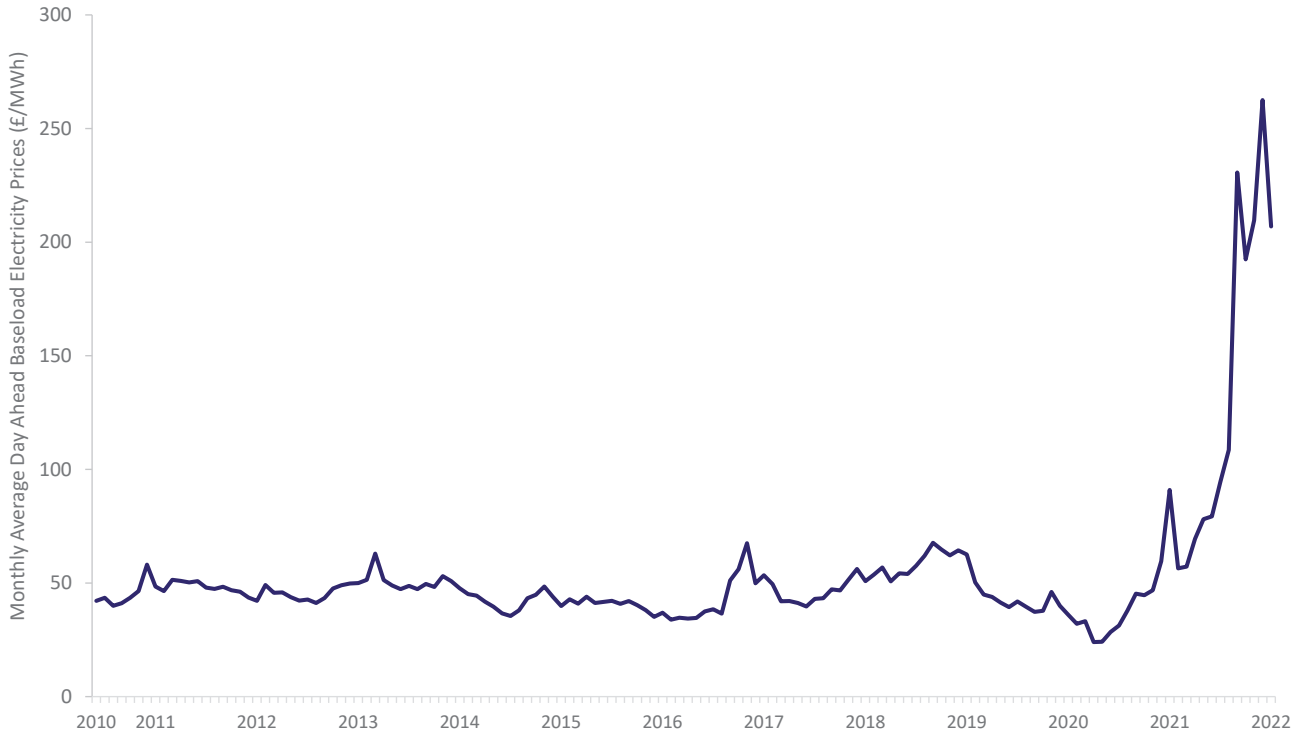
Gas Prices

The day-ahead UK National Balancing Point (NBP) gas price rose throughout 2021, ranging from less than 40 pence/therm (p/th) in February to £4.50 in December (average of £1.13/th), whereas the Brent crude benchmark increased by more than 50% during last year (average of $71/barrel).

The first quarter of 2022 then saw record levels of turmoil and volatility owing to the impact of the war in Ukraine, with geopolitical concerns having as significant an impact on pricing as actual supply and demand balances. Russia is the world's largest net exporter of oil and gas combined and so the drive to displace Russian supply, in the wake of international sanctions, has led to concerns about how local and regional markets will be able to balance supply and demand.

The day-ahead NBP gas price far exceeded previous record levels in early 2022, with prices closing at more than £6/th in early March, and intra-day trades exceeding £8/th. By way of context, prices in April 2020 reached a low of 9 p/th and the average nominal daily price between 2010-20 was 47 p/th.

Figure 5: UK Monthly Average Day-Ahead Baseload Electricity Prices
Source: OFGEM



Geopolitical uncertainty also caused significant variability in NBP month-ahead gas prices in early 2022. Typically that contract type is more stable than day-ahead, but this year it has ranged between £1.64/th and £5.03/th. Forward seasonal prices are also showing the reverse of normal historic trends, with summer 2022 prices higher than winter 2022. This will discourage storage injection and could lead to an even tighter winter market.

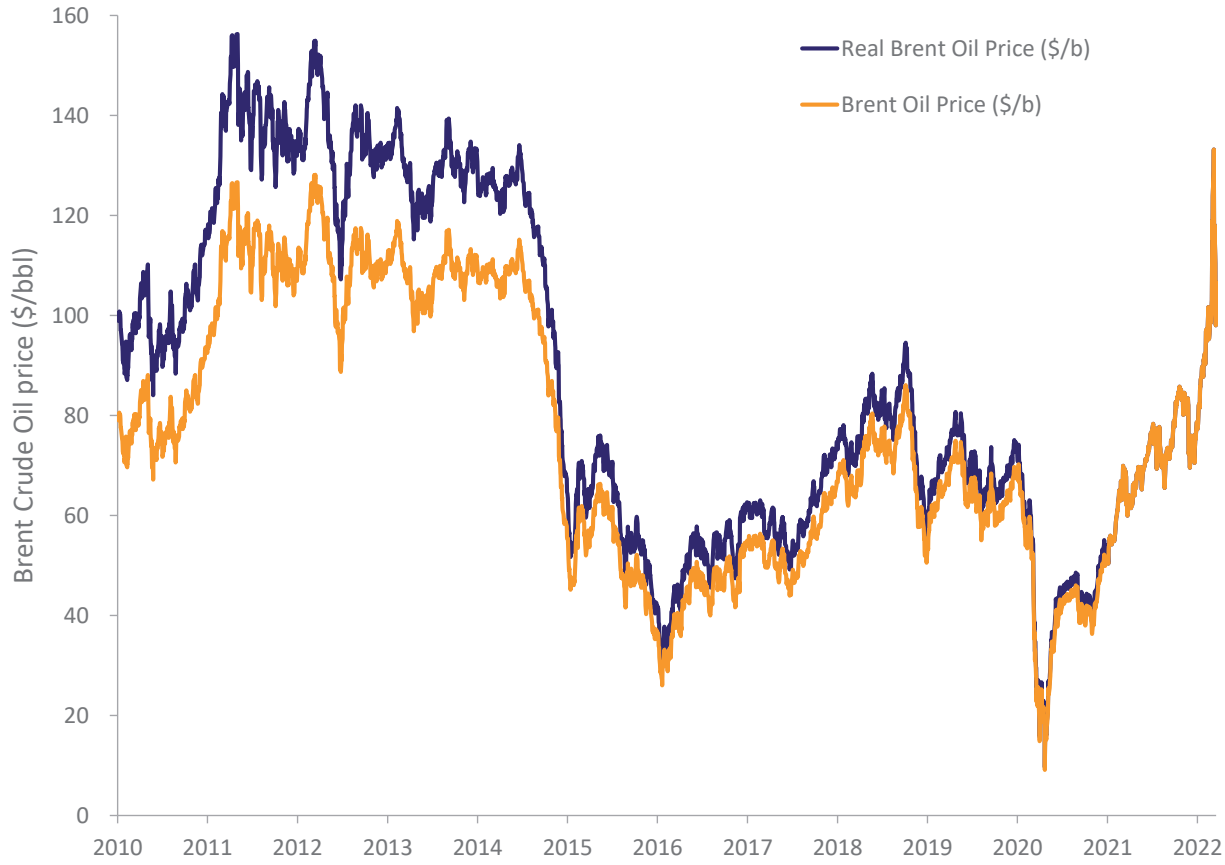
Electricity Prices

As gas still plays an important role within the UK electricity mix, high prices are also impacting on the wholesale costs of electricity, which have reached record levels owing to prices being set by the highest marginal fuel source. Carbon costs also impact on electricity prices as the cost of buying allowances are added to non-renewable generation. The EU Emissions Trading Scheme (ETS) allowance costs tripled in 2021, and UK ETS[1] costs have risen by around 60% since the market was launched in May 2021.

