**NET ZERO REVIEW: CALL FOR EVIDENCE**

**UKPIA RESPONSE**

**Overarching questions**

1. How does net zero enable us to meet our economic growth target of 2.5% a year?

Investment in Net Zero manufacturing technologies such as low carbon fuels, hydrogen and Carbon Capture Utilisation and Storage (CCUS) encourages economic growth[1] while ensuring that assets can deliver their full economic potential on a long-term sustainable basis as well as contributing the UK's energy resilience.

The UK Net Zero Strategy[2] published in October 2021 sets out how the UK will secure 440,000 well-paid jobs and unlock £90 billion in investment by 2030 on its path to eliminating UK overall GHG emissions by 2050. UKPIA supports and welcomes this strategy as a pragmatic approach to the transition to Net Zero.

Investment in Net Zero manufacturing technologies takes many forms, which include, but are not limited to

- Research and Innovation[3]
- Technology Development [4]
- Project Design [5]
- Project Construction and Commissioning [6]
- Project Operation

The investment in Net Zero enables many high skilled jobs in key areas including scientists, engineers, construction professionals and operations staff[7]. It will support key UK manufacturing industries including steel, cement, and mining[8].

The adoption of alternative/novel clean technologies such as Low Carbon Fuels, CCUS, Hydrogen, and Sustainable Aviation Fuels (SAF) would bring investment and research into the UK. Additional funding for SAF research and development and approval is required, along with funding to support scale up, to deliver the potential for the UK to become a world leader in low carbon technologies.

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[1] https://www.oecd.org/greengrowth/
[2] https://www.gov.uk/government/news/uks-path-to-net-zero-set-out-in-landmark-strategy
[3] https://www.gov.uk/government/publications/net-zero-research-and-innovation-framework
[4] https://economictimes.indiatimes.com/industry/renewables/essars-stanlow-to-invest-in-uks-largest-biofuels-storage-facility/articleshow/88271150.cms
[5] https://www.renewableenergymagazine.com/hydrogen/ineos-awards-contract-to-atkins-to-design-20220929
[6] https://www.phillips66.com/newsroom/2020-humber-uco/
[7] https://economy2030.resolutionfoundation.org/reports/net-zero-jobs/
[8] https://www.mckinsey.com/capabilities/sustainability/our-insights/decarbonizing-the-world-industries-a-net-zero-guide-for-nine-key-sectors

Transport sectors such as aviation[9],[10], ground transport[11] and the maritime sector[12] will require investment in new technologies to transition to Net Zero, also providing high skilled jobs and supporting UK manufacturing industries. As we indicate in the 2021 "Future of Mobility" report[13], a range of technologies such as Low Carbon Fuels, CCUS, Hydrogen, and Sustainable Aviation Fuels (SAF) will be needed across the different transport sectors to effectively transition to Net Zero

Additionally, the UK North Sea geological structure in offers scope for storage of CO2 imports, as well as that captured from UK installations. Exports of Hydrogen, SAF and skills should also be possible, contributing significantly to the UK's growth agenda.

The UK transition to Net Zero is part of international efforts to decarbonise and create a sustainable society over the long term. This includes commitments made at COP26, as well as commitments on aviation (IATA and CORSIA) and the maritime (IMO) sectors. However, a failure to decarbonise in an orderly manner risks far-reaching economic and societal impacts, which can rapidly spread across the entire economy[14] with significant potential for future recession.

2. What challenges and obstacles have you identified to decarbonisation?

Decarbonisation must be enabled by clear government policies which give certainty to operators and investors. These allow projects, often at scale and with significant investment to proceed in a cost-effective manner.

An example of a decarbonisation policy that has worked well is the Renewable Transport Fuels Obligation (RTFO)[15]. This has been in place since 2008 to reduce Greenhouse Gas (GHG) Emissions from the transport sector. In 2020 alone, the RTFO saved approximately 5.2 million tonnes of $CO_2$ emissions [16]. The trajectory, which increases to 2032 and flatlines thereafter has provided certainty for operators and investors alike.

We welcomed the announcements on decarbonising aviation made at the July 2022 Farnborough Air Show, including the commitment of 10% of aviation fuel to be made from sustainable sources by 2030[17]. However, we would encourage the UK government to provide greater certainty, by way of policy certainty or a clear trajectory, for sustainable aviation fuel (SAF). This would encourage investment in UK SAF production plants, meeting the UK Government commitment of having 5 commercial SAF plants under construction by 2025.

