

Green Recovery after COVID-19

Recommendations about Oil and Gas in the United Kingdom

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Executive Summary

Climate change is predicted to cause annually an extra 250,000 worldwide deaths between 2030 and 2050 in addition to critically threatening livelihoods and biodiversity. The 2015 Paris Agreement was a landmark commitment on a near-global scale to limit climate warming since pre-industrial levels to below 2 °C to prevent catastrophic damage, pursuing the target of 1.5 °C. However, by the end of 2018, only 21% of the global 'carbon budget' for limiting climate warming to 1.5 °C remained. It is clear that the pace of transition must be accelerated greatly to resolve this, which will involve unconventional, binding policies, particularly for the oil and gas industry.

The oil and gas industry is a major contributor historically and presently to greenhouse gas (GHG) emissions. This is both directly, in the extraction, refining and transport of raw materials, and far more so indirectly, in supplying energy and raw materials for commercial and individual use. The COVID-19 crisis has seen the oil and gas industry, and interdependent industries such as transport, take a severe hit that is likely to have long-term consequences. For example, as work patterns change, with the rise of remote work and the technology that accompanies it, international travel could be seen as largely unnecessary for many firms. Companies may even decide to reduce the risk of far-flung supply chains and bring them closer to home.

The direction that the UK government takes during and after the COVID-19 crisis will be key in ensuring a green economic recovery that supports struggling industries whilst accelerating the transition, which are not entirely mutually exclusive if dealt with appropriately. In fact, the impact that human activity has on the environment has been highlighted for many people via the media and personal observation during the COVID-19 crisis. There are unprecedented strong public opinions amongst the people of the UK to reduce emissions. It is essential that history does not repeat itself in the form of a carbon-intensive economic recovery as experienced after the 2008 financial crisis.

To achieve this in the short-term, redirection of subsidies away from carbon-intensive industries, as well as away from fossil fuels to renewable energy sources, will be critical. Alongside this, policies that encourage biofuel use, investment in energy efficient buildings, and changes to existing infrastructure to support a greener energy portfolio are needed. In the mid-term, policies to reduce fugitive gas, encourage an appropriate level of carbon offsetting, change to transport usage, and electric vehicles adoption will be significant. Long-term policies should take the form of monitoring these short and medium-term policies.

In the past, the UK carbon tax, introduced in 2013, has been credited with the dramatic transition away from coal, the most polluting fossil fuel. Such accomplishments prove that government intervention is impactful and necessary and gives hope that the policies such as those we recommend in this policy brief will be considered carefully.

Background of the UK Oil and Gas Sector

Impact of COVID-19

With the onset of the COVID-19 pandemic in the UK in early 2020, all business sectors have felt an impact, and the Oil and Gas industry is no exception. On its current course and speed, the industry could now be entering an era defined by intense competition, declining demand, investor scepticism, and increasing public and government pressure regarding impact on climate and the environment¹.

In the last 35 years, oil and gas demand has only dipped in two years, while in the first six months of 2020, it is estimated that it may plunge by more than 20%. More specifically, the International Energy Agency (IEA) forecast in June 2020 that oil demand in 2020 is expected to fall by 8.1 million barrels per day, the largest in history, before recovering to 5.7 millions of barrels per day in 2021². Gas, meanwhile, has seen a demand drop of 5-10% versus pre crisis growth projections³. This has created a consequent imbalance in supply and demand which has, in turn, led to reductions in commodity price. The price of Brent crude oil has fallen by over 55% since the start of 2020, having averaged \$64.3/bbl in 2019 and on 19 March 2020, falling below \$30/bbl, marking the lowest price since early 2016⁴. To minimize damage, OPEC producers and allies have agreed to cut supply by about 10% starting in May 2020⁵, with producers hoping this move will help to dampen the damage the fall in demand of oil and gas has caused on the industry. However, Mike Sommers of the American Petroleum Institute forecasts gloom: "We are not going to fully recover until we are through corona"⁶.

Furthermore, as lockdowns ease and the world begins to reopen, it is likely that more inefficient oil and gas companies will fold over the course of 2020, with some wells being too costly to reopen. At the time of writing, that is July 2020, oil hovers at \$40 per barrel⁷, which gives renewable projects a viable chance at rivaling the returns of a new oil field, possibly leading to more wary oil field investors⁸. Indeed, while oil is normally seen by investors as a safe investment (with oil companies traditionally enjoying Returns on Equity as high as 25%⁹ and oil prices hovering around \$100/barrel) in July 2020, ROE on oil averages at just below 10%, trending downwards¹⁰. This, in turn, has had the significant consequence of rendering the ROE for oil and offshore renewables largely equivalent; with wind at 11%; onshore wind 9%; and photovoltaic solar 8%¹¹. A structural advantage of renewables, including

¹McKinsey & Co (2020, May) Oil and gas after COVID-19. Retrieved from <https://www.mckinsey.com/industries/oil-and-gas/our-insights/oil-and-gas-after-covid-19-the-day-of-reckoning-or-a-new-age-of-opportunity>

²IEA (2020, June) Oil Market Report. Retrieved from <https://www.iea.org/reports/oil-market-report-june-2020>

³McKinsey & Co (2020, May) Oil and gas after COVID-19. Retrieved from <https://www.mckinsey.com/industries/oil-and-gas/our-insights/oil-and-gas-after-covid-19-the-day-of-reckoning-or-a-new-age-of-opportunity>

⁴OGUK (2020, March) Business Outlook 2020 - Markets and Investment. Retrieved from <https://oilandgasuk.co.uk/wp-content/uploads/2020/03/OGUK-Business-Outlook-2020-Markets-Investments.pdf>

⁵Record deal to cut output ends price war (2020, April). Retrieved from <https://www.bbc.co.uk/news/business-52264546>

⁶The Economist (2020, Apr 8) An unprecedented plunge in oil demand will turn the industry upside down. Retrieved from <https://www.economist.com/briefing/2020/04/08/an-unprecedented-plunge-in-oil-demand-will-turn-the-industry-upside-down>

⁷Oilprice (2020, July 2) Crude Oil Prices Today. Retrieved from <https://oilprice.com/>

⁸Kretzschmar, V. Could clean energy be the winner in the oil price war?. Retrieved July 2, 2020, from <https://www.woodmac.com/news/opinion/could-clean-energy-be-the-winner-in-the-oil-price-war/>

⁹Ambrose, J. (2020, May 19). How renewable energy could power Britain's economic recovery. Retrieved from <https://www.theguardian.com/environment/2020/may/19/how-renewable-energy-could-power-britains-economic-recovery>

¹⁰Bullard, N. (2020, May 07). The New Investor Math in the Wake of the Oil Market Crash. Retrieved from <https://www.bloomberg.com/news/articles/2020-05-07/the-new-investor-math-in-the-wake-of-the-oil-market-crash>

¹¹Ibid.

minimal long term operating costs (with the biggest costs for utility scale wind, solar, and battery storage projects being upfront capital¹²) and their priority access to grids, further supports investment into this technology. While the oil and gas industry nevertheless continues to dominate the energy sector, research suggests that without fundamental change, it will be difficult for it to return to the historically maintained¹³ attractive industry performance.

In addition to this, employment within the industry and indeed, across the country as a whole, has taken a hit, as many firms have cut jobs or frozen recruitment. As of the 19th of May, the UK's unemployment rate stands at 3.9%, with 5.8% seeking unemployment benefits; a 70% increase on 2019, indicating a large population of furloughed workers at risk of permanent unemployment¹⁴. Looking to the future, expectations are low, with the unemployment forecast at 10% in the second quarter of 2020, decreasing over the course of the following year¹⁵. Within the UK oil and gas industry itself, a loss of as many as 30,000 jobs over the next year and a half is projected¹⁶.

The Context of Climate Change Issues

Ultimately however, the resultant threat on jobs in the Oil and Gas industry is relatively lower than expected, with specific regards to COVID-19, as only 19% of jobs in the sector are at risk¹⁷. Nonetheless, climate change continues to be the key long term threat to this carbon-intensive industry.