1 The UK was part of the EU ETS until December 2020 and launched its own carbon market in May 2021.

Figure 6: Nominal & Real Brent Spot Price

Source: EIA, BBC



Oil Prices

Oil markets have also responded to concerns over disruption to the flow of Russian crude exports. Following the gains seen in 2021, prices almost doubled between January and March 2022. As with gas, Brent crude prices have moved between $78/b and $138/b in the first quarter of 2022. Although this is among record high nominal prices, it is not completely unprecedented when looking at real Brent prices, having seen highs in excess of $140/b between 2011-2014 in real terms. It is difficult to predict how prices will develop as this will be determined by the ongoing geopolitical events, and the market is also still being influenced by Covid concerns with new restrictions being imposed in China which may impact demand. In mid-March these concerns resulted in Brent prices dropping back to around $100/b, but some market forecasts have speculated that widespread disruption to Russian supply could result in prices reaching $200/b. The International Energy Agency (IEA) has also reported that the market could see the largest crisis in decades if the disruption to Russian supply is not offset by growth from other producers.[2]

2 https://www.iea.org/reports/oil-market-report-march-2022

Economic and Social Impacts

Western governments, including the UK, the European Commission and US, have imposed sanctions and announced strategies to reduce their dependence on Russian oil and gas imports. This will mean implementing a range of measures to diversify supplies and reduce demand, both in the short and long term.

Although the UK relies less on Russian supplies than other European countries do, there will be increased competition across existing supply routes to the UK and this is acting to further increase consumer prices. There has also been fuel switching taking place, with more coal being used in power generation to reduce gas use. As a result, global coal prices more than doubled in early March. This will likely increase global emissions in the short term and underlines the need for governments to accelerate investments in clean energy capacity to avoid locking in a permanent backwards slide on climate change goals.

Although energy costs do not necessarily reflect the current market price as they are linked to longer term contracts, consumers are feeling the impact of these high prices. Despite the protection offered by the price cap, domestic heating and electricity bills are increasing, with average household dual fuel bills rising by an average of almost £700/year effective from April. Another rise is likely this autumn, based on current market conditions. It should also be noted that industrial users of gas account for a significant proportion of consumption (from food production, through to chemicals and construction) but they are not covered by the price cap mechanism and so they are potentially exposed to the full extent of the market rates. The high oil prices are also resulting in record prices for petrol and diesel at the pump. This has contributed to the highest UK rates of inflation for 30 years, running at 5.5% in January 2022. The Bank of England forecasts that it will reach 8% in spring and could increase further throughout the year, before falling back to round the 2% target in the coming years.[3]

There have been recent calls for a 'windfall tax' to be levied on oil and gas producers to help offset the cost of living increases. However the nature of the upstream fiscal regime in the UK means that companies pay more during time of higher prices and profits. The Office for Budget Responsibility forecast that the upstream sector will pay £18.5bn in direct production taxes between 2021 and 2025 and a total of £23.4bn through to 2027. This is £13.5bn higher than the previous forecast in October 2021.

Rising inflation is also having a significant impact on supply chain margins across industries, with those within energy supply chains heavily impacted by this. In recent surveys, almost all OEUK supply chain members reported operating costs that were typically 10% or 20% higher than in early 2021. This is influenced by increased input costs such as steel and fuel and poses risks to the strength and diversity of the supply chain and the relative competitiveness of the UK as a place to invest. It is crucial that companies across the sector work constructively to improve business sustainability and stimulate growth.

3 https://www.bankofengland.co.uk/knowledgebank/will-inflation-in-the-uk-keep-rising#:~:text=Prices%20have%20risen%20sharply%20in,to%20come%20down%20after%20that.

Supporting our Energy Needs

IT IS IMPORTANT TO DELIVER A REDUCTION IN EMISSIONS in a way ensures security of supply and increased affordability. The offshore industry is committed to this, and the North Sea Transition Deal acts as a blueprint for how government can work with the sector.

THE UK REMAINS A LONG-TERM ENERGY IMPORTER driven mainly by a reliance on international oil and gas supplies.

UKCS OIL AND GAS IS THE COUNTRY'S LARGEST SOURCE OF ENERGY but its output is declining. There are some levers that could boost output in the short term but the greatest area of influence is production levels in three to five years' time. Fresh investment in oil and gas needs to be committed over the next 12-18 months to maintain longer term contributions to security of supply.

THE FOCUS ON GREATER ENERGY INDEPENDENCE MUST DRIVE THE DEVELOPMENT OF A DIVERSE PORTFOLIO of low carbon and renewable energies, alongside sustainable oil and gas supplies. Enduring support, and alignment of strategy, across political stakeholders and regulators is crucial.

THE TRANSFER OF INVESTMENT, SKILLS, INFRASTRUCTURE AND TECHNOLOGIES FROM THE OIL AND GAS SECTOR to the low-carbon sector are key enablers of the future energy system. stakeholders and regulators is crucial.

The UK is part of a complex and interlinked international energy system and sources its energy from a range of domestic sources and imports from all over the world, with flows both to and from the UK on a daily basis. However, the flows into the UK have been consistently higher than those from the country since 2004 as it has been a net importer of gas, and a net importer of crude oil since 2005.

Russia's war in Ukraine has brought security of supply to the top of the agenda. Russia is the world's largest gas and second largest oil exporter, so any disruption to its exports will intensify competition for supplies across Europe and further afield. This reinforces the importance of a well-reasoned and strategic approach towards the energy transition. The UK has to consider energy security and price, while still driving down emissions.

UK net energy import dependence peaked in 2013 at 48% of total energy demand. In 2020 this fell to almost 28%, largely reflecting a period of increased domestic oil and gas production and renewables

capacity, and reduced energy consumption. But it has returned to the longer-term trend in the first three-quarters of 2021 (37% import dependence). The best way to secure the UK's energy supply is to manage the proportion of its energy needs that are met by domestic supplies across all sources, with the remainder being met by reliable and sustainable imports. It will also be important to consider the energy intensity of imported energy to inform the approach of consumers and governments.

Production of energy from UK waters can continue to be the backbone of the UK's energy security, so it is important that these supplies are developed strategically. They need to be reliable and where relevant, delivered in an increasingly sustainable way. Continued political and stakeholder alignment and support for the sector is at the heart of this. Progress to net zero emissions is key, balanced with security of supply. Achieving both is possible through a focus on actions to help manage energy security risks in the short term, and longerterm actions to manage production and reduce demand for fossil fuels. This will be supported through delivery of the shared government and industry commitments in the North Sea Transition Deal.

Recent long-term global net zero scenarios, such as those from the IEA, have said there is no need for more new oil and gas resources to be developed. As also noted in the IEA's 2021 report, this scenario would also see the UK's (and other countries') dependence on Russia and Opec member states go up. In this scenario, these countries share of the global oil supply market would increase from 37% in recent years to 52% by 2050.[4] As has been seen with the current situation in Russia, an over-reliance on a relatively small number of exporters can have far-reaching consequences for energy supply. Governments will want to consider the energy security implications of any move that may increase import dependence, especially when domestic production is aligned with achieving a net zero emissions outcome.

SHORT-TERM OPERATIONAL ACTIONS

Focus on operational reliability and efficiency

Ensure continued access to skilled international workforce

Pursue opportunities to boost short term production such as:

- Address production constraints such as grid gas quality access specifications.
- Advance infill drilling and well intervention opportunities.
- Plan and manage shutdowns effectively.
- Extend the productive life of mature assets.

NEAR-TERM ACTIONS TO DRIVE LONGER TERM SUSTAINABILITY

Offer long-term support for oil and gas licensing and development, recognising the importance of their role alongside low carbon energies.

Take an integrated sector approach which maximises synergies across offshore energy sources.

Accelerate the pace and transparency of regulatory project approvals.

Address whole system decision-making processes to get projects across the line sooner.

Continue support for the NSTD, addressing blockers to asset electrification and continued pace of CCS and hydrogen development.

