

uk ENERGY POLICY Driving the Transition

Reflections on the Energy White Paper and associated publications

UK ENERGY POLICY Driving the Transition





The UK Oil and Gas Industry Association Limited (trading as OGUK) 2021 OGUK uses reasonable efforts to ensure that the materials and information contained in the report are current and accurate. OGUK offers the materials and information in good faith and believes that the information is correct at the date of publication. The materials and information are supplied to you on the condition that you or any other person receiving them will make their own determination as to their suitability and appropriateness for any proposed purpose prior to their use. Neither OGUK nor any of its members assume liability for any use made thereof.



Contents

Driving the Transition: our response	4
1. Background and context	8
2. Help make net zero happen by decarbonising the UKCS	10
3. Removing emissions from the wider economy	12
4. Transforming the oil and gas supply chain, skills and employment	16
5. The role of carbon pricing	18
6. Delivering a doubling of energy sector investment	20
7. Energy security and affordable bills	22



Driving the Transition: our response

"Given the importance of the policies launched over the last three months, OGUK offers its initial assessment of the proposals and opportunities"

Since the Committee on Climate Change (CCC) report "*Net Zero – The UK contribution to stopping global warming*" was published in May 2019, the country's energy policy has undergone a period of unprecedented change.¹ The three objectives of energy policy have traditionally been affordability, security of supply and environmental impact, but since 2019 the overarching objective of achieving a net-zero economy by 2050 has been overlaid, and the Prime Minister's Ten-Point-Plan provides a clear summary of the energy policy direction.²

During the second half of 2020, there were a range of major energy-related announcements, policy papers and consultations, as set out below, which will reshape the UK energy market. The pace of change will continue to be rapid during 2021, as the government prepares to host COP26. This report sets out how the UK's offshore oil and gas industry will play its part by continuing to deliver secure and affordable energy products to millions of households, businesses and communities while helping drive the transition towards a low-carbon future. Given the importance of the policies launched over the last three months and the initiatives to come, OGUK is taking the opportunity to offer an initial assessment of the proposals, particularly considering where there are opportunities to accelerate progress or where further intervention may be needed to deliver the intended outcomes at the required pace.

The UK oil and gas sector currently provides 45 per cent of the UK's total energy needs from home produced resources, and its supply chain is a global leader in energy technology and implementation. The changing sector has been a cornerstone of the UK energy economy for decades and has already committed to deliver a net-zero future by 2050 via *Roadmap 2035: a blueprint for net zero*, launched in 2019.³ The sector is already in action, investing in many of the emerging energy opportunities and has a significant contribution to make to the future. It is currently working with the Department for Business, Energy & Industrial Strategy (BEIS) on the North Sea Transition Deal (NSTD) as discussed within the



1 https://www.theccc.org.uk/publication/net-zero-the-uks-contribution-to-stopping-global-warming/

2 https://www.gov.uk/government/publications/the-ten-point-plan-for-a-green-industrial-revolution

3 https://oilandgasuk.co.uk/roadmap-2035/

OGUK

Energy White Paper.⁴ A North Sea Transition Deal will accelerate the country's net zero journey, reducing UK emissions and creating new jobs across the UK. Meanwhile continued low-carbon production of domestic resources provides a firm foundation for the UK's oil and gas supply chain to drive the energy transition at home and win business abroad, building on its deserved reputation of excellence acquired on the UK Continental Shelf (UKCS).

OGUK is the leading representative organisation for the UK offshore oil and gas industry. Our membership includes over 400 organisations with an interest in the UK's upstream oil and gas and other energy sectors. As the champions of industry, we work to inform understanding with facts and evidence, engage on a range of key issues and support the broader value of this industry in a changing energy landscape. From exploration through to decommissioning and located across the length and breadth of the UK, our members are critical to safely providing security of energy supply, while supporting around 270,000 jobs and contributing billions of pounds to the economy each year.

(i) Helping make Net Zero happen across the UK, starting with the UKCS

With the right policy framework in place, the UK can radically reduce carbon emissions from the extraction of oil and gas and use the UKCS to drive down UK wide industrial emissions.

The White Paper's support for decarbonisation of the sector and the regulatory framework introduced by the Oil and Gas Authority (OGA) Strategy update is welcome.⁵ The unique role of the UKCS is well recognised by the OGA in its Energy Integration Project⁶, co-ordinated with BEIS and other energy regulators, which identifies the unique opportunity to decarbonise the UK economy both by reducing the carbon footprint from the extraction of oil and gas as well as creating the energy infrastructure of the future through the growth of CCUS, hydrogen and offshore wind alongside traditional activities. The report concluded that the resources of the UKCS can help decarbonise 60 per cent of the UK economy over time. Industry has sought to progressively reduce its emissions over many years and has been a significant participant in the EU and now UK Emissions Trading Scheme which has reinforced this trend. In June 2020, the sector set ambitious emission reduction targets to halve its emissions by 2030. Importantly, these targets are in broad alignment with those proposed by the CCC in its Sixth Carbon Budget⁷ (78 per cent reduction target by 2035) and delivery of the 2050 net zero commitment.⁸ The sector also supports the UK Government endorsement of the World Bank Zero Routing Flaring initiative by 2030 and is developing a specific action plan to reduce methane emissions.

Realising the potential for offshore energy integration projects by connecting existing offshore operations to wider networks is a major new venture and will require support from the UK Government to align the different regulatory frameworks for offshore electricity. Electrification of existing assets would also benefit from access to a future decarbonisation fund built around the auction revenues from the UK Emissions Trading Scheme (ETS). Such measures will be needed to close the current affordability gap and establish an integrated transmission network early in this decade which would support the growth in offshore wind as well as oil and gas decarbonisation. As acknowledged in the White Paper, measures to support offshore infrastructure investment will need to be implemented swiftly if we are to make progress to decarbonise production within the lifespan of the oil and gas facilities that are currently in operation.

(ii) Developing the capability to remove emissions in the wider economy

The resources of the UKCS and the energy companies which continue to invest in the sector provide the UK with a competitive advantage in the rapidly growing CCUS and hydrogen sectors, available to few other countries globally.