As atmospheric greenhouse gas concentrations continue to rise, temperatures have increased by around 1°C¹⁸ since pre-industrial times. Boreal forests are now burning at the highest rate in 10,000 years¹⁹. Climate change will cause an extra 250,000 deaths worldwide every year between 2030 and 2050²⁰. Heatwaves will become more common²¹ while tropical cyclones are 8% more likely now than they were in 1979²². There will be economic consequences - at least \$67 billion of the economic cost of Hurricane Harvey was directly caused by climate change²³. In the UK, flooding due to rising sea levels will be a significant issue. By the 2080s, 1.2 million UK homes will be at 0.5% or higher annual

¹² Russell, C. (2020, April 06). Renewable energy wins over oil and gas in post-coronavirus world: Russell. Retrieved from <https://www.reuters.com/article/us-column-russell-health-coronavirus-cl/renewable-energy-wins-over-oil-and-gas-in-post-coronavirus-world-russell-idUSKBN21P0L5>

¹³ McKinsey & Co (2020, May) Oil and gas after COVID-19. Retrieved from <https://www.mckinsey.com/industries/oil-and-gas/our-insights/oil-and-gas-after-covid-19-the-day-of-reckoning-or-a-new-age-of-opportunity>

¹⁴ BBC. (2020, May 19). Coronavirus: Unemployment benefit claims spike and big sales expected. Retrieved from <https://www.bbc.com/news/uk-52714814>

¹⁵ Clark, D. (2020, May 29). Coronavirus: UK unemployment forecast 2020. Retrieved from <https://www.statista.com/statistics/1107870/uk-unemployment-forecast/>

¹⁶ Robertson, H. (2020, April 28). Demand collapse puts 30,000 UK oil and gas jobs at risk. Retrieved from <https://www.worldoil.com/news/2020/4/28/demand-collapse-puts-30-000-uk-oil-and-gas-jobs-at-risk>

¹⁷ Allas, T., Canal, M., & Hunt, V., 2020. Retrieved from <https://www.mckinsey.com/industries/public-sector/our-insights/covid-19-in-the-united-kingdom-assessing-jobs-at-risk-and-the-impact-on-people-and-places>

¹⁸ Met Office. (2015, November). Global climate in context as the world approaches 1°C above pre-industrial for the first time. Retrieved from <https://www.metoffice.gov.uk/research/news/2015/global-average-temperature-2015>

¹⁹ Kelly, R. et al. (2013). Recent burning of boreal forests exceeds fire regime limits of the past 10,000 years. Proceedings of the National Academy of Sciences Jul 2013, 201305069; DOI: 10.1073/pnas.1305069110

²⁰ World Health Organization. (2014). Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s. World Health Organization. Retrieved from <https://apps.who.int/iris/handle/10665/134014>

²¹ World Weather Attribution. (2019). Human contribution to the record-breaking July 2019 heat wave in Western Europe. Retrieved from <https://www.worldweatherattribution.org/wp-content/uploads/July2019heatwave.pdf>

²² Kossin, J. et al. (2020). Global increase in major tropical cyclone exceedance probability over the past four decades. *PNAS*, 117(22), 11975-11980.

²³ Frame, D., Wehner, M., & Rosier, S. (2020). The economic costs of Hurricane Harvey attributable to climate change. *Climate Change*, 160(2), 271-281.

risk of flooding²⁴ while damage from coastal flooding will cost 0.4% of UK GDP in the 2080s²⁵. Biodiversity may also be severely impacted²⁶, leading to a loss of economically-valuable ecosystem services. Unexpected consequences are also worth considering - a long-dormant El Niño weather pattern may resume in the Indian Ocean²⁷ while increased flooding could dramatically reduce the percentage of UK ambulance calls answered in the recommended time frame²⁸.

Ironically, however, COVID-19 has worked to slow down the rate of damage of some of these environmental risks. 2020 has seen an unprecedented reduction in CO2 emissions²⁹; with no war, recession or previous pandemic having caused such a dramatic reduction in carbon output over the past century as COVID-19 has in just a few short months. The IEA projects an estimated total global reduction in fossil fuel emissions of almost 2.6bn tonnes of CO2 (GtCO2) over 2020 (an 8% reduction) dominated by the decreased oil and coal consumption, with the daily global CO2 emissions having decreased by -17% (-11 to -25% for +/- 1%) by early April 2020, compared with the mean 2019 levels³⁰. On the other hand, Carbon Brief's findings show that annual average CO2 concentrations will continue to increase through this year (estimated 2.48ppm), despite the current reduction in emissions. This increase is 0.32ppm smaller than if there had been no lockdown; that is to say, according to Carbon Brief, though global emissions are smaller, they are still continuing to increase – just at a slower rate³¹. While these figures are purely estimates and drawing any hard conclusions at this point would be to ignore the dynamic and unpredictable nature of the current global situation, it is largely agreed that emissions will quickly rebound if the responses to the pandemic do not create lasting, structural change in our society towards net-zero emissions.

For a reasonable chance of preventing global warming exceeding 1.5 °C or 2 °C (an increase above this is considered dangerous), the net quantity of carbon released into the atmosphere through the burning of non-renewable energy sources must be limited. The value of the limit is known as the carbon budget and it is measured either in mass of carbon released or mass of carbon dioxide released³². In 2009, the total carbon budget for a 75% probability of limiting warming to 2 °C was estimated to be 1000 gigatonnes of carbon dioxide (for a 50% probability it was 1440 gigatonnes of carbon dioxide)³³. As of mid-June 2020, the remaining carbon budget for 2 °C was 657 gigatonnes of carbon dioxide³⁴. According to another estimate, by the end of 2018, 79% of the 1.5 °C carbon budget had been used up³⁵. The IPCC 2018 Special Report on 1.5 °C stated that the remaining carbon

²⁴ Committee on Climate Change. (2018). Managing the coast in a changing climate. Retrieved from <https://www.theccc.org.uk/publication/managing-the-coast-in-a-changing-climate/>

²⁵ Government Office for Science. (2004). Foresight Future Flooding Executive Summary. Retrieved from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/300332/04-947-flooding-summary.pdf

²⁶ Trisos, C.H., Merow, C. & Pigot, A.L. The projected timing of abrupt ecological disruption from climate change. *Nature* 580, 496–501 (2020). <https://doi.org/10.1038/s41586-020-2189-9>

²⁷ Thirumalai, K., Dinezio, P., Tierney, J., & Puy, M. (2019). An El Niño Mode in the Glacial Indian Ocean? *Paleoceanography and Paleoclimatology*, 34(8). 1316-1327.

²⁸ Yu, D., Yin, J., Wilby, R.L. *et al.* Disruption of emergency response to vulnerable populations during floods. *Nat Sustain* (2020). <https://doi.org/10.1038/s41893-020-0516-7>

²⁹ Le Quéré, C., Jackson, R.B., Jones, M.W. *et al.* Temporary reduction in daily global CO2 emissions during the COVID-19 forced confinement (2020). *Nat. Clim. Chang.* 10, 647–653 <https://doi.org/10.1038/s41558-020-0797-x>

³⁰ Betts, R., Jones, C., Jin, Y., Keeling, R., Kennedy, J., Knight, J., & Scaife, A. (2020, May 07). Analysis: What impact will the coronavirus pandemic have on atmospheric CO2? Retrieved from

<https://www.carbonbrief.org/analysis-what-impact-will-the-coronavirus-pandemic-have-on-atmospheric-co2>

³¹ *Ibid.*

³² Allen, M., Frame, D., Huntingford, C. *et al.* Warming caused by cumulative carbon emissions towards the trillionth tonne. *Nature* 458, 1163–1166 (2009). <https://doi.org/10.1038/nature08019>

³³ Meinshausen, M., Meinshausen, N., Hare, W. *et al.* Greenhouse-gas emission targets for limiting global warming to 2 °C. *Nature* 458, 1158–1162 (2009). <https://doi.org/10.1038/nature08017>

³⁴ Evershed, N. (2017, January 19). Carbon countdown clock: how much of the world's carbon budget have we spent? *The Guardian*. Retrieved from

<https://www.theguardian.com/environment/datablog/2017/jan/19/carbon-countdown-clock-how-much-of-the-worlds-carbon-budget-have-we-spent>

³⁵ Borunda, A. (2018, December 5). High stakes for the planet as carbon emissions rise again. *National Geographic*. Retrieved from <https://www.nationalgeographic.com/environment/2018/12/climate-geoengineering-series-intro/>

budget (calculated using GMST) was no more than 570 gigatonnes of carbon dioxide for a 66% probability of keeping warming to below 1.5 °C; for a 50% probability the carbon budget increases to 770 gigatonnes carbon dioxide³⁶. It must be kept in mind, however, that these values were calculated some time ago and that carbon emissions have not stopped in the intervening period. It is therefore advisable for carbon emissions to be limited to as far below the carbon budgets mentioned as possible.