4 https://www.iea.org/reports/net-zero-by-2050

UK Oil and Gas Supplies

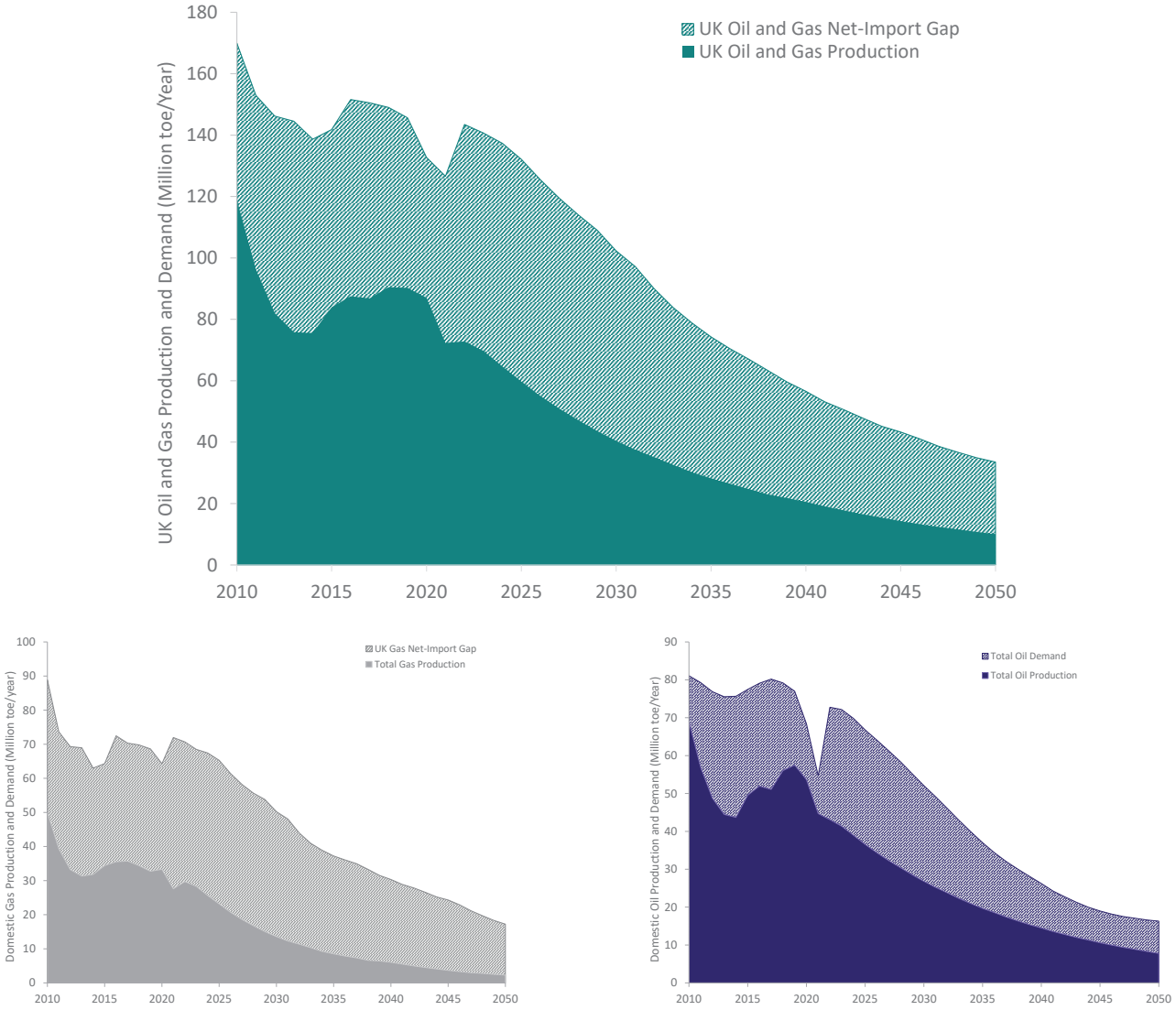
Domestic Production

UKCS oil[5] and gas production was just over 494mn boe (1.35mn boe/d) in 2021 (319mn b, or almost 45mn mtoe, of oil and 176mn boe, or 29bn m³, of gas). This represented an overall year-on-year decline of 17% and is 20% lower than 2019 levels. As noted, overall this was equivalent to 82% of domestic oil consumption and 38% of gas and means that the UK continues to be reliant on imports of oil and gas to meet demand. This trend is expected to continue throughout the coming years and decades as domestic resources decline at a faster rate than demand falls.

The recent decline in output in 2020-21 follows a period of relatively stable output. Lower investment and a number of significant planned production outages last year were the main reason for this. The Forties Pipeline System (FPS), the UKCS' largest oil pipeline, was closed for

Figure 7: UK Oil and Gas Production and Demand

Source: CCC, BEIS, Offshore Energies UK



5 Including natural gas liquids

three weeks in May and June 2021 and fields that produce through this route had to shut in production. Other pipeline and processing systems linked to FPS, such as the Graben Area Export Line, also planned outages to coincide with this period. While lower production is normal on the UKCS in summer, the level of reduction last year exceeds the norm owing to the scale of the outages. Overall, there was a reduction in UKCS daily output of more than 40% between March and June. In 2020 the summer output reduction was around 5% (as companies looked to defer activity owing to Covid controls) and in 2019 production declined by less than a fifth during the summer maintenance period – which is more in line with the average dip.

Figure 8: Monthly UK Oil and Gas Production

Source: BEIS

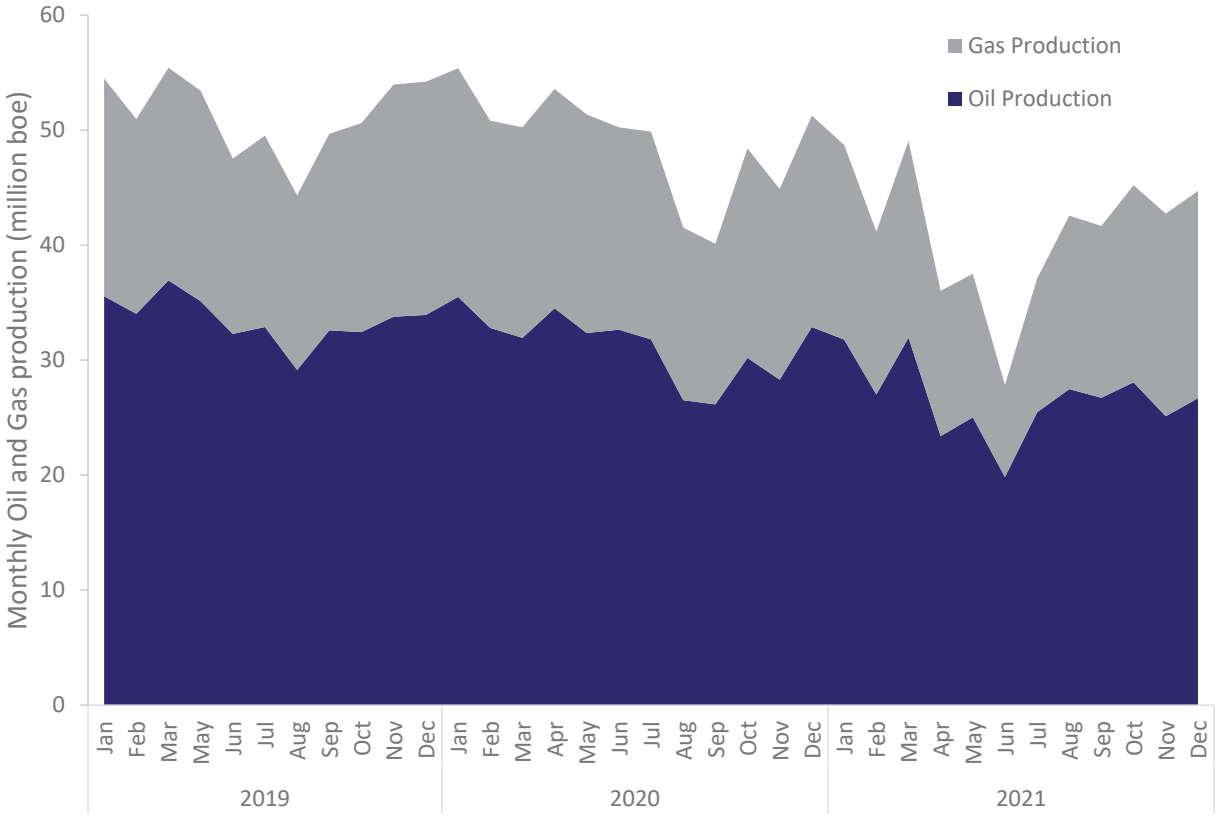
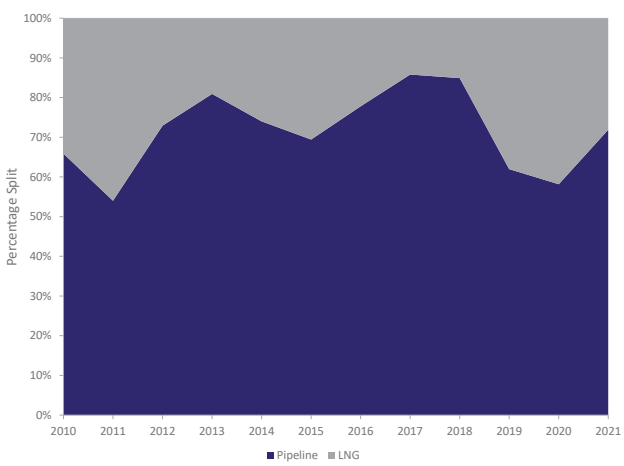
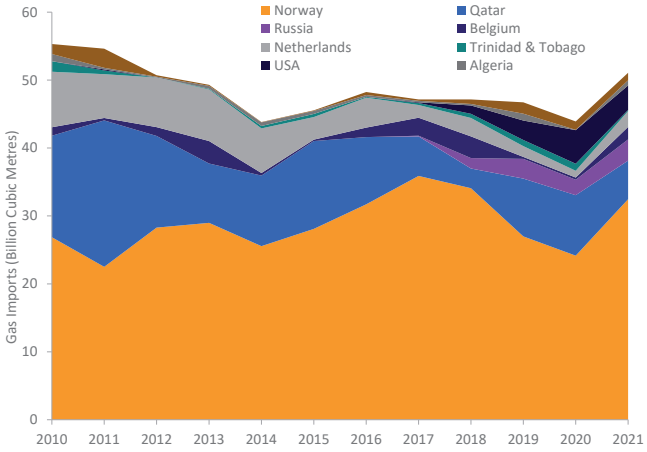