While clear policies encourage investment in decarbonisation, changes, or withdrawals of support for decarbonisation can cause investors to lose confidence, which can result in a lack

[9] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1095952/jet-zero-strategy.pdf
[10] https://www.gov.uk/government/speeches/jet-zero-strategy-our-approach-for-achieving-net-zero-aviation-by-2050
[11] https://www.smmt.co.uk/2021/10/smmt-statement-on-net-zero-strategy/
[12] https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2021/Oct/IRENA_Decarbonising_Shipping_2021.pdf
[13] https://www.ukpia.com/media/2579/ukpia-future-mobility-2021-low-res.pdf
[14] https://www.zurich.com/en/knowledge/topics/global-risks/the-risk-of-net-zero-transition
[15] https://www.gov.uk/guidance/renewable-transport-fuels-obligation
[16] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1032684/renewable-fuel-statistics-2020-final-report.pdf
[17] https://www.gov.uk/government/consultations/mandating-the-use-of-sustainable-aviation-fuels-in-the-uk

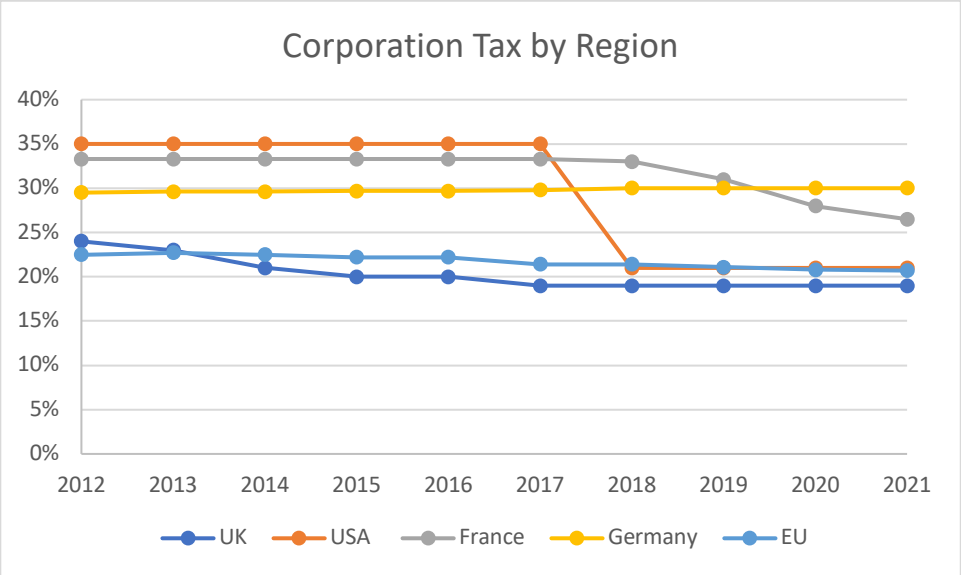
of investment in the UK. This could lead to a contraction of UK manufacturing and a reliance on imported products from countries which have been able to secure investment[18] in decarbonisation or which are produced with a higher carbon content. Government support over the long-term, including over different administrations, is required to deliver decarbonisation at the scale required.

There are significant challenges involved in the UK construction labour market, with 217,000 extra workers needed by 2025[19]. The causes of this shortage are diverse, including the fall-out of the COVID-19 pandemic and the UK's withdrawal from the European Union but need to be addressed to successfully manage the transition to Net Zero. We have considered more about the future skills needed for Net Zero technologies in our "Future Skills for the Downstream Sector" and further details can be found in our response to Q17, including a reference to the recent UKPIA Future Skills report.

As we discuss in our response to Q1, the UK transition to Net Zero is part of international efforts to decarbonise. Given the scale of investment required, the UK is, therefore, in international competition for investment funding. The attractiveness of the UK as a place to invest is, therefore, key to the delivery of Net Zero. Several factors will influence the attractiveness of one country over another. One example is the relative carbon pricing, such as the UK Emissions Trading Scheme (UK ETS) and we provide further information on this in our response to Q3. Another example is the relative energy costs, and we provide further information on this in our response to Q5. A further factor would be the introduction of windfall taxes which risk deterring future investment within a particular jurisdiction[20]. The rate of corporation tax within operating jurisdictions is also key to attracting international investment[21].

An additional factor may be the UK's ability to deliver on expected support for the transition through policy. It is essential that support (funding, business models, permitting and others) is delivered as expected if the UK is to meet its 2030 goals particularly for hydrogen, CCUS and electrification where projects will often have significant lead in times and first of a kind deployment will be needed within the next two years.

[18] https://www.theguardian.com/environment/2015/nov/25/uk-cancels-pioneering-1bn-carbon-capture-and-storage-competition
[19] https://constructionmanagement.co.uk/the-four-biggest-labour-shortages-in-construction/
[20] https://www.economist.com/leaders/2022/03/19/windfall-taxes-on-energy-companies-are-a-bad-idea
[21] https://taxfoundation.org/publications/corporate-tax-rates-around-the-world/#Regional




https://tradingeconomics.com/country-list/corporate-tax-rate

3. What opportunities are there for new/amended measures to stimulate or facilitate the transition to net zero in a way that is pro-growth and/or pro-business?

UKPIA and its members are working closely with the Government on the existing support frameworks for low carbon hydrogen [22] and CCUS [23] business models which are underpinned by the 2022 Energy Bill[24]. This Bill should be progressed as soon as possible to provide certainty for investors in Net Zero.

Long term policy certainty is required to support industrial decarbonisation. This could include for example fuel switching to low carbon hydrogen, carbon capture & sequestration (CCS) and electrification The UK Government also needs to align the delivery timing of multiple business models associated with the Net Zero Transition including Low carbon Hydrogen, Transport & Storage, CCS as often a combination of those are required for investment decisions.

In addition to business model support, abundant and competitively priced low carbon electricity is needed for electrification.