The widespread deployment of CCUS and hydrogen are recognised as vital means to achieve a net-zero outcome in all the envisaged 2050 scenarios. The time has now come to develop these new activities rapidly, and at scale, so they can contribute to the net zero objective. Any delay will prejudice the UK's ability to decarbonise at the required pace.

⁴ https://www.gov.uk/government/publications/energy-white-paper-powering-our-net-zero-future

⁵ https://www.ogauthority.co.uk/regulatory-framework/the-oga-strategy/

⁶ Oil and Gas Authority: UKCS Energy Integration - Final Report - 2020 - Publications - News & publications (ogauthority.co.uk)

⁷ https://www.theccc.org.uk/publication/sixth-carbon-budget/

⁸ https://oilandgasuk.co.uk/product/production-emissions-targets-report/

UK ENERGY POLICY Driving the Transition



The government objective of delivering at least 10Mt capture capacity by 2030 based on four cluster locations is realistic on the basis of the establishment of the £1bn CCUS Infrastructure fund (CIF). However long-term commercial mechanisms need to be in place rapidly to maintain investment flow in this new sector. In this regard, the updated CCUS business model proposals, envisaging the transport and storage infrastructure as a separate activity with an independent regulator is considered as an attractive approach. As set out in the White Paper, further regulatory measures are also needed around the reuse of existing oil and gas infrastructure to clarify the process for transferring assets and decommissioning liabilities.

As set out by the CCC and the White Paper, a twin-track approach is required in the supply of hydrogen. Blue hydrogen derived from natural gas will provide the foundation of the hydrogen economy whilst green hydrogen is developed and becomes progressively more cost competitive. The announcement of Net Zero Hydrogen Fund to kick start project development is therefore welcome. To achieve the ambitious targets in both the CCC report and the White Paper, the use of a Contract for Difference (CfD) approach associated with relevant regulatory framework to support demand is required, to fund the growth in hydrogen supply.

(iii) Responding effectively to robust economy-wide signals from carbon prices OGUK supports the introduction of the UK Emission

Trading System which replaced the EU scheme on 1 January 2021; as it evolves, it will need to maintain a competitive economy as the UK progresses through the energy transition.

The initial phases of the scheme will need to be managed carefully reflecting the departure from the EU scheme. That said, the UK ETS should be able to provide a stable and flexible mechanism to allow for carbon pricing in the UK economy to continue, whilst offering the prospect to link to mechanisms in other jurisdictions.

Carbon prices cannot, on their own, support the investment required across the full range of decarbonisation technologies. As the economywide carbon price increases, policies must continue to take account of carbon leakage and offshoring risk. Measures and financial support to significant decarbonisation efforts need to be intensified and the deployment of border adjustment mechanisms may also need to be considered as is the case within the EU and other jurisdictions.

(iv) Delivering investment across the energy market

Innovative funding structures between private and public sectors will need to be fostered to create the appropriate environment for a fair and managed transition.

As noted in both the CCC Sixth Carbon Budget and the HMT net zero interim report,⁹ many net-zero opportunities and projects will require large scale capital investment programmes, rising to around £50bn per annum; this is more than double the typical level of energy sector capital expenditure. Most of this is expected to come from the private sector and a range of financial investors, engaging at different points of the project timeline.

The volume of capital required builds an opportunity for a variety of funding mechanisms and business models to be implemented to suit investor risk appetite, some of which are already utilised in the energy sector and specifically the ring-fenced oil and gas sector today. It should be recognised that there is a need for wider policy to provide a long-term framework for new sectors to be developed that are investable at scale and across the whole of the UK whilst supporting continued investment in existing energy resources which will be needed as we go through the transition.

OGUK recognises there is a need for an economywide, long-term policy framework to incentivise investment at scale right across the energy sector. A supportive and competitive fiscal policy which consistently attracts capital programmes has an important role to play here.

Regarding Green Finance, the industry shares the view that the UK should become a gateway for global low-carbon investment across the whole energy sector. We welcome the opportunity to engage with the government and the OGA on a framework for reporting climate related disclosure and green taxonomy as offered through the HMT interim report.

⁹ https://www.gov.uk/government/publications/net-zero-review-interim-report

(v) Providing energy security and affordable bills

Maximising the use of the UK's energy resources through the energy transition is consistent with a net-zero future and supports the resilience of the domestic energy market.

All the various projections of the CCC and within the White Paper include significant ongoing oil and gas demand during the 2020–50 period and to some extent thereafter as the transition progresses. The UK industry will be able to continue to supply a significant proportion of this demand. A stable offshore licensing regime for exploration and development is an essential element of an orderly energy transition. This regime will, as a matter of course, be aligned to the revised OGA Strategy, taking account of the new obligation on the regulator and industry to support the UK's net zero objective as a whole. Other changes to the regulatory framework, for example arbitrary restrictions, are unnecessary and risk immediate damage to investor sentiment and to our indigenous supply chain capacity. This will negatively impact overall energy policy goals and result in delay to the energy transition. Such an approach would also diminish UK comparative advantage in this sector, including many offshore competencies.

Public and consumer acceptance is critical to the energy transition and this requires the effect on bills and the degree of disruption to be minimised. Energy systems as a whole must be resilient enough to avoid either supply disruptions or excessive price volatility. Likewise, energy technologies need to be developed to meet consumers' individual needs, especially in the business and industrial sectors. The approach in the White Paper and the CCC of developing a wide range of technology options, flexible enough to accommodate a large range of scenarios and requirements, is an important means of dealing with uncertainty.

(vi) Growing the economy, jobs, and places

The measures in the Energy White Paper coupled with the proposed North Sea Transition Deal will help develop the energy supply chain of the future, building on the oil and gas and North Sea heritage.

Action now will sustain high-skilled jobs, drive regional growth with new energy businesses, attract investment, and grow exports. The role of our sector's supply chain will be critical to develop efficiently new industries at the centre of the energy transition, as identified by the CCC and in the White Paper. The UK's energy supply chain is already a world leader in offshore oil and gas engineering, operations and decommissioning and subsea technology and the White Paper offers an exciting opportunity to build on this capability in years to come.