Governments are likely to mobilise significant spending in response to significantly weakened economies caused by the global coronavirus pandemic. The pandemic has had a tragic impact on many human lives and has had a huge cost on the economy. It has also acted as a reminder of what must be done in the future. The worldwide shutdown has resulted in significantly lower global emissions, which are projected to fall by 8% in 2020. Dramatic decreases in emissions in this region are needed over a decade to be roughly in line with a pathway to 1.5C³⁷. There are also valuable lessons to be learned from the 2008-2009 global financial crisis. After the crisis, governments focused on restarting their economies through carbon-intensive stimulus spending and CO2 emissions increased sharply reaching pre-crisis levels.

Current Status of the UK Oil and Gas Sector

Despite demand for oil and gas having fallen by 19% since 2000, the industry today provides more than 75% of the UK's total primary energy³⁸ (that is, energy harvested from original, unconverted natural resources). It is thus indisputable that the oil and gas industry plays a significant role in meeting the country's current energy needs and that it will continue to be a key contributor to the energy mix of tomorrow. In addition to this, the industry brings widespread economic benefits, contributing around £24 billion to the UK GDP (1.2% of the UK total) in 2018 and supporting approximately 270,000 jobs across the country in 2019³⁹. Within this, Shell, Total and BP are the most notable players, ranking highest on market capitalisation in the London Stock Exchange⁴⁰. The industry is, however, responsible for a large proportion (directly and indirectly) of the UK's GHG emissions; with 3% of the country's total GHG emissions generated from offshore oil and gas production itself and around half of total global emissions from the wider economy attributable to their use of oil and gas products⁴¹ (given the fact that oil and gas remain crucial in providing electricity, heating our homes, powering our industries, businesses and hospitals and fuelling our transport systems and manufacturing processes⁴²).

Lockdown measures put in place to control the spread of COVID-19, however, have led to a drastic change in energy use and triggered an unprecedented shock to oil and gas demand within the UK.

³⁶ Rogelj, J., D. Shindell, K. Jiang, S. Fifita, P. Forster, V. Ginzburg, C. Handa, H. Khesghi, S. Kobayashi, E. Kriegler, L. Mundaca, R. Séférian, and M.V. Vilariño, 2018: Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development. In: *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press.

³⁷ O'Callaghan, B., & Hepburn, C. (2020, May 05). Leading economists: Green coronavirus recovery also better for economy. Retrieved from <https://www.carbonbrief.org/leading-economists-green-coronavirus-recovery-also-better-for-economy>

³⁸ OUGK. (n.d.). Key Facts - Energy Provider. Retrieved July 2, 2020, from <https://oilandgasuk.co.uk/key-facts/energy-provider/>

³⁹ OUGK (2019). Economic Report 2019. Retrieved from <https://oilandgasuk.co.uk/wp-content/uploads/2019/09/Economic-Report-2019-OGUK.pdf>

⁴⁰ Cherowbrier, J. (2020, June 09). Oil and gas companies on LSE 2020. Retrieved from <https://www.statista.com/statistics/889600/oil-and-gas-companies-on-lse/>

⁴¹ CO2 abatement: Exploring options for oil and natural gas companies (2010, February). Retrieved from <https://www.mckinsey.com/industries/oil-and-gas/our-insights/co2-abatement-exploring-options-for-oil-and-natural-gas-companies>

⁴² Business outlook 2020 - Security and Supply (2020, April). Retrieved from <https://oilandgasuk.co.uk/wp-content/uploads/2020/04/OGUK-Business-Outlook-2020-Security-of-Supply.pdf>

Changes in daily activity in the UK are most stark within the aviation and surface transport sector; with travel bans and the confinement of people to their homes having resulted in a 50% drop in road transport activity in 2020 (compared to its 2019 level) and an equivalent reduction in the number of flights across Europe⁴³.

In terms of sustainable development within the industry, the Committee on Climate Change's call-to-action in May 2019, which recommends that the UK become the global lead and aim to achieve net-zero greenhouse gas emissions by 2050⁴⁴, has encouraged the oil and gas industry to redouble its efforts in contributing to this future. Indeed, the UK's upstream oil and gas industry was one of the first major sectors of the country's economy to embrace the 2050 target when, in September 2019, on behalf of the industry, OGUK outlined its plan (in their 'Roadmap 2035: A Blueprint for Net Zero') for turning these decarbonisation targets into a reality⁴⁵. However, the economic strain caused by the pandemic, on the government and public alike, may tempt the government to restore 'business as usual' and downplay its commitment to Net Zero, with less spending on sustainability projects (such as development of renewable energy sources and fuel-efficient transportation) in its short-term effort to reinvigorate the economy⁴⁶. That said, a study led by 'Carbon Brief' suggests that post COVID-19 recovery-spending on climate-friendly 'green' policy initiatives may not only help achieve a net-zero future but also offer the best economic returns for government spending⁴⁷.

As well as the economic case for a green recovery, there is a strong social and political case, particularly relating to the UK's young people who will be strongly impacted by climate change and are of course aware of this. In a BBC survey of UK children aged 8-16, 80% were 'worried' about climate change, while 17% reported that concerns had affected their 'sleeping and eating habits'⁴⁸. Over 800,000 UK 11-18 year olds voted in the UK Youth Parliament's Make Your Mark campaign poll in 2019, with climate change overtaking knife crime in the results as the issue considered the most pressing⁴⁹. Climate change mitigation is important for economic and social reasons; it may also win political support. In the September 2019 general strike for climate, between 300,000 and 350,000 UK protestors of all ages took part, but there was an especially strong youth-presence⁵⁰. The Conservative Party in particular should consider its record on this issue. Before the 2017 general election, Friends of the Earth analysed the manifestos of several parties on environmental policy. Out of 45, the Labour Party came highest with a score of 35, followed by the Green Party and then the Liberal Democrats (both with a score of 30 or above). The Conservatives, on the other hand, were awarded just 5.5 out of 45⁵¹. It is worth noting that in this same election, despite its outcome, every age group under 40 years old showed majority support for Labour, with nearly three times more 20-24 year olds voting for Labour than for the Conservatives⁵². If the Conservative Party wishes to win the

⁴³ McGrath (2020)

⁴⁴ 'Net Zero – The UK's contribution to stopping global warming (2019, May). Retrieved from

<https://www.theccc.org.uk/wp-content/uploads/2019/05/Net-Zero-The-UKs-contribution-to-stopping-global-warming.pdf>

⁴⁵ OGUK Production emissions targets report 2020 (2020, June). Retrieved from

<https://oilandgasuk.co.uk/wp-content/uploads/2020/06/OGUK-Production-Emissions-Targets-Report-2020.pdf>

⁴⁶ A green stimulus package for a post-Covid UK (2020, May). Retrieved from

<https://www.zero.cam.ac.uk/stories/green-stimulus-package-post-covid-uk>

⁴⁷ Leading economists: Green coronavirus recovery also better for the economy (2020, May). Retrieved from

<https://www.carbonbrief.org/leading-economists-green-coronavirus-recovery-also-better-for-economy>

⁴⁸ Climate anxiety: Survey for BBC Newsround shows children losing sleep over climate change and the environment. *BBC Newsround*. <https://bbc.co.uk/newsround/51451737>

⁴⁹ Afflick, R. (2019, October 25). Climate emergency declared biggest issue facing young people. *British Youth Council*.

Retrieved from <https://www.byc.org.uk/news/2019/climate-emergency-declared-biggest-issue-facing-young-people>

⁵⁰ Taylor, M., & Watts, J. (2019, September 20). 'Enough is enough': biggest-ever climate protest sweeps UK. *The Guardian*.