Figure 9: UK Gas Imports by Source

Source: BEIS





International Imports

Most of the UK's gas imports last year came from pipelines, with Norway being the UK's largest import source (more than 32bn m³), supplying 64% of gas flows into the UK. This marked the first time that Norwegian supply exceeded UK production. LNG supply made up 28% of imports (over 14bn m³), alongside other small in flows from the Netherlands (5%) and Belgium (4%). Qatar supplied the most LNG (39% of imported LNG and 11% of total imports), followed by Russia (22% of LNG and 6% of total imports). Although the UK is not overly dependent on gas imports from Russia, it has represented an increasing rate of flow since its Yamal LNG terminal began in 2017. Other sources of LNG also included the US, Algeria, Trinidad & Tobago and Peru. It should be noted that not all of the gas inflows to the UK are used there. The UK has a lot of pipeline and LNG import capacity and, when combined with UKCS supplies, this can exceed domestic demand. Therefore, it is normal to see gas flow out of the UK (especially during periods of low gas demand, such as high wind speeds or mild temperatures) for use or injection into storage in continental Europe and Ireland. This does not impact the UK's position as a net importer. Norway, for example, can use the UK to transport gas to the continent if other routes are full and LNG supplies can be landed in the UK and used in Europe if there are regasification capacity constraints on the continent.

Oil and Gas Investment and Production Outlook

Based on long-range forecasts from the NSTA and CCC's Balanced Pathway scenario, domestic oil production could fall to half of demand by 2030; and for gas it could be less than 25%. Although these outlooks already assume investment in new production and exploration on the UKCS continuing, there is an opportunity to account for a larger share of consumption through a clear focus on maximising economic recovery. A loss of investment will lead to the contribution being significantly lower. The end result would be a greater reliance on net imports within an increasingly competitive and volatile global market. The gas will also have to travel further to the UK which has associated emissions impacts.

It is important to maintain a short and

long-term focus so that new production opportunities may be developed in a timely manner. The fiscal regime and the UK's overall political sentiment need to remain stable and predictable, with these factors as important as price trends. Supportive announcements from the UK government in February and March are helpful. But this must be maintained as investment horizons can often span decades and therefore long-term certainty is important.

Short-Term Outlook

The number of new project approvals has been falling consistently throughout the last decade, reflecting a number of factors. As the basin is so mature, the investment opportunities now under consideration are generally smaller than they were. Alongside this, the business environment has continued to challenge investors, with some concerns in recent years around levels of political and public support and calls for higher taxes. This all negatively influences investor sentiment.

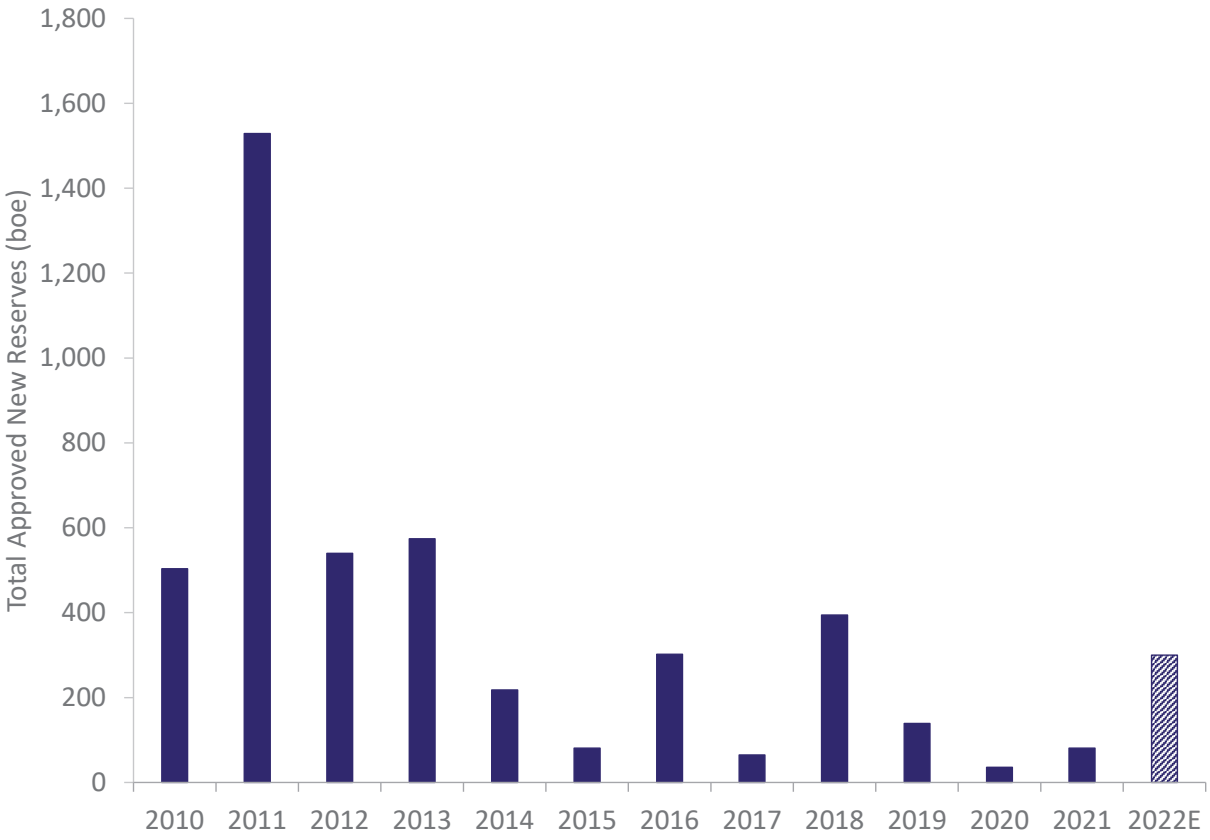
Only 80mn boe of new UKCS resources (of which 35mn boe are gas) were approved for development last year, spanning four new fields and large scale field redevelopments (Evelyn, Tolmount East, Captain enhanced oil recovery phase 2 and Breagh Phase 2). Developing these reserves will take around £750mn of new capital investment from companies but this will not be enough to support production over the long term, with this level of approved reserves only the equivalent of around two months' UKCS production in 2021. This trend is impacting on production levels in the basin now and without further investment will result in an accelerated decrease in the coming years. It is worth emphasising that this is likely at a faster rate than demand and will reduce the UK's energy sovereignty and ability to deliver a homegrown expansion into cleaner offshore energies.