The pace of change is critical. Many other countries are already using their oil and gas competencies to invest in their indigenous supply chains in the race to compete for low carbon technologies. The United Kingdom must act similarly to help the supply chain pivot into the emerging new energy technologies including CCUS and hydrogen bringing its own internationally competitive solutions to the marketplace, building on a strong diversified energy mix in the UK.



1. Background and context

"Achieving net zero for the UK will require substantial changes to energy policy and detailed regulatory frameworks to harness the investment required"

The UK Net Zero Target and Roadmap 2035

In 2019, the government established the legally binding objective to achieve a net-zero economy by 2050. In response, the oil and gas industry committed to support this ambition with the launch of Roadmap 2035 and subsequently in June 2020 announced emissions reduction targets for its own operations and the objective of a net zero UKCS by 2050 at the latest.

Achieving net zero for the UK will require substantial changes to energy policy and detailed regulatory frameworks to harness the investment required. Some of these changes are already being made while many others will take place over the coming months and years. The government published the Prime Minister's Ten Point plan in November 2020 which gave a strong indication of the technology areas that need to be developed.

Recent policy development activity

A range of more detailed documents indicating specific policy elements based on the Ten Point Plan have subsequently been released, particularly:

- Committee on Climate Change (CCC) Sixth Carbon Budget
- BEIS Energy White Paper
- HMT net zero interim report
- Scottish government hydrogen strategy ¹⁰

This paper is an initial response to the various policy recommendations included or implied by these publications. In addition, a range of consultations on individual policy measures are either in progress or planned during 2021. Several of these have been flagged in the Energy White Paper including:

- Consultation on export finance
- Outcome of licensing review
- Revised Ofgem Strategic Policy Statement
- Consultation on updates to the Gas Act
- CCUS business model update and cluster sequencing
- Hydrogen commercial framework

In this context, OGUK has already responded in detail to the consultation on the revised OGA Strategy which entered into force in February 2021. The sector is currently engaging with the OGA on how the new Strategy will be brought into its existing decisionmaking processes. Likewise, the government's decision on the UK Emission Trading Scheme has already been subject to a full consultation process and legislation is now being implemented.

Finally, during this time, the government also agreed the future EU-UK Trade and Cooperation Agreement which also has implications for energy and climate policy in the UK and other ongoing international trade agreements.

10 https://www.gov.scot/publications/scottish-government-hydrogen-policy-statement/

OGUK

North Sea Transition Deal

The sector is actively engaging with government on the North Sea Transition Deal (NSTD). We welcome the commitment expressed in the Energy White Paper by Government to agree a Deal with industry in the first half of 2021. The NSTD offers the framework for the sector to work closely with UK government to fully embrace the opportunities from the move to net zero, while also supporting other energy policy and economic objectives as follows:

- Supply decarbonisation cutting upstream oil and gas industry emissions through an ambitious production emissions reduction programme.
- Carbon Capture & Storage enabling large parts of UK industry and society to eliminate emissions.
- **Hydrogen** providing a realistic alternative for heating, heavy industry and transport.
- Supply chain transformation developing expertise that underpins energy-sector wide export growth from the UK, creating a globally competitive energy supply chain of international repute.
- **People & Skills** securing, stimulating, and creating tens of thousands of high-quality jobs in industrial heartlands.

Many of the proposals being discussed in the context of the NSTD relate to unlocking the increased investment that will be required in the economy to support the energy transition. Much of this investment will take place in offshore locations as highlighted in the OGA Energy Integration report. The OGA estimates that the UKCS can contribute up to 60 per cent of the activity to meet the net-zero pathway and oil and gas companies and the supply chain will be active across all solutions, from offshore floating wind to hydrogen production, to CCUS infrastructure, while also providing a large proportion of residual oil and gas needs as the transition progresses.



2. Help make net zero happen by decarbonising the UKCS

"Industry has identified a variety of solutions to decarbonise oil and gas production and achieve significant emissions reduction, from operational changes to new technology and large-scale electrification"

- The OGA revised Strategy is in force and now includes a Central Obligation on licensees to assist in the meeting of the net zero target and to reduce greenhouse emissions as far as reasonable in the circumstances. OGUK supports the revision of the Strategy encompassing the net zero target and industry is currently working with the OGA on practical implementation.
- The sector supports the implementation of the World Bank Zero Routine Flaring initiative by 2030¹¹, and an action plan on methane emissions for the sector will be published in support of this during Q2 2021.
- Further significant reductions in emissions are deliverable from the sector and would be facilitated by polices to support the viability of connection of assets to the onshore electricity networks and/ or lower carbon energy sources. This could lead to new oil and gas developments which would not have any direct emissions as suggested by the CCC. Such policy levers may include:
 - Access to decarbonisation funding, financed by the auctioning of UKETS allowances in support of offshore electrification projects, available from 2023 to support decarbonisation
 - Continuation and evolution of the existing class exemptions for offshore electricity generation/ distribution and supply such that electricity is affordable compared to alternative fuel sources (or other equivalent measures)
 - Alignment of regulatory frameworks across sectors to achieve accelerated development of offshore transmission networks, including the potential granting of licence exemptions for electricity infrastructure in support of decarbonisation projects

The industry has been proactive in support of the net zero objective via the early adoption of Roadmap 2035. The sector has already committed itself to reducing emissions at pace whilst providing the UK with the oil and gas it will continue to need through to 2050 and beyond. As part of this commitment, the sector has already set ambitious emissions reduction targets (covering scopes 1 and 2), published in June 2020. Industry has identified a variety of solutions to decarbonise oil and gas production and achieve significant emissions reduction, ranging from operational changes, reduction of venting and flaring, technology¹¹ development and deployment, and the large-scale electrification of platform operations (i.e. connection to wider offshore networks).

Various operational solutions to reducing emissions are underway and will be further accelerated in line with the revised OGA Strategy and in response to increased carbon allowance prices. Further detailed guidance on the expanded role of the OGA as outlined in the updated Strategy and its expectations for new and existing operations are currently being developed. Clarification of the respective role of OGA and OPRED in regulating sector emissions reduction, operator performance monitoring and emission reporting is welcomed. OGUK is also working with members to prepare a Methane Action Plan to promote continuous reduction in methane emissions from upstream oil and gas operations and identify best available techniques to reduce flaring and venting.