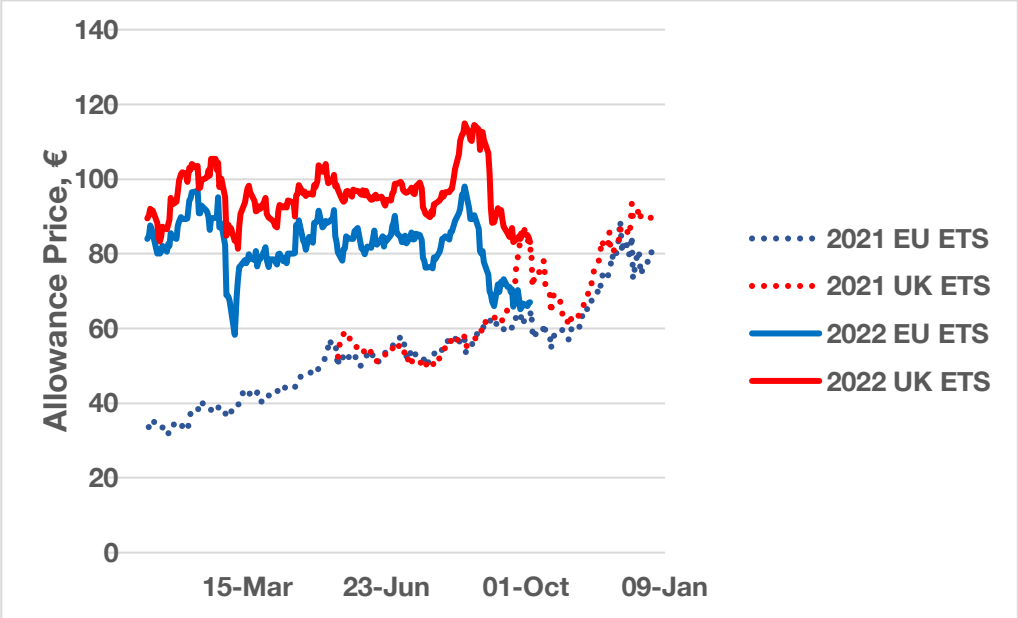
Finally. clarity on infrastructure is also needed: hydrogen grid, hydrogen blending into existing natural gas grid, transportation, and long-term storage liability for CO2.

UKPIA members operate under the UK Emissions Trading Scheme (ETS) which exists to manage GHG emissions from industrial emitters including the refining sector. This places a financial incentive to decarbonise; however other judications including the European Union (EU) operate schemes (the UK being part of this legislation prior to its withdrawal from the

[22] https://www.gov.uk/government/publications/hydrogen-investor-roadmap-leading-the-way-to-net-zero
[23] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1045066/ccus-transport-storage-business-model-jan-2022.pdf
[24] https://bills.parliament.uk/bills/3311

EU). If there is misalignment between these schemes, then it risks carbon leakage[25] from the UK, offshoring emissions through deindustrialisation and placing UK manufacturers at a significant disadvantage due to a higher cost bases relative to international competition. Currently the UK ETS costs are higher than those of the EU ETS[26], with UK ETS prices currently around £14/ton (20%) higher than EU ETS prices, penalising UK manufacturers and discouraging investment energy-intensive industries in the UK. Further, carbon costs schemes such as ETS schemes cover only 24% of goods on a global basis - the issue is wider than just a UK issue relative to the EU.

**Figure 1. Comparison of UK and EU ETS Allowance Prices 2021-2022**




*Data source: Ember, BoE daily exchange rates*

While one solution would be for the UK to re-join the EU ETS scheme, or to link the UK ETS with the EU ETS (as is the case with the Swiss and EU Schemes), we recognise that this may be difficult to achieve for political reasons. Another solution could be to introduce a well-designed Carbon Border Adjustment Mechanism (CBAM) to develop a level playing field – such a mechanism is already at an advanced stage in the EU following its announcement in July 2021[27]. We understand that the UK government will consult on this measure[28] and would encourage that this is done. This measure ensures that UK companies remain competitive, so that they can invest in Net Zero and prevent carbon leakage.

Additionally, the UK Government could fund key low carbon fuel, CCUS, Hydrogen and SAF research groups to develop promising technologies from the test tube to the pilot plant stage.

[25] https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/free-allocation/carbon-leakage_en

[26] ICE December 2022 futures prices provided by Ember.

[27] https://taxation-customs.ec.europa.eu/news/commission-proposes-new-carbon-border-adjustment-mechanism-and-revision-energy-taxation-directive-2021-07-14_en

[28] https://committees.parliament.uk/committee/62/environmental-audit-committee/news/171544/ministers-to-consult-on-implementing-cbam-following-eac-recommendation/

This could involve partnering with universities, and other groups with specialities in this field e.g., the UK CCS Research centre[29,30].