Data from NSTA shows that on average it takes three years to mature new field developments from project approval to first production, with a number of steps required as part of the regulatory process. The time from first discovery to production takes longer than this, but timescales are becoming shorter because of technology improvements and access to existing infrastructure. Supply from the sector is relatively inelastic and therefore cannot just be turned on and off quickly. Companies have to work to raise finance and align internal business plans and resources along with their partners in the supply chain in order to execute the required work scopes. All this makes it important that government take a strategic view on encouraging oil and gas investment during the net zero emissions transition to help ensure continuity and sustainability of supply.

OEUK expects sufficient production to come on stream from new fields this year to maintain output in line with 2021, which will help limit any increases in import dependency in the short term. A number of the projects starting up were approved during the slight increase in investment

Figure 10: Oil and Gas Reserves by Year of Approval

Source: NSTA, Offshore Energies UK

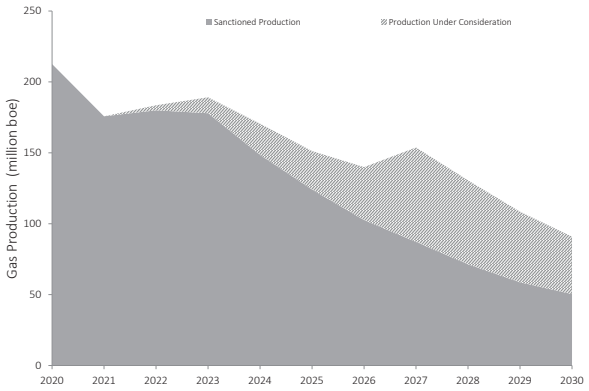


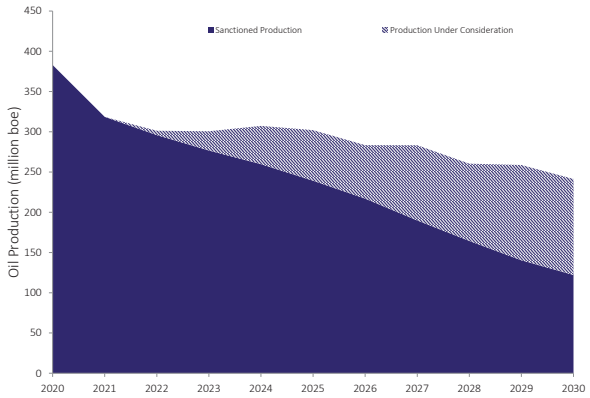
approvals seen in 2018. It is expected that 10 fields will start up in 2022 and early 2023 which, combined with the fields that started producing in late 2021, will bring around 450mn boe of new reserves (roughly 50:50 split between oil and gas) and peak production rates of around 250,000 boe/d. This would be enough to offset the declining production from existing assets, keeping total production from the basin relatively stable throughout 2022-23.

The opportunity to ramp up production in the short term, over and above existing plans, is relatively limited. However there are some levers which could in theory result in up to a 5% boost to output over the next 1-2 years. The biggest near-term gain will come from continual and reliable output, achieved by increasing production efficiency through focus on reliability and minimising outages. Consideration should also be paid to the impact of commodity prices and the impact they could have on companies' plans. This could mean accelerating smaller work scopes and brownfield infill drilling to help boost output and extending the productive life of mature assets, however these projects take time to plan and gain approvals for and therefore it can be difficult to advance them. There

Figure 11: Oil and Gas Production Outlooks

Source: NSTA, Offshore Energies UK





is also the potential opportunity to unlock greater levels of gas through adjustments to the specification requirements for access to the UK gas network. The UK has more stringent gas quality requirements than many other countries and a small adjustment to these specifications could mean that gas that does not meet these standards could be produced with no impact on safety or network performance. OEUK estimates that this could see an uplift in gas production of around 2%/year.

Longer-Term Outlook

Longer term, by investing responsibly, recognising the changing expectations in the finance landscape and satisfying environmental, social and governance expectations of investors, the domestic industry can play an important role in managing energy import dependence. It is important that governments, regulators and stakeholders maintain focused on delivery along with industry, so that projects may be developed in a timely manner.

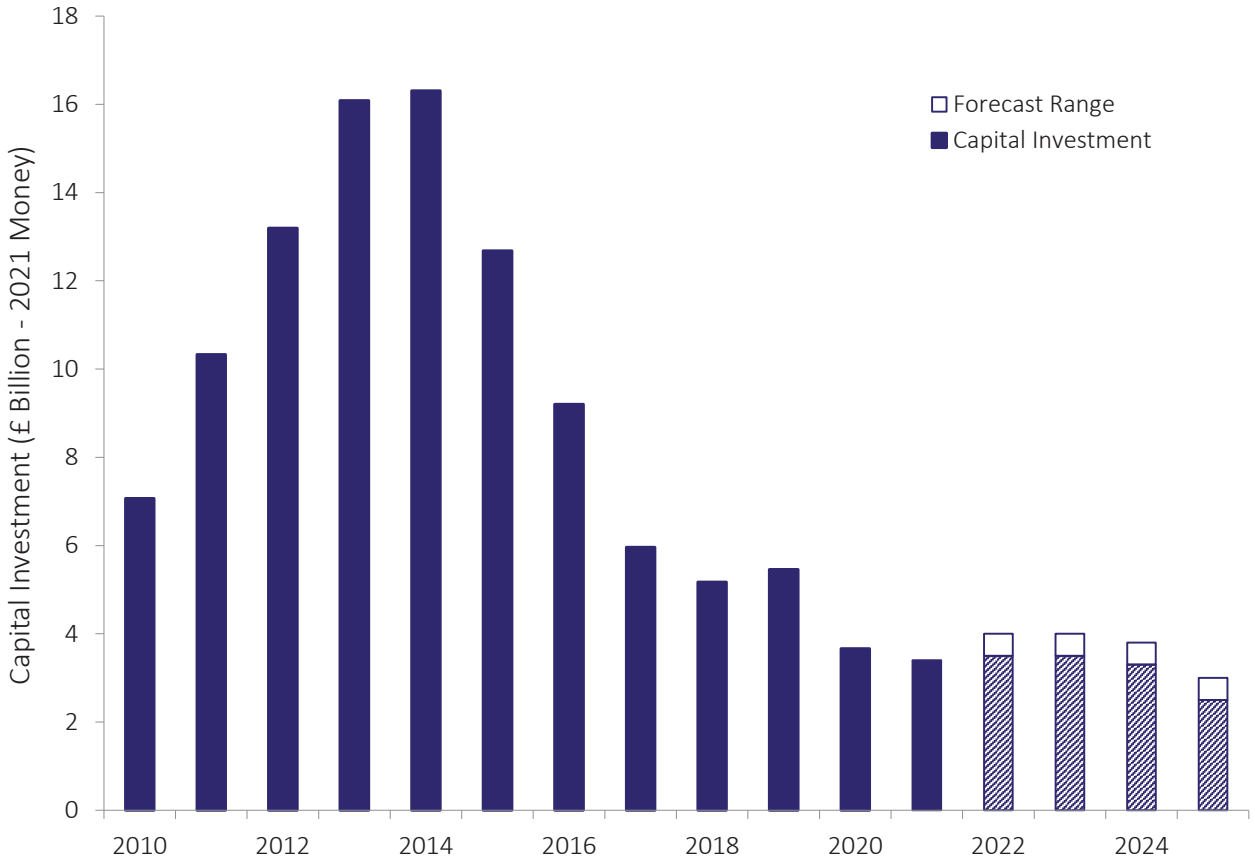
After some near-term stabilisation, output is expected to return to decline long term. But the rate at which it does so will be determined by how much is invested in developing new production in the next 12-24 months. It is likely that this rate will exceed the fall in demand, resulting in higher energy imports throughout the middle of the decade, at a time when the country is trying to become more energy-independent.

Based on current expectations the annual rate of decline could be about 7%-10%. But in a full investment case, where new greenfield and brownfield projects under consideration are advanced, this decline rate could be reduced – potentially by at least half. On the other hand, if no new investments are unlocked in the short term, the decline could be as high as 15%/year. It should be recognised that the current pipeline of opportunities contains more oil than gas reserves. A focus on new licensing and exploration can help to balance this in the coming years, with a need for a new licensing round to be announced in 2022.