¹¹ The initiative requires: "[companies to] develop new oil fields they operate according to plans that incorporate sustainable utilization or conservation of the field's associated gas without routine flaring [and that] companies with routine flaring at existing oil fields they operate will seek to implement economically viable solutions to eliminate this legacy flaring as soon as possible, and no later than 2030."

Large-scale electrification will be required to support the more significant emissions reductions. This requires a more concerted effort from industry, government and regulators and is one of the key components of the NSTD. In particular, rapid development of the offshore electricity transmission network is needed in the early 2020s, accompanied by reforms to the regulatory framework to ensure competitive supply of electricity to offshore users. The commitment expressed in the White Paper to tackle regulatory and policy barriers to the use of clean electricity, such as offshore wind, for powering offshore oil and gas facilities is therefore appreciated. A key issue identified in the Energy Integration report coordinated by OGA, is the need for an overarching framework to bring together the various regulatory bodies onshore and offshore.

Access to affordable sources of electricity is of central importance to the viability of the proposed electrification projects. Electrification means that operators will move from a situation of producing their own electricity to being a customer of another provider which could be accessing supplies from the wholesale power markets in the UK or elsewhere. Offshore electricity supply is currently subject to class exemptions which could be extended to support electrification projects.¹² Another potential intervention would be the extension of the exemptions already provided to many other energy-intensive sectors to the oil and gas sector.¹³

Some additional support to major decarbonisation projects (both on and offshore) may also be required where the capital costs of converting existing assets are particularly high.

Xilik

12 https://www.gov.uk/government/consultations/exemptions-from-the-requirement-for-an-electricity-licence-call-for-evidence

¹³ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/942616/CFD_RO_FIT_Exemption_ Guidance_Revised_December_2020.pdf



3. Removing emissions from the wider economy

"Frameworks for CCUS and hydrogen will be essential to achieving net zero, and the offshore energy industry has a critical role to play in developing this infrastructure"

- Government has already announced the £1bn CCUS Infrastructure Fund (CIF) to support initial development of CCUS Transport and Storage Infrastructure serving the main industrial clusters. A flexible and responsive regime for the sequencing of projects is now required.
- Carbon transport and storage infrastructure requires a bespoke long-term economic regulation regime, including an independent body with appropriate powers to promote investment.
- The proposed Industrial Carbon Capture (ICC) and Dispatchable Power Agreements (DPA) to create a secure market for CO, T&S infrastructure should be implemented rapidly.
- Coherent policy and regulation are needed to support re-use of oil and gas assets, facilitated by the OGA under the new Strategy and dealing with any valuation and residual liability issues.
- A Contract for Difference (CfD) scheme in support of hydrogen and other decarbonised gases is needed by the end of 2021 to create an economically viable hydrogen market to attract investment.
- Similarly, ambitious demand side measures are required at national and local level, including allowing for blending in networks from 2023, to create the long-term conditions for investment in hydrogen production.
- The arrangements for the gas market and storage infrastructure need to evolve so that decarbonised gas can effectively compete both within the national system and at a local level.

Carbon capture and storage

The UK has important advantages in the deployment of carbon capture and storage (CCS)¹⁴, benefiting from natural storage formations in the North Sea and Irish Sea and extensive oil and gas infrastructure that may be reused to deploy CCUS at a reduced cost. The UK also has the advantage of having a number of concentrated clusters of manufacturing industry and a significant level of natural gas consumption to form the basis for a large-scale CCUS and hydrogen industry.

The CCC report and the Energy White Paper confirm that carbon capture and storage is critical to achieve net zero in 2050 and will be a growth opportunity for the UK industry with an annual storage quantity of around 100m tonnes expected. In its latest report, the International Energy Agency (IEA) also confirms that CCUS is required at scale to decarbonise existing and future facilities at global level. UKCS has the potential to become a European hub for this technology, enabling sequestration of emissions from other countries and providing considerable potential to export related products and services. Carbon capture and storage offers a large market for the UK's existing oil and gas supply chain. All of the CCC scenarios also expect CCUS to make a large contribution to emissions reduction, especially in the industrial sector as a cost-effective means of permanent abatement. Figure 1, overleaf, sets out the central forecast for abatement of UK industrial activities.

¹⁴ This document concentrates on carbon capture and storage rather than discussing "utilisation" of CO₂ but will refer to "CCUS" throughout.



Figure 1: CCC projection of CCUS requirement Balanced scenario



The Government has committed £1bn of support via the CCUS Infrastructure Fund (CiF), which will accelerate the deployment of this technology and provide a strategic commitment. In addition to this funding and to kick-start development, the Government needs to develop long-term mechanisms to enable investors to make a return on investment in CCUS infrastructure overseen by an independent regulator specific to the CCUS sector and with a duty to promote the development of the industry. Economic regulation is required to both encourage investment and to ensure fair conditions for users of the infrastructure since there is likely to be an element of regionalised market power for the main providers of the transport and storage (T&S) services. An indicative structure has been set out by BEIS is set out below and forms a sound basis for development as set out in Figure 2.



Source: BEIS CCUS Business Model

15 https://www.gov.uk/government/publications/carbon-capture-usage-and-storage-ccus-business-models

Figure 2: Illustration of carbon T&S business model¹⁵

UK ENERGY POLICY Driving the Transition

OGUK

The offshore sector has a particular role and capability in developing carbon T&S infrastructure and a capacity level of at least of 10Mt per annum by 2030 is achievable based on three initial storage locations. Based on data included in the Energy Integration Project, led by the OGA, the investment required to deliver this is between £2bn and £3bn, and would allow the UK to become a significant global player, leading Europe in CO₂ storage capacity. The government is currently consulting on the sequencing of the potential CCUS Clusters, where it is expecting the carbon T&S businesses to take the lead in developing the configuration of each cluster and to access the above funds and to be awarded an economic licence as a carbon transporter. This approach is welcome although the scheme needs to ensure that all potential clusters projects can see a route to deployment so that the existing supply chain and expertise is retained.