4. What more could government do to support businesses, consumers, and other actors to decarbonise?

UKPIA recognises and welcomes the incentives provided under competitions (such as the £1m provided to develop the first ever 100% SAF-driven transatlantic flight)[31] and the £165m capital grant funding for first of a kind and demonstration SAF plants[32]. However, these are often significantly lower than the total capital investment required for the plants (for example the Fulcrum site at Northpoint will require an additional £600m investment[33]. The US provides significantly more support for investment in US SAF plants[34] through tax credits and the US Sustainable Skies Act. We would therefore ask that the UK Government review its policy support frameworks for SAF in the light of efforts in competing world economies. Additionally, as per our response to Q2, we would ask that clarity is provided on the SAF mandate to provide certainty for investors.

The Low Carbon Hydrogen Business Model (LCHBM) relies on off-take agreements[35] from low carbon hydrogen producers to consumers to be viable. The government could look to be more active in this area to promote the development of these users, such as UK Glass or Steel manufacturers, particularly within the CCS clusters. This includes supporting the UK natural Gas Grid to be ready to accept up to 20% hydrogen as soon as possible [36] and the removal of the Gas Safety (Management) Regulations 1996 regulations[37] which currently limit the maximum hydrogen content of UK natural gas to 0.1%[38].

Other means which could support the growth of hydrogen demand could include:

- The government creation of a hydrogen demand strategy, which identifies potential growth areas and outlines an indicative pathway for its development including potential volume requirements.
- Identification of customers for low carbon hydrogen as a main criterion for funding Low Carbon Hydrogen (LCH) production projects. The UK six refineries operating in the downstream oil sector can be early anchor customers for projects to grow hydrogen economy as they have high hydrogen usage at present (from fossil sources).

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[29] https://www.letsrecycle.com/news/velocyss-waste-to-fuel-project-moves-forward/#:~:text=In%20partnership%20with%20British%20Airways,%2C%20and%20'FTS%20technology'.
[30] htts://ukccsrc.ac.uk/
[31] https://www.gov.uk/government/publications/net-zero-transatlantic-flight-fund
[32] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1095952/jet-zero-strategy.pdf
[33] https://www.fulcrum-bioenergy.com/northpoint
[34] https://www.iata.org/contentassets/d13875e9ed784f75bac90f000760e998/fact-sheet---us-and-eu-saf-policies.pdf
[35] https://www.investopedia.com/terms/o/offtake-agreement.asp#:~:text=What%20Is%20an%20Offtake%20Agreement,stream%20for%20its%20future%20output.
[36] https://www.energynetworks.org/newsroom/britains-gas-grid-ready-to-deliver-hydrogen-across-the-country-from-2023-energy-networks-announce
[37] https://www.legislation.gov.uk/uksi/1996/551/contents/made
[38] https://cms.law/en/int/expert-guides/cms-expert-guide-to-hydrogen/united-kingdom

- Ensuring transport policy for low carbon hydrogen supports all LCH sources which meet low carbon standards – consistent with the approach being taken in industrial use.

As we indicate in our response to Q3, the competitiveness of UK GHG emitters including the refining sector is affected by the operation of the UK ETS system. There needs to be a level playing field at an international level allowing UK companies to thrive and invest in the UK Net Zero transition. This could include the use of CBAMs where appropriate to prevent carbon leakage with reductions in UK carbon emissions simply by offshoring and deindustrialisation.

5. Where and in what areas of policy focus could net zero be achieved in a more economically efficient manner?

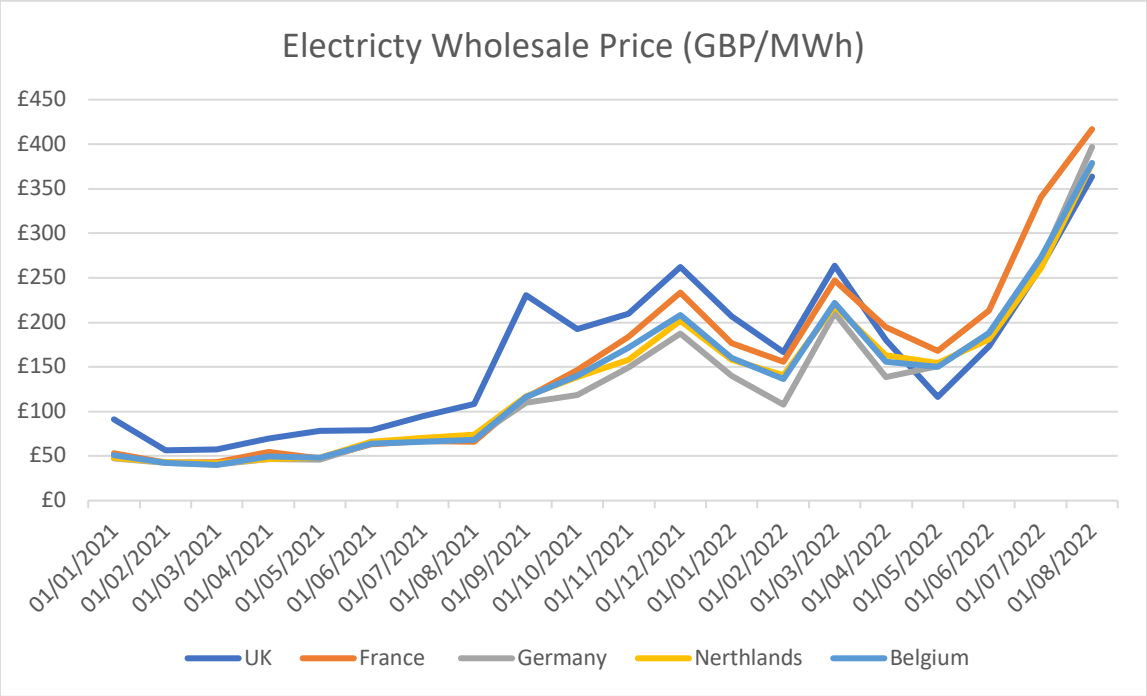
The UK Government needs to show leadership and commitment to Net Zero to create an environment in the UK in which companies are willing and able to invest at the levels required to decarbonise at scale. This includes commitments over longer periods, often over changes in governments or administrations. For example, the commitments outlined in the carbon budgets should include the 6th carbon budget for 2033-2037[39] are an excellent example of good practice providing certainty for future investment.