There is a conveyor belt of pre-approval projects being matured and OEUK does foresee more new production consents across 2022-23. Projects aiming for development approval could bring up to £3.5bn in new investment and unlock

Figure 12: Oil and Gas Capital Investment

Source: NSTA, Offshore Energies UK



around 300mn boe of new reserves (40% of which are gas). Overall, there is almost £20bn of possible capital expenditure within company plans between 2022-26.

A pick-up in new field approvals would feed through into a slight increase in overall capital investment throughout 2022-23, expected to be £3.5-£4bn/year. This is a little higher than 2020 and 2021 (£3.6bn and £3.4bn, respectively). But these levels are less than two thirds of those seen prior to the pandemic in 2019 (£5.5bn). Development timescales mean that the production benefits from this new investment, in terms of helping to manage decline rates, would be mainly seen in 2025 and later. However there are a number of opportunities which can be progressed in shorter timescales thanks to advances in technology and a large pipeline network.

Higher investment would unlock more drilling activity, but it will be a relatively modest increase, and from current record low levels. Only 66 wells were spudded in 2021: 56 development, five exploration and five appraisal wells. Most of the development drilling was associated with brownfield projects and exploration activity was dominated by near-field opportunities, which generally offer a shorter payback

time and a lower technical risk. For 2022, OEUK would anticipate a roughly 10% increase in development and exploration drilling. But there is still some uncertainty surrounding the specific schedules of some projects.

A steady stream of new capital approvals in the development of new fields, and in extending the life of existing assets, is also important for ongoing levels of operational expenditure. This is the largest area of industry expenditure and rose 10% in 2021 (to £7.2bn), marking a return to pre-Covid levels, as offshore maintenance activities rose last year. Going forward it is likely that operating expenditure will trend roughly in line with production rates.

A clear pipeline of projects also allows supply chain companies to plan, while project delays and uncertain schedules challenge efficient resource allocation and financial planning. Companies across the supply chain face continued, and escalating, cost pressures, following low industry activity and the erosion of margins. These factors make it difficult for supply chain companies to invest in their own technologies and capabilities. Competition for supplier resources is growing internationally, and it is important that upstream oil and gas activity in the UK keeps pace with other basins. Companies need to be able to demonstrate solid income and margins, alongside growth potential, to help improve investor sentiment. Supply chain companies are also increasingly applying their expertise across the energy landscape and it is important that a strategic approach to skills development is adopted in order to ensure that companies are able to attract and retain resources to manage increased project demand.

Oil and Gas Production and Net Zero

Through the North Sea Transition Deal, the UK oil and gas sector has committed to progressive emissions reduction targets on the path to net zero by 2050 and remains steadfast in its commitment to achieving this. Doing so will help secure maximum economic recovery from the UKCS in a sustainable way. The revised NSTA strategy helps ensure that all new investment approvals are compatible with these emissions targets and the UK government also plans to implement a 'Climate Compatibility Checkpoint' to ensure that future licensing rounds are in line with the UK's broader climate ambitions. The checkpoint will provide transparency on industry performance. But it is also important that it provides long-term certainty to oil and gas investors that they will be able to develop the resources that are discovered and matured within their new licences.

Good progress is being made on the industry's emissions performance, with 2020 being 11% down on the 2018 baseline. Achieving the ambitious industry targets will require further action ranging from marginal gains to significant interventions such as the electrification of offshore assets. This presents the largest opportunity for further production emissions reductions.

Power generation accounts for around 70% of emissions from offshore installations. Electrification would help secure future production from hubs by improving reliability, extending asset life and giving investors the confidence that future projects relying on this infrastructure will be delivered with a smaller carbon footprint. With gas the main fuel source in offshore power generation (3.6bn m^3 used in 2021), electrification would also free up more gas for sale from the UKCS. Aside from the benefits to oil and

gas production, electrification should also be viewed as a first step in the development of a future, integrated offshore energy system with possible synergies associated with the development of offshore wind power and hydrogen production.

However, it is recognised that private investment in the development of electrification hubs is currently being held back by technical and economic challenges. There are several levers which government and regulators can use to speed up timely asset electrification:

- Introduce a streamlined and focused regulatory environment to deliver electrification at scale and pace. To minimise running costs, lower power costs may be achieved through private wire arrangements or other means such as a contract for difference (CfD) associated with the forthcoming Innovation and Targeted Oil and Gas (INTOG) leasing round.
- Support for the development of, and access to, an offshore power grid as early as 2026. This would allow flows both to and from the grid from offshore infrastructure. Action on this should focus on:
  - Resolution of private wire arrangements
  - Connection costs
  - Transmission costs
  - Designing a centralised grid offshore
  - Upgrade of the onshore grid
- Encourage and incentivise synergies between the different users of the offshore power network (including oil and gas installations, wind farms and hydrogen production)

Advancing the Transition to a Lower Carbon, Diverse Energy Mix

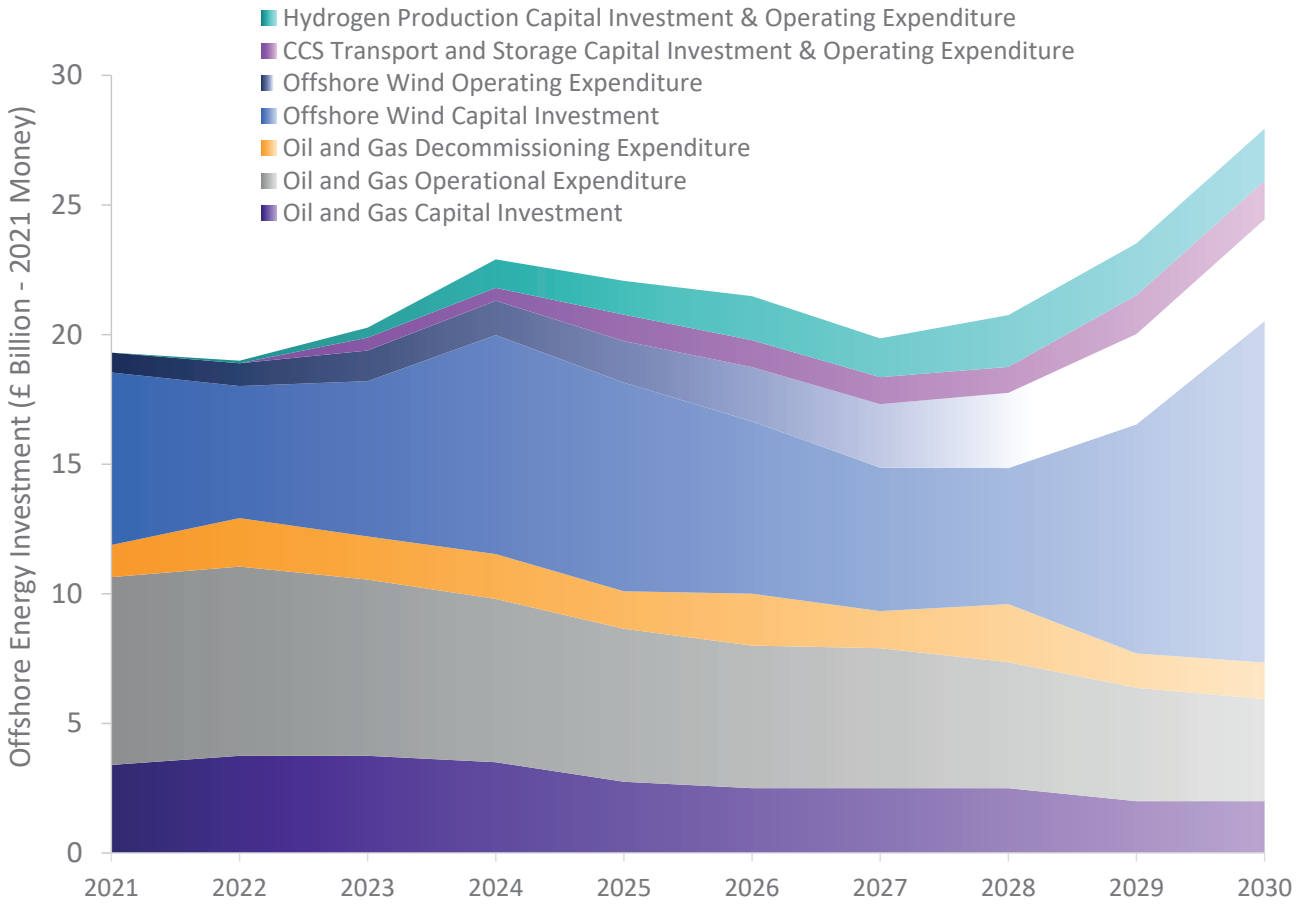
As well as limiting imports through responsible investments upstream, the sector can also help to reduce dependence on oil and gas by developing alternative energy sources, scaled up to ensure greater diversity. This includes a significant increase in offshore wind capacity and development of hydrogen production and gas-fired power with CCS. The companies that diversify their investments and resources from the oil and gas sector will be key to scaling up capacity across these forms of energy production in the UK. Together with new nuclear power, they offer increased growth opportunities for the supply chain and boost low carbon energy supply.