A clear policy framework relating to the reuse of oil and gas assets will also be important. It is expected that an economic regulation approach will mean that any reused assets, and any remedial expenditure will form part of the regulated asset base of a new ring-fenced carbon T&S business. Assets to be reused will be transferred to those businesses and any residual liability questions dealt with. The OGA, under the revised Strategy, will have a role in facilitating such transactions and approving decommissioning and reuse plans of licensees.

Figure 3: Lifecycle emissions from hydrogen production

Finally, in order for new carbon T&S businesses to be economically sustainable, a secure pipeline of industrial carbon capture projects will be needed. Complementary action by government will also be required to encourage capture opportunities to drive demand for access to the T&S network as, initially, the carbon price cannot alone support the costs of constructing and running the assets required (as well as the eventual decommissioning). Alongside industrial capture, it is also likely that electricity generation from gas (and eventually decarbonised gas in the form of hydrogen) is likely to be required as part of the net zero energy system to provide the necessary flexibility to support renewable production and meet the needs of end users. The proposed Industrial Carbon Capture (ICC) and Dispatchable Power Agreements (DPA) put forward by BEIS in its CCUS Business Models update will therefore also form an important element of the overall framework.

The hydrogen economy

There is a growing consensus on the need for a versatile molecule-based energy carrier such as hydrogen alongside electrification to achieve a reliable and affordable energy mix. Hydrogen provides flexibility and resilience for heat, transport and industrial applications that electrification alone cannot provide. An Energy Networks Association report in 2019 found that a policy of solely relying



Both "blue" (from methane reformation with CCUS) and "green" (from electrolysis) will be significant components of the 2050 hydrogen system. However, initially, hydrogen produced from reformed methane is likely to be the most cost-effective means to deliver clean hydrogen at scale. Currently, the lifecycle carbon reductions from blue hydrogen are lower than for average grid-supplied electricity.¹⁶

16 https://hydrogencouncil.com/en/hydrogen-decarbonization-pathways/



Figure 4: Summary of CCC 2050 Hydrogen Scenarios

	Balanced Net Zero Pathway	Headwinds	Widespread Engagement	Widespread Innovation
Natural Gas Grid	Trials in 2020s. Large-scale from 2030 near industrial clusters. Conversion continues to 2050.	Trials in 2020s. Large-scale from 2030 around industrial clusters, limited radiation. 20% of homes on hydrogen by 2035.	No conversion. Industry hydrogen sourced via private pipelines.	Hydrogen grid conversion trials in 2020s. Large-scale from 2030, limited radiation. Most buildings within radius convert to hydrogen. After 2035 no further buildings convert.
Hydrogen demand (TWh) in 2050	223	376	161	233

Source: CCC

on mass electrification would cost an additional £13 billion per annum out to 2050.¹⁷ Indeed, for some industrial high-grade heat applications and process emissions, hydrogen may be the only economically viable option without jeopardising UK businesses' competitiveness. Adopting a range of technology options also provides for a more consumer focused and resilient energy system, particularly for the seasonal swings in demand created by unexpected weather events.

The CCC has recognised in its scenario approach within the Sixth Carbon Budget that the long-term balance between electricity and hydrogen, and the different sources of hydrogen, are impossible to precisely predict. Such a scenario approach is appropriate as it recognises that costs, technologies and consumer preferences will evolve rapidly over time. However, in all scenarios, it is clear that rapid action is needed now to develop the market and build the supplies and infrastructure required to meet the ambitions for hydrogen. The Scottish Government already has a Hydrogen Strategy and a proposed £100 million fund for hydrogen development. Taken in conjunction with a UK-wide strategy placing hydrogen at the heart of local communities, including the concept of Hydrogen towns or zones, in domestic, transport and industrial applications could transform the energy mix. Overall, it is considered that 50 TWh per annum capacity of low-carbon hydrogen will be required by 2030, consistent with the 5GW capacity figure outlined by Government in the White Paper.

Commercial mechanisms will be needed to attract investment in hydrogen supply with a preference for a CfD structure. Such a mechanism has been proven to be an effective tool to attract investors in the electricity sector and led to the rapid scale up and deployment of technologies, which in turn have brought costs down rapidly. However, the hydrogen economy will only emerge if both supply and demand are stimulated through a combination of regulatory and policy interventions. In the industrial sector for example, natural gas fuelled equipment will need to be replaced with alternative technologies and industrial applications will face the choice of being retrofitted with CCUS directly or converted to run on hydrogen rather than natural gas.

17 Pathways to Net Zero: Decarbonising the Gas Networks in Great Britain



4. Transforming the oil and gas supply chain, skills and employment

"The offshore industry's skill set is essential to maintaining the UK's comparative advantage in the energy transition"

- The UK oil and gas supply chain is worth over £26bn per year, supporting thousands of jobs and exporting around the world.¹⁸ It is a source of national comparative advantage that should be maximised in the transition to net zero technologies.
- UK Government must recognise and continue to actively champion the role of the sector and its workforce in the energy transition.
- Companies and consortia across the supply chain need support in the initial phases of developing low carbon capabilities and solutions though feasibility and FEED studies.
- Policies in support of new technologies should have stated objectives with respect to competitive, relevant, high-value local content based on clear evidence of the highest value sectors relevant to the UK.

The oil and gas supply chain is recognised as worldleading in its field and it is critical that the UK invests and builds on this capability, ensuring it is wellequipped to deliver the energy transition. The UK oil and gas supply chain currently provides around twothirds of the content of UK oil and gas expenditure and has generated more than £12bn in export revenue per year. The companies in the UK supply chain are already starting to diversify into new technologies; however, without a broad pipeline of projects at pace, companies will redeploy their resources abroad to other markets and the UK will permanently lose an important industrial resource.

The supply chain may have a more prominent role to play in investment in new low-carbon technologies. For example, some elements of the investment could be led by supply chain and infrastructure consortia alongside traditional oil and gas businesses and other investors. This will help further develop leading capabilities in net zero technologies, helping to capture global work and grow export revenue. The industry skill set is essential to maintain UK comparative advantage in the energy transition. The supply chain expertise is required in CCUS and hydrogen but also in decommissioning of wind farms, the roll out of floating wind and in the emerging geothermal industry. Damage to the supply chain will delay the energy transition, offshoring activity on top of the social and economic damage. The industry has a track record in delivering offshore capital projects, so the industry is well placed to attract investment in energy transition.