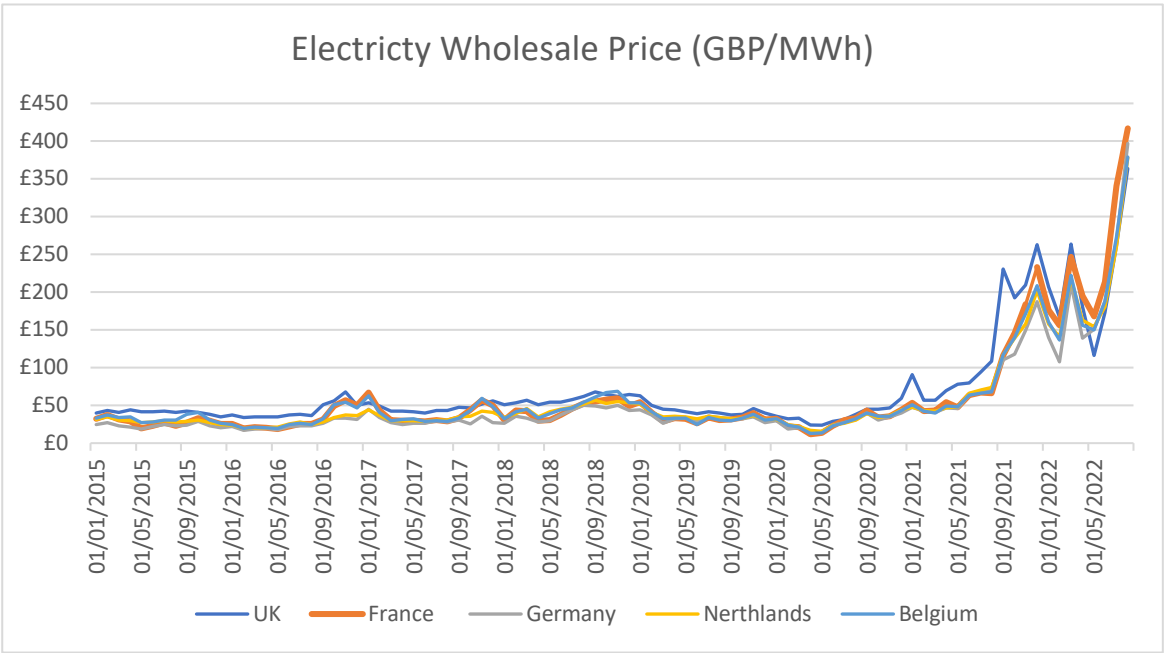
Specifically, the UK Government should be open and vocal in its support of the decarbonisation of the downstream sector, emphasising the current and future importance of this sector in factors such as energy security and supporting thousands of livelihoods[40].

These would both de-risk investment decisions, allowing borrowing at more advantageous rates, reducing the overall project costs involved[41].

The cost of energy in the UK relative to international competitors is also critical to the competitiveness of UK Energy Intensive Industries. Government policy in this area including support through the Energy Prices Bill[42] is essential in the long-term viability of UK industries. The following graphs indicate the relative electricity and gas prices of the UK against major world economies.

[39] https://www.gov.uk/government/publications/net-zero-strategy/indicative-annual-range-for-each-year-within-the-sixth-carbon-budget-addendum-to-net-zero-strategy-14-december-2021
[40] https://www.ukpia.com/
[41] https://www.investopedia.com/articles/optioninvestor/08/manage-interest-rate-risk.asp
[42] https://bills.parliament.uk/bills/3341




https://ember-climate.org/data-catalogue/european-wholesale-electricity-price-data/

UKPIA members operate under the UK Emissions Trading Scheme (ETS) which exists to manage GHG emissions from industrial emitters including the refining sector. This places a financial incentive to decarbonise; however other judications including the European Union (EU) operate schemes (the UK being part of this legislation prior to its withdrawal from the EU). If there is misalignment between these schemes, then it risks carbon leakage from the UK, offshoring emissions through deindustrialisation and placing UK manufacturers at a significant disadvantage due to a higher cost bases relative to international competition. Currently the UK ETS costs are higher than those of the EU ETS, with UK ETS prices currently around £14/ton (20%) higher than EU ETS prices, penalising UK manufacturers and

discouraging investment energy-intensive industries in the UK. Further, carbon costs schemes such as ETS schemes cover only 24% of goods on a global basis - the issue is wider than just a UK issue relative to the EU.