Retrieved from <https://www.theguardian.com/environment/2019/sep/20/enough-biggest-ever-climate-protest-uk>

⁵¹ Friends of the Earth UK. (2019, December 7). Election manifestos: Labour tops Friends of the Earth's climate and nature league table. *Friends of the Earth*. Retrieved from

<https://friendsoftheearth.uk/general-election/election-manifestos-labour-tops-friends-earths-climate-and-nature-league-table>

⁵² Curtis, C. (2017, June 13). How Britain voted at the 2017 general election. *YouGov*. Retrieved from

<https://yougov.co.uk/topics/politics/articles-reports/2017/06/13/how-britain-voted-2017-general-election>

support of younger people, it must prioritise the issues that matter to them. This includes acting on climate change.

Existing Green Policies

Existing green policies for the oil and gas sector are lacking. While OUGK has committed to becoming net-zero by 2050⁵³, oil and gas extraction has been consistently absent from government climate policies and the UK continues to license new oil and gas exploration and development in the North Sea until it is no longer able to do so due to resource constraints. Currently, the government continues to prioritise the maximisation of oil and gas extraction until it is uneconomic to continue to extract⁵⁴. To achieve net-zero within the timeframe, government intervention and support will be necessary. Apart from a formal commitment of the government to a shift towards energy sources with less carbon emissions and potentially a reliance on nuclear and renewable power generation⁵⁵, there has been a lack of direction from the government on how it wants to reduce its dependence on the oil and gas industry for the UK's energy mix; for instance, the Energy White Paper that is meant to detail the UK's net-zero energy strategy has been continuously delayed⁵⁶.

Carbon taxes and the Emission Trading System (ETS) exist in over 40 countries as well as in some regions and cities. While a majority of economists agree that carbon pricing is a cost-effective way of curbing emissions, it is politically hard to set high enough taxes or capping emissions such that there is a deep reduction in emissions⁵⁷. There exists a trade-off for voters: requiring customers to pay higher prices for energy today in return for a greener planet in the future. In March 2020, the UK has a carbon tax of around \$25 per ton CO₂⁵⁸, which in the past, starting from 2013, has incentivised electric utilities to switch from coal to natural gas and has contributed to the decline in the proportion of electricity generated by coal from 40% to 3% within six years⁵⁹. An effective carbon tax which will reduce emissions by 80% from 1990 levels will be around £80 a tonne⁶⁰. But there is still a large amount of variation of the carbon price faced by different industries⁶¹ which needs to be addressed.

Prominent green energy sectors are solar, wind, and geothermal power. In 2019, solar power consisted of 3.9% of the UK's energy mix⁶² and had a capacity factor (ratio of an actual energy output over maximum possible energy output over a period) of around 9.7%⁶³. Growth in solar power has been limited by an increased VAT on photovoltaic installations from 5% to 20% to comply with EU

⁵³Rigzone (2019, Oct 2) What Net Zero Means for UK Oil and Gas. Retrieved from

https://www.rigzone.com/news/what_net_zero_means_for_uk_oil_and_gas-02-oct-2019-159950-article/

⁵⁴Muttit, G. (2019, May 15). UK oil and gas: Climate emergency, jobs and the need for a managed phase-out. Retrieved from

<http://priceofoil.org/2019/05/15/uk-oil-and-gas-climate-emergency-jobs-and-the-need-for-a-managed-phase-out/>

⁵⁵Adelman, O. (2019, June 07). UK energy white paper to detail nuclear RAB funding model. Retrieved from

<https://www.spglobal.com/platts/en/market-insights/latest-news/electric-power/060719-uk-energy-white-paper-to-detail-nuclear-rab-funding-model>

⁵⁶Current +- (2020, Feb 07) Energy white paper set for publication in 'matter of weeks'. Retrieved from

<https://www.current-news.co.uk/news/energy-white-paper-set-for-publication-in-matter-of-weeks>

⁵⁷Plumer, B., & Popovich, N. (2019, April 02). These Countries Have Prices on Carbon. Are They Working? Retrieved from

<https://www.nytimes.com/interactive/2019/04/02/climate/pricing-carbon-emissions.html>

⁵⁸GOV.UK (2020, March 11) Changes to tax provisions for Carbon Emissions Tax. Retrieved from

<https://www.gov.uk/government/publications/changes-to-tax-provisions-for-carbon-emissions-tax/changes-to-tax-provisions-for-carbon-emissions-tax>

⁵⁹University College London. (2020, January 27). British carbon tax leads to 93% drop in coal-fired electricity. Retrieved from

<https://phys.org/news/2020-01-british-carbon-tax-coal-fired-electricity.html>

⁶⁰Hook, L., & Giles, C. (2020, March 10). Zero emissions goal: The mess of Britain's carbon taxes. Retrieved from

<https://www.ft.com/content/c4e7cf36-61f5-11ea-a6cd-df28cc3c6a68>

⁶¹Ibid.

⁶²GOV.UK (2019, April 11) Renewable electricity capacity and generation. Retrieved from

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/789371/ET_6.1.xls

⁶³Greenmatch. (2019, December 17). UK Solar Capacity: Is the Future of Solar Cloudy? Retrieved from

<https://www.greenmatch.co.uk/blog/2019/09/uk-solar-capacity>

legislation active from October 2019⁶⁴. Furthermore, the Smart Export Guarantee initiative financially supports small solar generators for electricity exported to the grid⁶⁵.

Furthermore, there has been more growth since government opposition to subsidising new onshore wind farms has been abandoned. In light of this change, subsidy awards will be auctioned, so that the final cost of clean energy can be calculated and incorporated into the price in 2021. For instance, SSE and Equinor have also announced plans to invest £6bn to £8bn to create the world's largest offshore wind farm near Yorkshire to fulfil 2.5% of the UK's electricity needs. Following the timeframe before the pandemic, new projects will be running in the mid-2020s⁶⁶.

Lastly, currently underdeveloped, geothermal energy could help the UK meet 20% of its energy requirements if implemented effectively and locally. It is also a possibility, though an unlikely one at present given the high dependence on foreign governments, that the UK could buy geothermal energy from abroad, which increases in significance in a post-Brexit politically more stable climate⁶⁷.

Analysis of Policy Options

Government spending can be highly effective in accelerating economic recovery after a major crisis, especially in a pandemic-induced recession⁶⁸. Ideally, stimulus packages will seek to bring about a structural change towards greener companies and less emissions. Outlined in this section and table 1 are potential pathways for the UK's oil and gas industry to recover from the economic impact of COVID-19 in a way that also benefits the environment. The options have been assessed according to their economic and environmental benefits alongside the administrative and political feasibility regarding their implementation. Of course, these are but generalised suggestions which will need to be adapted in accordance to a company's individual circumstances.

Oil and Gas Industry

1) Reduce methane emissions from oil and gas operations:

The fugitive gas methane is a strong greenhouse gas with a global warming potential (GWP) much greater than CO₂. The IEA estimates it is technically possible to reduce around 75%⁶⁹ of the current global methane emissions released from oil and gas operations each year through abatement techniques such as leak and detection repair (LDAR), installation of recovery units or by the application of technology such as double mechanical seals on pumps⁷⁰. With some of these opportunities for reducing methane emissions being quite labour intensive (such as, for example, a demand for operators to physically repair leaks), many skilled oil and gas workers at risk of being laid off because of COVID-19 could be retrained, to work on abatement programmes⁷¹. However, declines in revenue from oil and gas operations following COVID-19 may mean that companies pay less

⁶⁴ GOV.UK (2019, Dec 17) VAT on solar panels. Retrieved from <https://commonslibrary.parliament.uk/research-briefings/cbp-8602/>

⁶⁵ Ofgem. (2019, June 11). Smart Export Guarantee (SEG). Retrieved from <https://www.ofgem.gov.uk/publications-and-updates/smart-export-guarantee-seg>

⁶⁶ The Guardian (2015, Feb 17) World's biggest offshore windfarm approved for Yorkshire coast. Retrieved from <https://www.theguardian.com/environment/2015/feb/17/worlds-biggest-offshore-windfarm-approved-for-yorkshire-coast>

⁶⁷ SKM (2012, Aug 8) ECREEE renewable energy projects review. Retrieved from <http://www.ecreee.org/>

⁶⁸ Ibid.