Some initial work has been done in reviewing the energy supply chain (with deeper analysis anticipated) and its suitability to contribute to new investment in, for example, CCUS. This is summarised opposite.¹⁸

¹⁸ https://assets.ey.com/content/dam/ey-sites/ey-com/en_uk/news/2020/02/ey-review-of-the-uk-oilfield-services-industry.pdf [Figure 6]

UK ENERGY POLICY Driving the Transition



Figure 5: UKCS supply chain readiness for CCUS



Source: OGUK

To accelerate the transformation of the supply chain and help it pivot, the Government should consider making funds available to prepare capabilities and invest in the resources required for net-zero projects as well as ensuring those activities are embedded in UK communities, thereby bringing added benefits to local economies and job opportunities. Export and import of energy products and government support for energy transition will also depend on the terms of the implementation of the EU-UK TCA in the energy sector and future export finance arrangements. Considering the broad alignment between the Energy White Paper and the European Green Deal, there is an opportunity for the UK to take a leadership position with its European partners on Energy Transition and for the UK supply chain to build competitive advantage by maintaining connectivity with the rest of Europe.

The HMT net zero interim report also highlights the communities and workforce impacts of energy transition. Those impacts need to be carefully managed to guarantee the social acceptance of the energy transition. To support the world-class reputation that the UK oil and gas industry has established, there has been significant investment over the last few decades in developing the UK's talent base. In order to deliver the UK's net zero ambitions, there must be a similar concerted effort to both transition parts of the UK's existing oil and gas workforce to new roles and attract and nurture the next generation of talent.



5. The role of carbon pricing

"OGUK supports a competitive, economy-wide carbon price regime through the UK ETS"

- OGUK supports a competitive, economy-wide carbon price regime through the UK ETS.
- Where necessary in the early years of implementation, government should take measures to avoid potential volatility ensure orderly price formation early linking to EU ETS (i.e. by April 2022) or via the Cost Containment Mechanism.
- Industry would welcome the opportunity to explore potential Carbon Border Adjustment Mechanisms similar to those being considered by European Union and Canada.
- To remain competitive with other countries, the government should make ambitious use of ETS auction revenues to support economy wide decarbonisation objectives, including those of the oil and gas sector and in support of CCUS and hydrogen.

Carbon pricing is an essential component of energy policy and works well alongside direct (financial) incentives needed to launch initial investments in deeper decarbonisation projects. Carbon prices allow for a powerful long term price signal for both operational improvements and investment, and also provide a technology-neutral and efficient pathway to emerge which will progressively reduce the need for direct support.

The UK and devolved governments have now put in place a UK Emission Trading Scheme and the legislation is now being prepared so that the caps for 2020–30 can be set and for the initial auctions to take place in early 2021. The first compliance year will be completed via the verification and surrender process to be implemented in early 2022. Overall, this is a welcome decision in that an allowance-based scheme provides a long-term signal regarding the future for carbon prices and the flexibility provided by a trading-based scheme.

The UK ETS is still in its infancy. The government is yet to set the trajectory for the quantity of UK allowances to be issued. This will be a fine balance to call to ensure ambitious government decarbonisation targets are compatible with the impact on the wider economy. Any carbon pricing scheme needs to recognise that UK companies are competing in international markets, often against businesses without the same level of policy ambition or rigour in terms of monitoring and verification. HM Treasury's interim report showed very clearly the difference between carbon emissions on a territorial versus consumption basis, demonstrating that some "carbon leakage" has occurred via embedded emissions from imported products. This is also a risk in the oil and gas sector and analysis by the OGA has shown that the emission intensity of imports of liquified natural gas may be two or three times that of UK-based production.¹⁹

A number of mechanisms have been used to help address the carbon leakage issue and provide for a more level playing field. Historically, as part of EU ETS, certain sectors have been allocated some allowances free of charge up to a certain benchmark. However, the coverage of this process has been scaled back both in terms of the sectors being covered, and the proportion of required certificates allocated. The UK ETS will initially use the "carbon leakage list (CLL)" based on EU economic data with a review due in 2022. Gas production facilities were removed from the CLL for Phase IV and there are no certificates at all for any power generation offshore. As carbon prices continue to increase, this will have an increasing impact on the sector.

19 https://www.ogauthority.co.uk/news-publications/news/2020/north-sea-gas-has-lower-carbon-footprint-than-imported-lng/



Figure 6: UK emissions, territorial versus consumption basis



Source: Office for National Statistics (ONS).

Within the EU, other mitigating measures are beginning to take precedence over free allocation. Rather than allocating certificates for free, EU Member States are expected to auction certificates and there are both EU Commission and national funds available for emission reducing projects across all sectors, including electrification and carbon capture. ²⁰ These funds will be worth several billion euros per annum over the 2020–30 period.

The final possible set of measures to avoid carbon leakage are associated with border adjustments, provided these are established in compliance with both global and bilateral trade agreements. The EU has recently consulted on the structure of such measures and the possible sectors to be included in an initial phase. Again, this is something UK government may need to consider in due course.

Carbon price assumptions also affect government and regulatory decisions. HM Treasury recently published a revision to its Green Book which project and programme appraisal across government. Two notable changes regarding carbon emissions were signalled in the document. Firstly, government is expected to update its estimates of the social cost of carbon to reflect the establishment of the netzero objective in government appraisal. Secondly, HM Treasury suggest that the discount rate used when assessing projects aimed at future emission reduction should be substantially reduced so that these would be valued equally with immediate reductions.²¹ The EU has a centrally determined Innovation Fund of around €10 billion, as well as a requirement on EU Member States to use at least 50 per cent of auction revenues for energy and climate objectives.²²

Both these measures, if applied in government and elsewhere, substantially tilt the economics of capital investment in support of emission reduction. The OGA, in its revised Strategy, has also adjusted how emission values should be incorporated into the evaluation of economic recovery.