While one solution would be for the UK to re-join the EU ETS scheme, or to link the UK ETS with the EU ETS (as is the case with the Swiss and EU Schemes), we recognise that this may be difficult to achieve for political reasons. Another solution could be to introduce a well-designed Carbon Border Adjustment Mechanism (CBAM) to develop a level playing field – such a mechanism is already at an advanced stage in the EU following its announcement in July 2021. We understand that the UK government will consult on this measure and would encourage that this is done. This measure ensures that UK companies remain competitive, so that they can invest in Net Zero and prevent carbon leakage.

Government intervention by "picking winners"[43] without significant justification can lead to higher costs and unproductive or wasteful expenditure on unnecessary projects. For example, the ban on Internal Combustion Engines (ICE) vehicles by 2035 [44] ignores the ability of low carbon fuels [45] or hydrogen [46] to be used, which can achieve the same policy objectives.

6. How should we balance our priorities to maintaining energy security with our commitments to delivering net zero by 2050?

The potential for competing priorities in the transition to Net Zero was recognised in the publication of the 2022 British Energy Strategy[47] and there are many elements in the Strategy with which we agree.

This Strategy included an increase in ambition for low carbon hydrogen with a new target of 10GW of production by 2030, in part to alleviate the reliance on imported Liquified Natural Gas (LNG) which accounts for around 50% of UK demand[48]. The production of hydrogen through LCHBM support should therefore be progressed as soon as possible to allow the large-scale investments to proceed to meet the 2030 target.

The UK is a net importer of diesel and Jet Fuel, with the UK importing approximately 13.3m tonnes of diesel (approximately 50%) and 9.5m tonnes of Jet Fuel (approximately 75%) in 2019, prior to the COVID-19 pandemic[49]. A significant percentage of the diesel imported at that time came from Russia[50], which has subsequently reduced following sanctions associated

[43] https://www.kcl.ac.uk/ifis/assets/creating-not-picking-winners.pdf
[44] https://www.gov.uk/government/news/government-takes-historic-step-towards-net-zero-with-end-of-sale-of-new-petrol-and-diesel-cars-by-2030
[45] https://www.shell.com/energy-and-innovation/new-energies/low-carbon-fuels.html
[46] https://www.cummins.com/news/2022/01/27/hydrogen-internal-combustion-engines-and-hydrogen-fuel-cells
[47] https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy
[48] https://www.ons.gov.uk/economy/nationalaccounts/balanceofpayments/articles/trendsinukimportsandexportsoffuels/2022-06-29#:~:text=LNG%20is%20imported%20to%20the,%2C%20Peru%2C%20Angola%20and%20Russia.
[49] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1094354/DUKES_3.2.xlsx
[50] https://www.ons.gov.uk/economy/nationalaccounts/balanceofpayments/articles/trendsinukimportsandexportsoffuels/2022-06-29#a-closer-look-at-oil

with their invasion of Ukraine. However, as well as impacting energy security, this has led to a reduction in supply availability and a general increase in wholesale diesel prices in the UK[51].

Looking to the future, new risks are likely to be encountered as the UK transitions to a Net Zero economy[52]. There is expected to be increasing dependence on electricity as a source of energy, therefore, measures must be put in place to ensure resilient supply and to recognise increased risk from climate change events, for example: local flood risk; increased risk of lightning strikes; and power supply disruption.

Other measures will also be required to ensure continued resilience for current energy supply (in particular, for natural gas and petroleum products) as the supply reduces in line with falling demand. Typically investment in, and closure of, large Energy Intensive Industrial plants results in large changes in the supply / demand balances for these products, resulting in potential supply mismatches and short-term disruptions[53].

New risk factors are expected to include the availability of non-conventional feedstock such as biomass (e.g., non-availability due to bush fires), waste (reduced availability due to circular economy measures) and raw materials (e.g., rare earth metals, lithium, and graphite) on which current electrification policies are dependent. These new risks include geopolitical factors, cost, and competition for resources (local and international). We would encourage the UK government to review their support for UK sources of these inputs to ensure ongoing energy security as the transition moves forward. For instance: UKPIA member, P66 is a key manufacturer of graphite [54] in its Coker plant (the only one of its type in the UK); lithium may also be produced in Cornwall[55]; and the planned British Volt battery plant at Blyth, Northumberland[56], is a key part of the UK's transition. Concawe have considered some of the supply transition risks in their impact assessment on the potential implications for the UK's refining system and the link with Refinery 2050[57].

UKPIA responded to the 2021 consultation on the Downstream Oil Resilience Bill[58], and raised concerns that the Bill may negatively influence industry investment decisions in the UK, including both investments to maintain supplies today, and also decisions for decarbonisation related investment. These concerns remain valid and should be taken into account in the Net Zero Strategy review.

As we have set out above, increasing UK low carbon fuel production as an enabler to Net Zero has several benefits for energy security, including reducing the reliance on imports (including those of both fossil and renewable fuels).