⁶⁹ Sustainable Recovery World Energy Outlook Special Report (2020, June). Retrieved from <https://www.iea.org/reports/sustainable-recovery>

⁷⁰ McKinsey (2020, Jan 7) The future is now: How oil and gas companies can decarbonize. Retrieved from <https://www.mckinsey.com/industries/oil-and-gas/our-insights/the-future-is-now-how-oil-and-gas-companies-can-decarbonize>

⁷¹ Sustainable Recovery World Energy Outlook Special Report (2020, June). Retrieved from <https://www.iea.org/reports/sustainable-recovery>

Policy vs impact	Political Feasibility	Administrative Feasibility	Environmental Impact	Economic Impact
Oil and Gas industry				
Do nothing	-	+	-	-
1) Reduce methane emissions from oil and gas operations	+	+/-	+	+
2) Reform fossil fuel subsidies	+/-	+	+	+/-
3) Support and expand use of biofuels	+	-	+	+
4) Change power source	+	-	+	+/-
5) Reduce gas flaring	+/-	+/-	+	+
6) Implementation of carbon offsetting initiatives	+	+	+/-	+/-
7) Investment in technology for operation efficiency	+	+/-	+	+
Oil and Gas reliant industries				
8) Changes to transport usage	-	+	+	-
9) Changes to infrastructure	+/-	+	+	+
10) Electric vehicles	+	+	+	+/-

Table 1: Evaluation of potential pathways detailed below, each measured against four criteria, with '+' indicating positive impact or straightforward implementation, '-' negative impact of foreseen difficulties in implementation, and '+/-' an option that is neither wholly positive nor wholly negative in its outlook.

attention to implementing reduction programmes. Continued and enhanced government support will therefore be needed to incite cooperation of the industry.

2) Reform fossil fuel subsidies

Fossil fuel consumption subsidies lower the price of fossil fuels or fossil fuel-based electricity to end-use consumers. According to a report from the European commission, the UK leads the European Union in giving subsidies to fossil fuels - providing €12bn (£10.5bn) a year in support for fossil fuels in the UK, significantly more than the €8.3bn spent on renewable energy⁷². However, given the dramatic drop in oil and gas prices as a result of COVID-19 coupled with the widespread economic limitations for the country that will follow the pandemic, this figure is likely to drop. Phasing out inefficient fossil fuel subsidy regimes over the coming years could provide new budget space and make room for more spending on green initiatives (such as renewable energy generation) and the boosting of long-term economic growth⁷³. The dramatic fall in oil and gas prices also presents an opportunity to cut subsidies without increasing end-user prices. However, reform programmes must be aware of social and political sensitivities and consider their effect on energy accessibility, particularly by the poorest in society for whom a decrease in affordability could result in energy poverty⁷⁴. Out phasing should therefore occur steadily and incrementally as opposed to suddenly. The IEA predicts that, assuming fossil fuel subsidies are dropped by 2030 in all regions (with the exception of the Middle East), global emissions would be half than what they are predicted to be⁷⁵.

3) Support and expand use of biofuels

As one of the most labour-intensive energy industries, the liquid biofuel industry is a critical employer of both low and high skilled workers. Indeed, though biofuel production increased by around 25% between 2013 and 2018, the number of people employed in the sector increased by around 40%⁷⁶. However, a significant share of production capacity has been idled or is operating at reduced capacity as a result of the slowdown in overall liquid fuel demand (with production expected to fall by around 15% in 2020)⁷⁷. New policies, such as changes to fuel tax regimes to boost consumption of biofuel blends or the use of biofuels at service stations, could help stabilise the industry and create a large number of new jobs in a short period of time⁷⁸. Investment in sustainable biofuel production and consumption infrastructure could also have long-term environmental benefits such as offsetting the need for oil imports and reducing emissions from sectors that find it difficult to implement low-carbon electricity such as heavy-duty vehicles, aviation and shipping⁷⁹. However, building an advanced biofuel industry or even just large-scale biofuel production facilities is a timely (an estimated 2-3 years required to build one large-scale production facility⁸⁰) and costly operation which requires the employment of a large number of labour workers (both construction and permanent technical and professional staff associated with O&M and the logistics of fuel supply) and highly-skilled research and development personnel⁸¹.

⁷²The Guardian (2019, Jan 23) UK has biggest fossil fuel subsidies in the EU, finds commission. Retrieved from <https://www.theguardian.com/environment/2019/jan/23/uk-has-biggest-fossil-fuel-subsidies-in-the-eu-finds-commission>

⁷³ Sustainable Recovery World Energy Outlook Special Report (2020, June). Retrieved from <https://www.iea.org/reports/sustainable-recovery>

⁷⁴ Sustainable Recovery World Energy Outlook Special Report (2020, June). Retrieved from <https://www.iea.org/reports/sustainable-recovery>

⁷⁵ Sustainable Recovery World Energy Outlook Special Report (2020, June). Retrieved from <https://www.iea.org/reports/sustainable-recovery>

⁷⁶Ibid.

⁷⁷Ibid.

⁷⁸Ibid.

⁷⁹ Sustainable Recovery World Energy Outlook Special Report (2020, June). Retrieved from <https://www.iea.org/reports/sustainable-recovery>

⁸⁰Ibid.

⁸¹Ibid.

4) Change power source

Upstream operations such as exploration, drilling, and extraction account for two-thirds of sector-specific emissions⁸², with over 60% of CO₂ emissions from the UK oil and gas industry having come from offshore electricity generation in 2018⁸³. Companies involved in this area could change up their power sources within their operations, shifting to on-site renewable-power generation (such as solar PVs with batteries)⁸⁴ or connecting offshore or nearshore rigs and platforms to the central grid (as opposed to decentralised diesel and gas generation)⁸⁵. On the UKCS (UK Continental Shelf), locally generated offshore power is on average four to five times more emissions intensive (935gCO₂/kWh in 2018) than electricity from the UK national grid⁸⁶. If upstream producers electrified most of their operations, that could add up to 720 tCO₂e a year in abatement by 2050, at an estimated cost of \$10/tCO₂e, depending on local electricity costs⁸⁷. However, the technology, offshore renewable resources, infrastructure and commercial affordability are not currently in place to enable such offshore electrification of operations. Facilitating this will require major investment and would take an estimated decade to deploy at scale⁸⁸. In addition, voluntary participation in such projects may be limited following COVID-19, which means government encouragement or legislative action may also be necessary to bring about results.

5) Reduce gas flaring

Gas flaring occurs in oil production sites when unwanted or excess natural gas is produced as a by-product of oil extraction. If there is no infrastructure in place to put this 'associated gas' to productive use, or if there is no strong commercial case or regulatory incentive for it to be brought to market, it is simply flared⁸⁹. Flaring gas wastes a valuable energy resource that could be used to support economic growth and also contributes to climate change by releasing a significant amount of CO₂ into the atmosphere⁹⁰. Just over 1.2 million tonnes of gas were flared on UK offshore installations in 2018, producing 3 million tonnes of Co₂, making flaring the second largest source of CO₂ emissions on offshore installations⁹¹. Though some flaring is inevitable and at times even required for safety, limitations within infrastructure and a lack of productive use for associated gas can lead to it occurring far too often. Combatting this will require action by individual companies to further develop their gas-processing infrastructure (including the implementation of zero routine flaring designs in new-builds)⁹², improve their flaring efficiency (mckinsey) and develop and implement flare management plans that detail how monitoring will be done and what performance indicators will be⁹³ (with a lack of monitoring equipment and transparent, systematic reporting of flaring figures leading to significant uncertainty and downplaying regarding the magnitude of the problem)⁹⁴. In addition to this, changes will need to be made on a governmental level to make the conversion, use and sale of associated gas economically viable for companies within the industry. This would involve a revision of

⁸² McKinsey (2020, Jan 7) The future is now: How oil and gas companies can decarbonize. Retrieved from <https://www.mckinsey.com/industries/oil-and-gas/our-insights/the-future-is-now-how-oil-and-gas-companies-can-decarbonize>

⁸³ OKUG Productions emissions targets report 2020 (2020, June). Retrieved from <https://oilandgasuk.co.uk/wp-content/uploads/2020/06/OGUK-Production-Emissions-Targets-Report-2020.pdf>

⁸⁴ McKinsey (2020, Jan 7) The future is now: How oil and gas companies can decarbonize. Retrieved from <https://www.mckinsey.com/industries/oil-and-gas/our-insights/the-future-is-now-how-oil-and-gas-companies-can-decarbonize>

⁸⁵ OKUG Productions emissions targets report 2020 (2020, June). Retrieved from <https://oilandgasuk.co.uk/wp-content/uploads/2020/06/OGUK-Production-Emissions-Targets-Report-2020.pdf>

⁸⁶ Ibid.