Although these changes in government appraisal are recognised, these may not necessarily be in line with the commercial evaluation of investment projects or companies' own assessment of the future markets. These should therefore be considered as a basis for discussion rather than a regulatory imposition on commercial decision making.

²⁰ https://ec.europa.eu/clima/policies/ets/auctioning_en

²¹ https://www.gov.uk/government/publications/final-report-of-the-2020-green-book-review

²² https://ec.europa.eu/clima/policies/innovation-fund_en



6. Delivering a doubling of energy sector investment

"Stable and predictable policy frameworks will be needed to realise £50bn per year of energy sector investment, as set out by the CCC"

- To deliver the net-zero objective, energy sector investment will need to double permanently from current levels to around £50billion per annum. Experience demonstrates that stable and predictable regulatory and policy frameworks are required to encourage new investors
- OGUK supports the phased implementation of the disclosure framework provided by the Task Force on Climate-related Financial Disclosures.

The CCC report clearly identified the scope of the investment challenge in reaching the net-zero objective. Energy sector investment is likely to roughly double from the current levels of £20-25bn per annum to around £50bn. This increase in investment will likely be a permanent feature of the economy since, once installed, the additional assets will need to be operated, maintained and eventually decommissioned and replaced. However, the incremental impact will be offset to the extent that some of the new technologies now being made available also may have lower maintenance costs or higher efficiencies, such as electric vehicles. Finally, the cost of financing investment has fallen significantly in real terms since the financial crisis in 2008 and due to other wider long-term trends in the economy. These changes will also have consequences

Figure 7: UK capital investment 2019



Source: OGUK

for the wider macro-economic outcomes in terms of taxes and the government balance sheet and also, to the extent that these costs need to be reflected in energy bills, on different groups of consumers.

The HM Treasury interim report on net zero identified a number of market failures that could prevent investment from reaching the required levels across a range of different technologies. Many of these are well established themes in standard economic models and are discussed in the Treasury review of the Green Book criteria such as:

- Externalities
- Uncertainty, including around policy development
- Economies of scale and scope
- Dynamic market failures and multiple equilibria
- Local and regional impacts

Although most investment is expected to be from the private sector, this could indicate different types of government intervention in energy markets than has been typical in the UK.

The wider range of market failures is particularly relevant to new and emerging sectors such as CCUS, hydrogen and electric vehicles. As a result, it is unlikely that relying on a single aspect of policy, for example carbon prices, will be successful in the early stages of technology development. Instead, as set out in the chart below, different types of intervention will be needed as the adoption cycle for technologies progresses.

OGUK





Oil and gas companies can play an important role in harnessing capital markets. The UK oil and gas industry has consistently been able to deliver investment and ongoing expenditure rates of around £10-15bn per annum whilst managing a range of complicated offshore engineering projects and programmes.²³ As well as continuing to sustain the required rate of oil and gas investment into the future, companies are now taking a leading role in the extension of the offshore wind sector towards the government's 40GW target whilst also investing in CCUS and hydrogen.

Transitioning to net zero also creates opportunities for the energy sector and the wider UK economy. The sheer volume of capital required builds an opportunity for a variety of funding mechanisms and business models to be implemented to suit investor risk appetite, some of which are already utilised in the energy sector and specifically the ring-fenced sector today.

As an example, one of the features of the UK upstream regime has been the bespoke tax framework which was set up to support investment in 2014.²⁴ (In simple terms, this allowed for investment inside the tax ring fence to be depreciated more quickly whilst at the same time the government take of earnings was higher). This contrasts somewhat with the standard regime for long-lived assets elsewhere that have a much slower depreciation rate. A greater level of alignment between the fiscal treatment of

capital across the energy sector may have a role to play in attracting non-ring fence investment.

Investors across the board, in response to the requirements of their individual clients and regulatory bodies, are looking for a far wider range of non-financial information from businesses with respect to their alignment to climate objectives. Early implementation of these principles in the UK will help maintain reputation as a global green finance location. Attainable and appropriate climate disclosure targets, such as the framework set out by the Task Force on Climate Related Financial Disclosure (TCFD) are already form a strong basis and these are already being used by businesses when compiling reports for investors on the Environment, Social and Governance (ESG) attributes.

UK oil and gas operations are often part of global groups and the boundary for some of this reporting would normally be expected to reflect this. It must be ensured that the overall green finance and wider UK fiscal policy framework is able to continue to incentivise capital investment in both oil and gas and new energy sources throughout the energy transition. To do so, the industry is working with the OGA and investor groups on an appropriate template for reporting such indicators for a particular UK audience.

²³ https://oilandgasuk.co.uk/product/economic-report/

²⁴ Driving investment: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/382785/PU1721_ Driving_investment_-a_plan_to_reform_the_oil_and_gas_fiscal_regime.pdf



7. Energy security and affordable bills

"The UK should avoid being locked into - or out of - any specific technology or fuel type; to be successful, the transition of the energy industry must be future proof and resilient"

- The analysis of the CCC sixth carbon budget confirms that multiple technology options will be needed at scale in support of the net-zero objective. There will be a significant long-term role for decarbonised gases and low carbon liquid fuels.
- To retain public support for the Energy Transition, government must ensure continued security of supply at existing levels both during and after transition and allow for consumers to choose decarbonised solutions that meet their needs and minimise disruption.
- Oil and gas consumption during the energy transition will be significant and the UKCS is capable of meeting the majority of these needs from indigenous resources. Continued licencing of activity, overseen by the OGA under the new net zero compatible Strategy underpins such an approach.

Energy scenarios

The CCC has developed a scenario approach to capture the range of possible outcomes for the energy mix and associated demand and supply by 2050. This highlights that a range of technology options will need to be developed. Other stakeholders have also developed similar pathways, notably the National Grid Future Energy Scenarios. Some key features of the CCC scenarios including the main elements relevant to the oil and gas sector, are set out in the table below. This highlights that a range of technology options will need to be developed to continue to meet consumers' needs. OGUK would also note that all scenarios confirm the need for substantial oil and gas consumption which is broadly similar to the UK's remaining reserves as estimated by the OGA. Furthermore, the IEA predicts a fastgrowing petrochemical and feedstock demand for oil and gas at global level.