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[51] https://www.rac.co.uk/drive/news/fuel-news/price-gap-between-petrol-and-diesel-rises-to-a-record-17p-a-litre/

[52] https://www.ukpia.com/media/2761/ukpia-response-to-national-resilience-strategy-nrs-call-for-evidence.pdf

[53] https://www.wri.org/climate/expert-perspective/unlocking-hard-abate-sectors

[54] https://www.phillips66.com/refining/humber-refinery/

[55] https://cornishlithium.com/

[56] https://www.britishvolt.com/what-we-do/

[57] https://www.concawe.eu/publication/a-clean-planet-for-all-impact-assessment-on-the-potential-implications-for-our-refining-system-and-the-link-with-refinery-2050/

[58] https://www.ukpia.com/media/2707/dsor-bill-response-july-2021-final.pdf

7. What export opportunities does the transition to net zero present for the UK economy or UK businesses?

As we articulate in our response to Q6, the UK is currently a net importer of diesel, jet fuel and renewable fuels. Increasing UK production of low carbon fuels reduces the demand for these imports in the first instance, and if it can be sufficiently increased, allows for exports of these fuels.

Demand for SAF in the EU will continue to grow as the EU implement their mandates under the ReFuelEU Aviation scheme [59]. Outside the EU, international SAF demand will be created under the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) scheme [60].

Similarly, planned decarbonisation the maritime sector through the Refuel EU Maritime legislation [61]and the International Maritime Organisation (IMO)[62] will provide demand for low carbon fuels, which could potentially be met through UK exports.

Finally, should the UK develop the skills and expertise of its citizens in the net zero transition, including the areas of technology, knowledge, and project management then these skills can be exported outside of the UK[63]. We have considered more about the future skills needed for Net Zero technologies in our "Future Skills for the Downstream Sector" and further details can be found in our response to Q17, including a reference to the recent UKPIA Future Skills report.

**Questions for businesses**

8. What growth benefits/opportunities have you had, or do you envisage having, from the net zero transition?

The transition to Net Zero provides many growth benefits and opportunities. Taking one example, the HyNet industrialisation project[64] in the North West as an example, this will provide:

- 6,000 local jobs and 75,000 jobs across the UK by 2035.
- Generation of £17bn for the local region, and £31bn for the UK as a whole.
- A reduction in carbon emissions of 10 million tonnes by 2030

Similarly, the HumberZero cluster[65] will provide

- Production of 173,000 tonnes of low carbon hydrogen annually
- The safeguarding of more than 20,000 jobs in the Humber region and beyond

[59] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12303-Sustainable-aviation-fuels-ReFuelEU-Aviation_en
[60] https://www.icao.int/environmental-protection/CORSIA/Pages/default.aspx
[61] https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/698808/EPRS_BRI(2021)698808_EN.pdf
[62] https://www.imo.org/en/MediaCentre/HotTopics/Pages/Reducing-greenhouse-gas-emissions-from-ships.aspx
[63] https://www.energymonitor.ai/policy/just-transition/investment-in-skills-is-key-to-realising-the-clean-energy-transition
[64] https://hynet.co.uk/
[65] https://www.humberzero.co.uk/what-is-humber-zero/

- An investment of £1.2bn in the initial phase alone
- A reduction in carbon emissions of 8 million tonnes annually

Finally, the Scottish Acorn project [66] may provide significant benefits in low carbon hydrogen and CCUS, subject to government support under the Track 2 CCS Cluster. UKPIA members are active in all these and other CCS clusters and would welcome the UK Government committing to announce Track 2

9. What barriers do you face in decarbonising your business and its operations?

UKPIA has identified the following areas where barriers exist in decarbonising its members business and operations:

High UK infrastructure costs:

The UK has high costs for infrastructure projects[67]. While some of these factors are related to geopolitical events including the COVID-19 pandemic and the recent military action in Ukraine, there are also underlying reasons why this is the case on a long-term basis[68] . UK labour costs are also significantly higher [69], reflecting a tightening of the UK labour market. This includes roles such as scientists and engineers which will be critical to net zero delivery, and we welcome changes to UK immigration rules for these roles.[70]. Finally, we welcome the findings of the Environmental Audit Committee on the net zero skill gap and would encourage the UK Government to address the issues raised[71].

Consistency in hydrogen support under decarbonisation schemes:

The Low Carbon Hydrogen Standard (LCHS)[72] is a barrier to the introduction of alternative sources of low carbon hydrogen from the refining sector. Hydrogen produced as a by-product from the Catalytic Reforming process used in all UK refineries does not qualify for support under the LCHS. This is despite it meeting the requirements under the standard (which currently only applies to "green" and "blue" hydrogen). We would therefore encourage the urgent expansion of the LCHS to include hydrogen produced as a by-product from the Catalytic Reforming process.