⁸⁷ McKinsey (2020, Jan 7) The future is now: How oil and gas companies can decarbonize. Retrieved from <https://www.mckinsey.com/industries/oil-and-gas/our-insights/the-future-is-now-how-oil-and-gas-companies-can-decarbonize>

⁸⁸ OKUG Productions emissions targets report 2020 (2020, June). Retrieved from <https://oilandgasuk.co.uk/wp-content/uploads/2020/06/OGUK-Production-Emissions-Targets-Report-2020.pdf>

⁸⁹ Gas Flaring Reduction. Retrieved from <https://www.worldbank.org/en/programs/gasflaringreduction>

⁹⁰ Ibid.

⁹¹ OKUG Productions emissions targets report 2020 (2020, June). Retrieved from <https://oilandgasuk.co.uk/wp-content/uploads/2020/06/OGUK-Production-Emissions-Targets-Report-2020.pdf>

⁹² Ibid.

⁹³ Ibid.

⁹⁴ Gas flaring in industry: An overview (2015, December). Retrieved from <http://large.stanford.edu/courses/2016/ph240/miller1/docs/emam.pdf>

oil and gas legislation to ensure policies on the treatment of associated gas are unambiguous and so that fiscal terms encourage or require the use of associated gas⁹⁵.

6) Implementation of carbon offsetting initiatives

A crucial and attractive policy for both private industry and the government alike is that of carbon offsetting initiatives, through which they can 'offset' their activities that emit carbon dioxide and other greenhouse gases by funding mitigating activities elsewhere. This includes creating carbon sinks by planting large quantities of trees, funding implementation of clean energy technologies, purchasing and destroying carbon credits from an emissions trading scheme, or using ecological restoration to soak up carbon emissions.

However, offsetting does not provide a genuine solution but rather contributes a short term alternative to mitigate a carbon footprint. Indeed, the European Commission has previously warned that 85% of offsetting projects are unlikely to deliver real or measurable reductions⁹⁶ and other intergovernmental organizations such as the UN have called out the deficiencies in passing on the burden to more vulnerable communities⁹⁷.

Most carbon offsetting projects today are accredited by third-party standards; the principle criteria of which require the projects to be 'real (evidence that the project offsets emissions of carbon equivalents), measurable (the volume of emission reductions can be measured), additional (emission reductions would not happen without the project) and verifiable (neutral, third-party entity has verified the emission reductions)⁹⁸.

A notable example is that of Shell, who have pledged to offset customers' emissions by purchasing carbon credits generated from projects in the UK and internationally that protect and regenerate forests⁹⁹. In a similar vein, the Italian energy giant ENI announced programs to plant 20 million acres (four times the size of Wales) of forest in Africa to create a carbon sink, with a goal to use offsetting to compensate for all its upstream operations emissions by 2030¹⁰⁰. However, critics of this plan say that the efficacy of this plan is limited, given that what will be planted will resemble more a industrial tree farm rather than a forest, with swathes of same-age trees of the same species, limiting the sustainability and usefulness of the programme.¹⁰¹ Consequently, any future similar attempts should aim to further ENI's ambition and guarantee the sustainability and diversity of wildlife under such a plan.

7) Investment in technology to increase operational efficiency

The extraction and transformation of hydrocarbons is a significant energy consumer. Reducing energy losses in refining, processing, transmission and distribution not only abates the production of greenhouse gas emissions but also reduces costs both for companies and end consumers¹⁰². Advances in digital technologies and within the emerging space of artificial intelligence offer new tools and techniques to capture and leverage information to streamline operations while increasing

⁹⁵ Flaring emissions (2020, June). Retrieved from <https://www.iea.org/reports/flaring-emissions>

⁹⁶ The Telegraph (2019, Aug 20) Carbon Offsetting may increase pollution. Retrieved from <https://www.telegraph.co.uk/science/2019/08/20/carbon-offsetting-may-increase-pollution-experts-warn-rich-cant/>

⁹⁷ The UN Environment Programme (Accessed July 2020) Carbon Offsets are not our get out of jail free card. Retrieved from <https://www.unenvironment.org/news-and-stories/story/carbon-offsets-are-not-our-get-out-jail-free-card>

⁹⁸ Kim, R. & Pierce, B.C. (2018). Carbon offsets: An overview for scientific societies (p. 4). Retrieved from <https://www.cis.upenn.edu/~bcpiere/papers/carbon-offsets.pdf>

⁹⁹ Drivers set to go carbon neutral with shell (2019, Oct). Retrieved from <https://www.shell.co.uk/media/2019-media-releases/drivers-set-to-go-carbon-neutral-with-shell.html>

¹⁰⁰ ENI to plant vast forest in push to cut greenhouse gas emissions (2019, March). Retrieved from <https://www.ft.com/content/7c4d944e-470d-11e9-b168-96a37d002cd3>

¹⁰¹ REDD (2019, Mar 19) Oil company Eni plans 8.1 million hectare land grab in Africa for carbon offset plantations. Retrieved from <https://redd-monitor.org/2019/03/17/oil-company-eni-plans-8-1-million-hectare-land-grab-in-africa-for-carbon-offset-plantations/>

¹⁰² Five ways the oil and gas industry can mitigate climate catastrophe (2020, April). Retrieved from <https://www.offshore-technology.com/features/five-ways-the-oil-and-gas-industry-can-mitigate-climate-catastrophe/>

production¹⁰³. As such, investment in new technologies such as energy efficient plant designs (from the architectural design of facilities, to the equipment and processes that are implemented in each facility), advanced computer controls, advanced modelling of reservoirs to increase production efficiencies, new extraction and processing methods and improved technologies for monitoring the efficiency of equipment in the field¹⁰⁴, could prove both environmentally and economically beneficial in the long term.

Oil and Gas Reliant Industries

With the present climate, the government can and should, like many other European governments have done, seize the opportunity to pressure transport and oil-reliant industries to set stronger environmental goals and make drastic changes to their practices.

8) Changes to transport usage

Given the dramatically low oil prices, low demand for flights and travel in general, and requests for financial support from these industries, the government can use this leverage to pressure private firms. Across Europe, we see examples like the French government demanding AirFrance to cut future domestic flights or face no taxpayer assistance, and the Austrian government declaring that the state airline's bailout is contingent on climate friendly provisions¹⁰⁵. The UK government has not made their bailouts as tied to environmental conditions¹⁰⁶

9) Changes to infrastructure

Similarly, the Chinese government has promised \$1.4 trillion of 'new infrastructure construction' of low carbon technologies, providing one of the greatest opportunities for a 'green recovery' via an extended railway system and ultra high-voltage power lines with less energy dissipation¹⁰⁷. In Canada and Spain, we also see industry efforts to transition, with the energy giants Enbridge¹⁰⁸ and Repsol¹⁰⁹ respectively accelerating transitions to renewable energy with energy source diversification and projects like urban waste gas extraction, CO2 capture for fuel synthesis.

An upgrade to the UK's housing stock will also be necessary to lower the nation's energy demand, according to the Institution of Engineering and Technology.¹¹⁰ According to this report, the 'only viable strategy' will be to reduce heating demand by 'dramatically increasing' the thermal efficiency of houses. This would include a large nationwide refit of all homes entirely at once rather than incrementally. These improvements would include installing better and external insulation, electric heat pumps, amongst others. While successive Conservative and Labour governments have made pledges in the past to retrofit between 1-4 million homes, the UK will need to retrofit all homes by 2050 to meet its climate goals¹¹¹.