The wider lesson from this scenario approach, which is also reflected in the White Paper, demonstrates that it is important not to lock the UK into (or out of) any specific technology or fuel type or to assume that there is a uniform set of technology solutions. To be successful, the transition of the energy industry must be future proof and resilient. The regulatory framework therefore also has to remain flexible to enable the industry to adapt to any scenario to maintain energy security while building a platform for net zero industry.

Maintaining optionality for consumers and incentivising competition to reduce the full cycle carbon footprint is therefore important in the energy transition and supportive of consumer interests. As considerable changes will, in any case, be required to the cost of energy and the way it is used, there is a need to make any other aspects of the transition as simple as possible and to minimise associated disruption.



	Selected CCC Energy Scenarios ²⁵				
Impact on energy sector	"Balance"	"Headwind"	"Widespread Engagement"	"Widespread Innovation"	
Manufacturing and construction sector	electrification + H2 + CCUS	Blue H2 dominant + CCS	Electrification dominant Some green and blue H2	Electrification + green H2 High-rate CCS	
Renewable share of Power Generation	80%	75% low demand	85%	80% low demand	
Hydrogen production	Blue then Green Some BECCS	Blue H2 dominant	Green H2 Low demand	Green H2 dominant	
GHG removal ²⁶	BECCS + some DACCS	Electrification dominant	BECCS + No DACCS	BECCS + DACCS	
Estimated Cumulative UK Oil and Gas Demand (2020-2050) ²⁷	Oil – 7.4 Billion boe Gas – 10 Billion boe Total: 17.4	Oil – 7.8 Billion boe Gas – 13 Billion boe Total: 20.8	Oil – 7.4 Billion boe Gas – 10 Billion boe Total: 17.4	Oil – 7.3 Billion boe Gas – 10 Billion boe Total: 17.3	

Source: OGUK derived from CCC Sixth Carbon Budget

Consumer impact and behavioural change

Retaining energy security for the UK and managing household consumers' costs and risk of disruption will remain critical throughout the energy transition. Consumers will already be asked to make considerable behavioural changes and support for this will dissipate if the energy system as a whole becomes less reliable and resilient. There will also be a considerable period during the transition where existing infrastructure will need to be maintained, at current levels of reliability, alongside new or expanded networks being developed. This is also likely to add to overall energy costs to some extent.

Energy costs are, therefore, likely to increase somewhat as end user bills will continue to be one of the key revenue streams used to fund additional investment in low-carbon technologies, as is already the case for renewable energy production. HM Treasury noted that £11.4bn was allocated through fiscally neutral spend, such as Contracts for Difference, through consumer bills in 2019–20. However, the CCC has modelled the long-term cost of the transition to net zero at less than 1 per cent of GDP. This takes account both of the incremental investment requirements discussed above and potential savings associated with particular technologies compared to today.

Against this can be set the benefits of, for example, air quality and health and the avoided costs of adaptation to climate change. Overall, it appears that the costs of transition are manageable. However, such an outcome is dependent on a manged transition and for example, the avoidance of systemic negative financial impacts.²⁸

At the same time, consumers will be required to adopt different technologies and behaviours. Although there is a place for minimum standards, government should be cautious about basing too much of the burden on obligations or outright prohibitions. This is particularly true for sectors that are harder to decarbonise and where consumers' energy needs are bespoke, or technologies are

²⁵ There is an extreme scenario "Tailwind" aiming at net zero prior to 2050 (2042)

²⁶ BECCS: Bio Energy CCUS, DACCS: Direct Air Carbon Capture with CCUS

²⁷ OGA estimates UK North Sea remaining reserves to be up to 10 to 20 Billions boe; https://www.ogauthority.co.uk/data-centre/datadownloads-and-publications/reserves-and-resources/

^{28 &#}x27;Transition in thinking: The impact of climate change on the UK banking sector', Bank of England, September 2018.

OGUK

still developing. There is also a large educational element associated with changing behaviours in a way that is acceptable and sustainable. This requires honest communication about the choices associated with different technologies and avoiding overstating or understating their potential impacts and performance.

Role of future oil and gas production

It is crucial that the UK can maximise indigenous resource opportunities consistent with the new OGA Strategy and therefore the net zero objective. This approach maintains energy sovereignty and security and provides a sound economic basis for investment in new technology. The central necessity of the UK maintaining indigenous resource opportunities, and therefore energy sovereignty and security, was recognised by the CCC in its Sixth Carbon Budget report and in the terms of reference published by BEIS for the current Licensing Review. The White Paper likewise recognises that projected demand for oil and gas would continue for "decades to come" albeit at lower levels than today, while also highlighting the importance of the sector to the goals of robust energy security and the wider economy.

As well as the benefits in terms of energy policy objectives, the UK oil and gas industry brings a wide range of social and economic benefits:

- Supporting around 270,000 jobs in communities across the country
- Contribution to UK tax revenues, estimated at almost £5bn in the next 5 years and over £350bn over the last five decades
- Important industrial capabilities, embedded in the sectors' world-class supply chain, that will be required to support the development of net zero solutions at scale - such as CCUS and hydrogen

The industry has already been through several transformative process cycles and continues to demonstrate its capacity to adapt to new challenges. Notably, it has enabled the United Kingdom to reduce its overall carbon footprint by making possible the substitution of coal by gas and remained competitive against other major international basins.

A stable and robust licencing framework is required to maintain the flow of investment in exploration and development of oil and gas on the UKCS. New exploration and development are key to meeting the objective of a fair and orderly transition and to support oil and gas demand to 2050 and beyond. This will enable the supply chain to support energy transition, while retaining the existing jobs in oil and gas and expertise which is crucial for the development of the indigenous CCUS and hydrogen industries.

To maintain its licence to operate, UK production needs to lead the way and demonstrate action and commitment to emissions reduction, especially as we trade in international markets. Ambitious emission reduction targets and enabling electrification of offshore assets in the 2020s are included in the NSTD. We also continuing to work with the OGA on the implementation of the revised OGA Strategy which entered into force in February 2021.

OGUK

UK ENERGY POLICY *Driving the Transition*



oilandgasuk.co.uk



© 2021 The UK Oil and Gas Industry Association Limited, trading as OGUK