Within the North Sea Transition Deal there is a commitment to achieve 50% local content with low carbon hydrogen and CCS projects, with the Offshore Wind Sector Deal aiming for 60% local content. This would create a solid base of capabilities that can also be exported around the world. However, supply-chain companies will find it difficult to meet increased demand from the energy sector as they are suffering from low margins and face challenges in boosting their UK capabilities.

Creating a more diverse energy system will require significant expenditure across a range of sources, including oil and gas, offshore wind, hydrogen and carbon capture. Between 2022 and 2030 OEUK estimates that this could be between £200bn and £250bn of private sector investments in new projects and operating expenditure. Within this, it is likely that around 40% will be on managing oil and gas related activity and 60% on the scale up of lower-carbon energy sources. It should be recognised that there are uncertainties within this forecast, since many projects are at early concept stages and subject to further definition and revisions. The further out in the timeline, the more uncertainty there is. Although it does give an indication of the

Figure 13: Offshore Energy Investment Outlook

Source: Offshore Energies UK, NSTA, Rystad



scale of opportunities for companies across the sector, this profile will only be delivered against the backdrop of the right investment and business conditions.

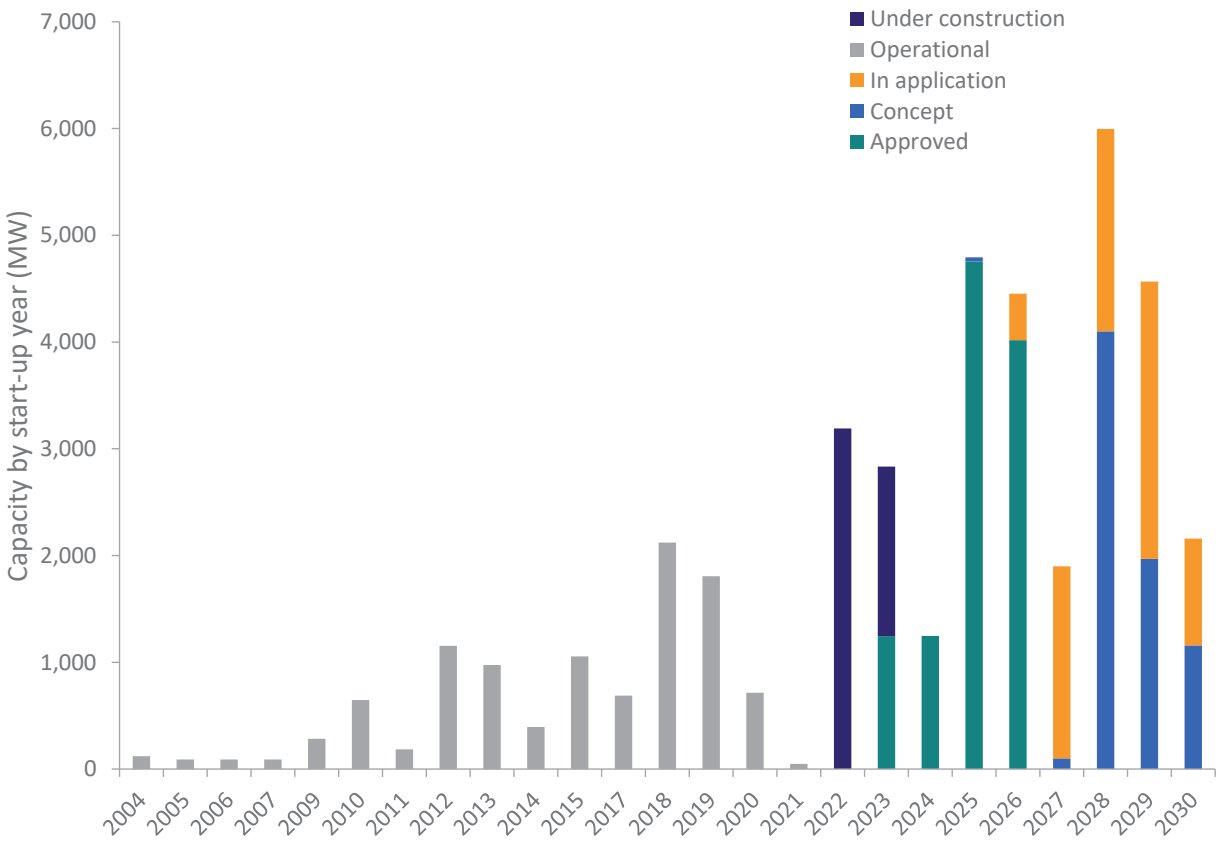
Offshore Wind

The UK has the world's second largest installed offshore wind capacity (10.5 GW), having seen around £47bn of capital investment to date. Further significant capacity additions will be required, with a target of 40 GW (1 GW of floating) by 2030 and the CCC anticipating the need for 100 GW by 2050. To enable this, it is crucial that the UK continues to develop a robust pipeline of activity, enabled by a competitive regulatory, delivery and investment environment.

The results of two new licence rounds were announced in 2021 which, cumulatively means that more than 60 GW of total offshore wind capacity have now been awarded UKCS licences. Crown Estate released its 4th round of licensing opportunities which awarded 7 GW of new seabed rights in England and ScotWind, the first licensing round in Scotland for over a decade, awarded just under 25 GW of potential with a significant focus on floating projects.

Figure 14: Offshore Energy Investment Outlook

Source: Rystad Cube Dashboard



Although not all the awarded capacity will be in place and producing before the end of the decade, the likely project pipeline indicates that the target of 40 GW by 2030 is achievable. Assuming a load factor of 57% (based on BEIS projections)[6], this level of capacity could be enough to meet more than 60% of anticipated electricity needs and 13% of UK expected total energy consumption in 2030 .

Total capital investment could be in excess of £60bn through to 2030, with most of this directed towards fixed installations. Investment in floating wind projects is likely to attract less than 5% of this. Floating projects tend to have additional commercial and technical complexities and are therefore still slightly less advanced. But their share of the offshore wind investments is likely to go up sharply after 2030, with many floating wind projects in concept phase and 60% of the ScotWind capacity being floating projects. In total, the UK is expected to have around 9 floating offshore wind projects coming online up to and including 2030.

This is significant progress towards

6 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/911817/electricity-generation-cost-report-2020.pdf

increasing renewable electricity output and also presents a strong pipeline of opportunity for supply chain companies to invest in and develop new and existing capabilities. However it should also be noted that countries around the world are also looking to significantly scale up offshore wind capacity, which could stretch the ability of supply chain companies to satisfy all the demand.

To support UK supply chain development in a global context, the Offshore Wind Growth Partnership (through the Offshore Wind Sector Deal) has been created to promote collaborative behaviour where opportunities for growth and innovation can be shared so that the supply chain is equipped to rapidly expand its offshore wind portfolio. So far, the initiative has supported over 130 projects through funding of almost £13mn with the intention of investing up to £250mn.

Offshore wind also has the potential to support the electrification of offshore oil and gas asset power generation. The INTOG leasing round will allow companies to apply for the right to develop wind projects specifically to provide power to oil and gas assets. The round will also allow the development of smaller scale innovative projects which are aimed at producing outputs such as green hydrogen.

This will increase the representation of oil and gas companies moving into offshore wind power, however many companies have already made this move. Almost 44% of ScotWind capacity (60% of floating wind capacity) is backed by companies traditionally viewed as oil and gas businesses. This is an example of energy integration in action and demonstrates how the transfer of skills, capabilities and capital from the oil and gas sector will be a central part of the growth in offshore wind capacity.