¹⁰³ Driving operational performance in oil and gas. Retrieved from <https://www.ey.com/Publication/vwlUAssets/ey-driving-operational-performance-in-oil-and-gas/%24FILE/ey-driving-operational-performance-in-oil-and-gas.pdf>

¹⁰⁴ Emissions management. Retrieved from <https://www.ipieca.org/our-work/climate-energy/emissions-management/>

¹⁰⁵ The Guardian (2020, May 17) Is the COVID-19 crisis the catalyst for greening the world's airlines? Retrieved from <https://www.theguardian.com/world/2020/may/17/is-covid-19-crisis-the-catalyst-for-the-greening-of-worlds-airlines>

¹⁰⁶ The Guardian (2020 June 5) Airlines and carmakers benefit from UK Covid relief scheme. Retrieved from <https://www.theguardian.com/world/2020/jun/04/airlines-and-carmakers-benefit-from-uk-covid-relief-scheme>

¹⁰⁷ The Coronavirus Pandemic (2020, May 18) China can show the world what a green economic recovery looks like. Retrieved from <https://www.scmp.com/comment/opinion/article/3084603/china-can-show-world-what-green-economic-recovery-looks>

¹⁰⁸ Financial Post (2020, June 8) North America's largest pipeline company aims to pivot to natural gas and renewable energy. Retrieved from <https://business.financialpost.com/commodities/energy/north-americas-largest-pipeline-company-aims-to-pivot-to-natural-gas-and-renewable-energy>

¹⁰⁹ Repsol (2019, December 2) Repsol will be a net zero emissions company by 2050. Retrieved from <https://www.repsol.com/en/press-room/press-releases/2019/repsol-will-be-a-net-zero-emissions-company-by-2050.cshtml>

¹¹⁰ energypost (2018, Oct 16) UK homes need 'deep efficiency retrofit' to meet climate goals. Retrieved from <https://energypost.eu/retrofitting-energy-efficiency-in-uk-homes/>

¹¹¹ GOV.UK (2020, June 29) Whole House Retrofit (WHR) competition. Retrieved from <https://www.gov.uk/guidance/whole-house-retrofit-whr-competition>

10) Electric vehicles

Transport is the major emission sector, and a report by Nottingham Trent University states that electrifying all 32 million vehicles in the UK will reduce total carbon emissions by more than 14%¹¹². The Government aims to end the sale of new diesel and petrol vehicles by 2040, but attempts to move this forward to 2035 will be crucial¹¹³. However, electric vehicle (EV) registration remains very low, only reaching 27,000 in 2019. EVs are slightly more expensive in initial purchase when considering home-charging infrastructure that adds to the price, but once bought, they are generally cheaper to run than gasoline based vehicles. A study by researchers from the International Council for Clean Transportation showed that the pure electric version of VW Golf was the cheapest out of the hybrid, petrol and diesel versions¹¹⁴. To meet its goals, the government will need to further encourage purchase and use of EVs, through subsidies, public campaigns, and pressure on non-EV owners and manufacturers, as it is successfully demonstrated in Norway where EVs are exempt from registration tax¹¹⁵¹¹⁶. However, the UK has low grants for electric car purchases so British drivers saw the smallest saving in using electric cars at 5%¹¹⁷.

Challenges Ahead

Whilst this report will outline clear pathways, the combination of virus-induced and climate crisis faces governments with unprecedented challenges.

The very nature of the COVID-19 virus remains yet unravelled, as for example it still is uncertain whether infected patients will be immune to another infection and whether a “second wave” will come. Based on experience from other viruses like SARS¹¹⁸, it is highly likely to retain at least some temporary resistance. Thus, the future will most definitely involve some form of social distancing.

There is also the risk that other governments will take an environmentally less considerate pathway and thus pose an imbalance in competition. Given Brexit-details are still being worked out, the UK itself might be tempted to give in into economical short-term gain by deviating from the EU emergency response to COVID-19 and climate change¹¹⁹¹²⁰.

Any large-scale action will commence after just coming out of the prolonged lock-down and thus its effectiveness will be influenced by the public mood, especially given that currently climate change predominantly is seen only indirectly due to the long-term nature of its effect in the UK. However, according to a study on social impacts of COVID-19, 64% of the interviewed people strongly agreed that staying at home has benefited the climate. This also implies they saw and are more aware now of how inconvenient climate measures might be. 61% of people felt no change in how concerned they

¹¹²edie (2020, May 15) Switching all UK cars to electric vehicles would slash emissions by 12%, researchers claim. Retrieved from <https://www.edie.net/news/8/Switching-all-UK-cars-to-electric-vehicles-would-slash-emissions-by-12---researchers-claim/>

¹¹³edie (2020, Feb 4) COP26: Boris Johnson to move diesel ban forward to 2035 and call for global net-zero transition. Retrieved from

<https://www.edie.net/news/9/COP26--Boris-Johnson-to-move-diesel-ban-forward-to-2035-and-call-for-global-net-zero-transition/>

¹¹⁴ Carrington, D. (2019, February 12). Electric cars are already cheaper to own and run, says study. Retrieved from <https://www.theguardian.com/environment/2019/feb/12/electric-cars-already-cheaper-own-run-study#:~:text=Electric cars are already cheaper to own and run than,countries analysed in new research.&text=The ICCT analysis was updated,the smallest saving – 5%.>

¹¹⁵Norsk elbilforening (2020, July 10) Norwegian EV policy. Retrieved from <https://elbil.no/english/norwegian-ev-policy/>

¹¹⁶ Carrington, D. (2019, February 12). Electric cars are already cheaper to own and run, says study. Retrieved from <https://www.theguardian.com/environment/2017/dec/01/electric-cars-already-cheaper-to-own-and-run-than-petrol-or-diesel-study>

¹¹⁷ Ibid.

¹¹⁸ WHO (2020) SARS (Severe Acute Respiratory Syndrome). Retrieved from <https://www.who.int/ith/diseases/sars/en/>

¹¹⁹ Impel.eu (2020, Apr 24) Alliance: Appeal for Green Recovery from Covid-19 pandemic. Retrieved from <https://www.impel.eu/alliance-appeal-for-green-recovery-from-covid-19-pandemic/>

¹²⁰ BBC (2020, June 4) Demands grow for 'green industrial revolution'. Retrieved from <https://www.bbc.co.uk/news/science-environment-52906551>

were about climate change when asked about COVID-19's effect on this, whilst 56% people think that climate-positive changes shall be upheld¹²¹. Apart from a feeling of restlessness after social distancing, there might be both numbness towards yet another crisis, and lack of action induced by unwarranted optimism having just faced off COVID-19.

Lastly, lobby-pressure within the UK might induce bailouts to oil and gas companies, airlines¹²², and even car manufacturers. These are not only unsustainable solutions, but also might harm green energy providers. Still, the stance of the Oil and Gas UK trade association (OGUK) having committed to achieving net-zero emissions by 2050¹²³ is promising. OGUK argues that the government has to play an active role in supporting its transition to net-zero. The industry has the capability and human capital to support the development of carbon capture, use and storage as well as hydrogen and other low-carbon energy sources¹²⁴.

COVID-19 Recovery Recommendations

Six Degrees recommendations to the Oil and Gas industry for a green recovery after COVID-19 will be divided into three time periods – short, mid and long term. The short term recommendations will focus on uniting the immediate economic recovery needed with green solutions. Long term recommendations will focus on mitigating climate change generally, in which the disruption due to COVID-19 is not in focus. Lastly, mid term policies will unite the two previously mentioned, in how the immediate solutions can be developed into long lasting change.

Short Term

These are the changes that should take place in the next year to two years. The actions that can be taken by the Government, companies and corporations, and private individuals are outlined below.

Government:

Redirection of subsidies

We recommend the redirection of subsidies to be taken by the Government as a short term policy change. The fall in energy prices makes this an ideal window in which to cut fossil fuel subsidies and increase carbon taxes. An added benefit would be increased Government revenue and control over where the budget is spent. High emitting industries including the oil and gas industries have been affected by COVID-19. Before the crisis it was already accepted that their practices would have to change if significant emissions reductions were to occur. Redirection of subsidies away from carbon intensive industries in the short term would prevent industry workers returning to work during the recovery only to later find themselves faced with unemployment when climate action is taken, as it eventually must be. From a political, social and, of course, climate point of view, it is recommended that the redirection of subsidies occurs during, and not after, the economic recovery from COVID-19.

¹²¹Office for National Statistics (2020, July 3) Coronavirus and the social impacts on Great Britain. Retrieved from <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandwellbeing/datasets/coronavirusandthesocialimpactsongreatbritaindata>

¹²²ssee (2020, May) Will COVID-19 fiscal recovery packages accelerate or retard progress on climate change? Retrieved from <https://www.smithschool.ox.ac.uk/publications/wpapers/workingpaper20-02.pdf>

¹²³Oilprice (2020, July 2) UK Oil and Gas Industry Embraces Net Zero Emissions Plan By 2050. Retrieved from <https://oilprice.com/Latest-Energy-News/World-News/UK-Oil-Gas-Industry-Embraces-Net-Zero-Emissions-Plan-By-2050.html>

¹²⁴OGUK (2020, Mar) Business Outlook 2020: Activity and Supply Chain. Retrieved from <https://oilandgasuk.cld.bz/Business-Outlook-2020-Activity-and-Supply-Chain/15>

Changes of power sources

We recommend that the Government both legislates for and subsidises the conversion of the UK's energy grid from a fossil-fuel reliant one to a renewable energy reliant one in the near term. This will facilitate the retraining of oil and gas industry workers and can therefore reduce unemployment within the energy sector. Incentives for the changing of power sources within the business sector and by individuals should also be provided. If the UK is to meet its climate goals, the energy sector must change and now is a good time to start.

Support biofuels

We recommend support for biofuels and effort to increase their uptake within business, by individuals and the public sector should take priority in the UK in the short term, to provide a bridge between current fuel usage and an electric vehicle economy in the future. The biofuels industry is capable of employing a significant number of low skilled and high skilled workers. As well as its important role in climate mitigation, support for biofuels at this point would cushion the effect of rising unemployment, particularly in low skill sectors such as hospitality.

Energy efficiency

We recommend that the Government invests in retrofitting buildings to improve their energy efficiency. This may take place through increased subsidies for privately owned buildings and via direct investment in improving the energy efficiency of state-owned buildings such as schools. As well as the obvious benefit of climate mitigation, job creation and reduced energy costs would result from the implementation of such a policy in the short term.

Changes to infrastructure

We recommend that the Government supports and passes legislation requiring the changing of infrastructure from fossil fuel-reliant to that that can run on renewable energy. This should take place as soon as possible to allow the UK energy grid to become fully renewable sooner.

Businesses:

Redirection of subsidies

In the short term, companies should review their finances and reduce money flow to carbon intensive companies, practices and industries, given that eventually government pressure will develop.

Changes of power sources

Companies should review their energy suppliers. If a green energy plan is not offered, a switch should be made to a renewable energy plan from another supplier. ensure the electricity they are supplied with is renewable. If communicated, this action can increase public support (and therefore profit) for a company.

Support biofuels

Where possible, companies should use biofuel to power their vehicles.

Energy efficiency

We recommend that companies retrofit their buildings to make them energy efficient. We also encourage companies to invest in energy efficient appliances. If taken in the short term, these

changes will decrease energy costs, leading to an increase in profitability in the mid to long term period.

Changes to infrastructure

Companies that own fossil-fuel dependent infrastructure should start on the process of altering it to allow it to run on renewable energy. Particular focus should be given to electrification of company assets.

Individuals:

Energy efficiency

In the short term, we recommend that individuals retrofit their homes to increase energy efficiency and choose energy efficient appliances. Both these actions will reduce household spending on energy in the mid to long term.

Pressure government and companies into following recommendations

Individuals have a great deal of political power. We encourage them to use this to pressure the Government and corporations into ensuring the recovery from the economic crisis caused by COVID-19 tackles the parallel crisis of climate change.

Mid Term

Mid term changes should take place over the next decade. As with the short term changes, the actions that can be taken by the Government, companies and individuals are outlined.

Government:

Fugitive gas

We recommend this as a drastic reduction of fugitive gas will be crucial in order to meet emission targets, and the labour-intensive aspect of it makes it a strong investment for the economy. However, as the labour required will be from people already trained in oil and gas, their expertise is better used in making energy usage more efficient and changing power sources. It is nevertheless an important action, as oil and gas is unlikely to be phased out completely in the next decades, and due to the current fall in oil and gas corporations will require government incentive to implement these initiatives.

Carbon offsetting

We recommend this as a mitigation strategy for carbon emissions, although it is limited in effect and further action is necessary in the long run. Currently, carbon offsetting initiatives are run by third parties, with variable standards of quality, measurements, and so on, making standardization through government and intergovernmental organizations beneficial. To ensure consumer protection, as well as for environmental reasons, the Government should tightly regulate offsetting schemes and make sure they do not include false claims, particularly those run by airlines. Restoring of peatbogs and reforestation will also be important aspects of the UK's carbon offsetting policy. It is an appropriate mid term strategy, as administrative work will be timely and there are no significant employment or political benefits in context of COVID-19. However, it is important to realize carbon offsetting can only function as mitigation, and a shift to other power sources is necessary in the long run.

Changes to transport usage

We recommend the government requests changes to transport usage, particularly moving away from traditionally high-carbon-emitting methods such as flights and petrol cars. This can take place in conditions to government support to the industries, e.g. bailouts and subsidies, to ensure climate friendly provisions are made. In the long run it is necessary for transport to be transformed and run close to net zero, and process needs to be made on this now. We recommend that the government encourages purchasing and using EVs. This needs to be done by subsidising vehicle purchases and charging network erection.

Businesses:

Fugitive gas

We recommend oil and gas businesses to take technology to reduce fugitive gas, and emissions throughout production in general. Considering government incentives, if not complete abolishment, is likely to come in the near future, taking advantage of the low interest rates in investment and infrastructure following COVID-19 is highly recommended.

Carbon offsetting

We recommend businesses to ensure the carbon offsetting services they choose to use are effective and ecological. It is particularly favorable to make the measures taken to ensure quality to carbon offsetting is made public, as it will be favorable in the consumer's view of the company.

Changes to transport usage

We recommend businesses to re-think their use of transport, both in the type of transport such as flights, trains, and frequency of use. Companies in the oil and gas industry should take COVID-19 as an opportunity to rethink their power sources and energy use in operations. The industry has experienced a major disruption now, and will need to change operations and use of energy in order to avoid a second one. It is in their best interest to recover in an environmentally friendly manner. We recommend businesses to move to electric vehicles as far as possible, and support building of charging infrastructure.

Individual:

Fugitive gas

Ensure their electricity/energy provider has technology and processes in place to prevent fugitive gas being emitted.

Carbon offsetting

Make a habit of checking how businesses are carbon offsetting, and avoid falling for 'green washing'. Whenever not available through regular purchase, making a habit of compensating for your own activity is also recommended. Notably, in the long run a change of lifestyle is necessary to meet carbon emission goals.

Changes to transport usage

Do not travel by plane and petroleum car unless necessary. Make a habit of digital conference meetings. Change to using electric vehicles.

Long Term

Long term recommendations are policy to be taken by the government in the next 50 years. Due to the time and issues at scale, it will be particularly important for the government to lead with policy changes.

Carbon offsetting

Considering a complete elimination of oil, gas and other CO2 emitting energy sources is difficult if not impossible due to the systems already built, we recommend a reliable system for carbon offsetting to be developed. Legislation should be made to govern the quality and reliance of carbon offsetting measures, yet limit their use to strictly necessary in the long run. This can at first be done alongside carbon taxation, but as carbon tax presupposes a large scale use of carbon both cannot be sustained long term.

Transport

We recommend legislation and heavy taxation to make transportation carbon neutral. This includes personal, public, airline and so on. Although measures to limit individual transport are effective in reducing CO2 emissions it is not enough. A fundamental change of energy source is more realistic due to human behaviour, this includes electric vehicles, biofuel, and effective use of carbon offsetting measures in the necessary transportation modes.

Change of power sources

We recommend a fundamental change of power sources to an electricity grid running entirely on renewable energy. Due to the UK geography and placement of existing oil rigs tidal, hydro and wind energy are particularly susceptible. It is important to note that the change of power source will include both at home and in rigs.