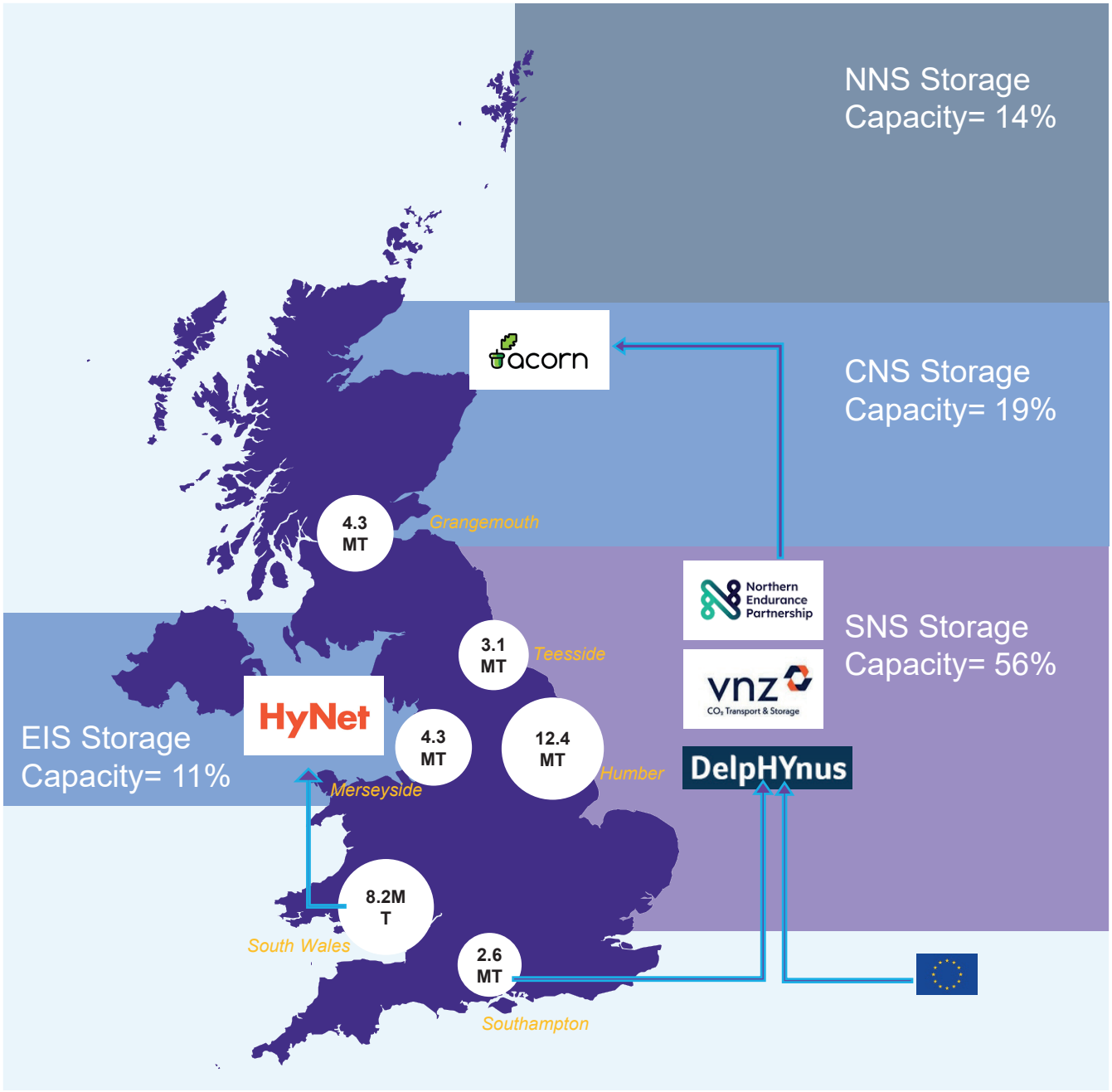
Scaling up offshore wind will require the government, regulators and industry to work to overcome some emerging challenges and take advantage of new opportunities. Demand will need to respond in line with the significant scale up in capacity, reversing the annual declines in consumption since 2005, and it is crucial that the transmission network is in place to carry the electricity to the centres of demand. It will also be important to consider off-grid connection options, such as use of offshore electricity supply for green hydrogen production. Streamlining the regulatory framework is also required, including collaboration across environmental assessments and fast-tracking the consenting process. It is also important that a strategic approach is taken to skills development across the energy sector to allow the smooth transfer of capabilities.

Hydrogen & CCS Development

As acknowledged by both the CCC and Net Zero Strategy, both hydrogen and CCS will have a crucial role to play in achieving the UK's net zero targets. This presents a significant opportunity to develop and support the deployment of these at scale across the UK. Companies with heritage in oil and gas are involved in each of the key early stage CCS transport and storage and hydrogen production projects. Supply chain companies are also already applying their skills across the integrated energy landscape, with strong synergies in the capabilities, skills and technologies required to support the oil and gas lifecycles with those needed for hydrogen production and CCS transport and storage project projects.

Figure 15: UK Industrial Cluster Projects

Source: Offshore Energies UK



CCS

There are five CO_2 transport and storage projects in development within the UK, with the government having agreed to support the deployment of four of these clusters by 2030 – two in the middle of the decade and two towards the end of the decade. The government is committing up to £1bn of funding in support of this, however the majority of spend will be from private investments.

The UK has awarded initial support (track 1 status) to the proposed NEP (Northern Endurance Partnership) and the Hynet projects. Other projects will compete for track two status, which will support deployment by the end of the decade.

Data from the NSTA-led Energy Integration Project[7] outlines that a typical CCS transport and storage site, with injection capacity of 5mn mt/year would cost around £750mn, dependent on the re-use of infrastructure, with required storage capacity of around 4 gigatons by 2050. Developing this strategically will help to further progress the skills and capabilities already in place across the UK supply chain and also unlock international export opportunities.

The CCS transport and storage infrastructure network will be developed in a different way from those already in place such as gas and power which service a wide range of direct and indirect users. The CCS network will be relatively localised and have a smaller range of large-scale users, with the potential for allowing the storage of carbon from other countries. The development of an appropriate and bespoke framework for the cost of capital and other financial indicators will be key to making the new sector an investable proposition, along with long-term commercial mechanisms to maintain investment flow.

Key areas for policy development with respect to development of the offshore CCS networks for industry, NSTA and BEIS include:

- Finalisation of the transport and storage and capture project business models and launch of the track-2 cluster selection process, as soon as possible.
- Acceleration of the framework for developing new stores, including regular exploration licensing rounds for new offshore CO_2 storage sites co-ordinated with the offshore acreage leasing process. Clarity on the market framework for future network expansion is also required to incentivise private sector investment in storage appraisal.

Hydrogen

Hydrogen is particularly well suited to displacing fossil fuel use in industrial and heavy-duty transport owing to its versatility, energy storage properties, and high energy-mass density. OEUK firmly believes that a reliable supply of hydrogen will encourage more fuel switching and help establish and stimulate growth in the sector, alleviating the various market failures. However hydrogen should not be seen as a panacea, but a part of an increasingly integrated energy system which is less reliant on fossil fuels and that build on existing infrastructure and capabilities. Hydrogen may not be the preferred alternative for all types of current gas consumption. For example many households will look to choose electric vehicles and heating systems rather than hydrogen fuelled. This is why it is important that government focuses on the rapid roll out of renewable electricity and offshore wind, in addition to solutions such as hydrogen.

In line with the commitments in the North

7 https://www.nstauthority.co.uk/media/6630/ukcs_energy_integration_annex-2-ccs-final-august-2020.pdf

Sea Transition Deal, it is important that appropriate commercial models are implemented in order to stimulate demand for low carbon hydrogen production. Support from government is required to enable this, in line with:

- Low Carbon Hydrogen Threshold: OEUK strongly believes that there should only be one label of “low carbon hydrogen standard” for the UK market and that it should consider all production pathways, including methane reformation, that align with the UK’s NSTD goals.
- Hydrogen business models: a contractual producer-focused model is essential if hydrogen is to be deployed at scale and attract new investment quickly into the sector in the initial phases. Hydrogen must be made available in enough quantity to demonstrate its many applications and to allay fears about availability.
- Blending: integrating hydrogen into the gas grid poses several challenges that are the responsibility of various regulators including Ofgem and HSE.
- Recognition of the role of devolved and local initiatives to develop applications for hydrogen in transport, domestic and commercial locations.

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