Similarly, "blue" hydrogen meeting the requirements of the LCHS does not qualify as a Renewable Fuel of Non-Biological Origin (RFNBO) under the RTFO scheme[73]. Only "green" hydrogen is permitted, which picks a technology "winner" and does not allow a level playing field. As we outline in our response to Q5, this has the potential to stifle the transition to net

[66] https://theacornproject.uk/
[67] https://www.ons.gov.uk/economy/inflationandpriceindices/articles/pricemovementsinconstructionmaterialsandplanthireuk/2019to2021
[68] https://economics.stackexchange.com/questions/12068/why-is-uk-infrastructure-so-expensive
[69] https://www.ons.gov.uk/economy/economicoutputandproductivity/productivitymeasures/bulletins/labourcostsandlabourincomeuk/2022#:~:text=1.-,Main%20points,higher%20than%20their%202019%20levels.
[70] https://www.hrmagazine.co.uk/content/news/relaxed-immigration-rules-could-benefit-uk-labour-market/
[71] https://committees.parliament.uk/committee/62/environmental-audit-committee/news/158177/government-not-sufficiently-grappling-skills-gap-needed-for-net-zero/
[72] https://www.gov.uk/government/publications/uk-low-carbon-hydrogen-standard-emissions-reporting-and-sustainability-criteria
[73] https://www.gov.uk/government/consultations/amending-the-renewable-transport-fuels-obligation-rtfo-to-increase-carbon-savings-on-land-air-and-at-sea

zero and increase overall costs. We would therefore encourage a single definition of low carbon hydrogen across all areas of UK Government policy, including the RTFO

As part of policy (especially business models and other financial) support where it is offered, it is essential that all indicated timelines are kept to as they will in many places be a key part of Final Investment Decisions (FID) by companies seeking to invest. If there are delays this may negatively impact on project timelines and at worst may see investment capital go to other countries who are already delivering support (for example the Inflation Reduction Act in the USA)[74].

Sustainable Aviation Fuel (SAF) Mandate:

As we outline in our response to Q2, the lack of a current detailed SAF mandate, including a trajectory, does not encourage investment in UK SAF plants. We would therefore encourage that this is developed as soon as possible to provide investment certainty.

HSE and Planning Approvals:

The role of the Health and Safety Executive (HSE), the UK environmental regulators (EA, SEPA and Natural Resources Wales) and the UK planning system will be key to the delivery of net zero in an effective and timely manner. While work on this is progressing [75,76], the UK government needs to ensure that sufficient prioritisation and resources are in place to deliver the safe transition in a timely manner allowing projects to be delivered in the timescales required.

High Carbon Costs:

UKPIA members operate under the UK Emissions Trading Scheme (ETS) which exists to manage GHG emissions from industrial emitters including the refining sector. This places a financial incentive to decarbonise; however other judications including the European Union (EU) operate schemes (the UK being part of this legislation prior to its withdrawal from the EU). If there is misalignment between these schemes, then it risks carbon leakage[77] from the UK, offshoring emissions through deindustrialisation and placing UK manufacturers at a significant disadvantage due to a higher cost bases relative to international competition. Currently the UK ETS costs are higher than those of the EU ETS, with UK ETS prices currently around £14/ton (20%) higher than EU ETS prices, penalising UK manufacturers and discouraging investment in the UK. Further, carbon costs schemes such as ETS schemes cover only 24% of goods on a global basis - the issue is wider than just a UK issue relative to the EU. Further information including recent trends can be found in our response to Q3.

High Energy Costs:

The cost of energy in the UK relative to international competitors is also critical to the competitiveness of UK Energy Intensive Industries. Government policy in this area including support through the Energy Prices Bill[78] is essential in the long-term viability of UK industries. Further information including recent trends can be found in our response to Q5.

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[74] https://www.energyintel.com/00000182-8ed9-d4e0-abc6-def941900000
[75] https://www.hsl.gov.uk/safe-net-zero
[76] https://www.gov.uk/government/publications/environment-agency-reaching-net-zero-by-2030
[77] https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/free-allocation/carbon-leakage_en
[78] https://bills.parliament.uk/bills/3341

10. Looking at the international market in your sector, what green opportunities seem to be nascent or growing?

Opportunities exist in providing new and innovative low carbon fuels, including SAFs, hydrogen and renewable fuels to provide energy for societal in a sustainable manner. This will also include the responsible use of CCUS technology. We articulate these opportunities in more detail in the UKPIA Transition, Transformation, and Innovation report[79].

These opportunities are not solely in the UK and can be developed in partnership with government policy frameworks to export both the low carbon energy products themselves, but also the skills and expertise in their development and production.

Finally, the UK is well placed to become a global leader in CCUS and CCUS technology[80], with

- A worldwide reputation as an international centre of engineering excellence
- Extensive experience from the oil, gas, and petrochemicals sector
- Substantial CO2 storage potential and industrial infrastructure

UKPIA and its members are active and heavily engaged with work on all of these opportunities. This includes:

Hydrogen:

UKPIA members are a major part of projects that will potentially deliver over 10GW of hydrogen (blue and green) by 2030.

- Vertex hydrogen as part of HyNet alone could deliver 4GW.
- Gigastack is proving 100MW electrolysers with P66 the prime customer.
- bp Teesside project would produce 1GW pa blue hydrogen and 0.5GW of green hydrogen.
- Esso has signed an MOU that could deliver 4.3TWh of hydrogen in early stages.
- Petroineos is part of planned low carbon hydrogen power plant project across Grangemouth

CCUS:

UKPIA members are active in at least 6 clusters with CCUS at their core:

- HyNet NW,
- ACORN/NECCUS,
- East Coast Cluster,
- South Wales Industrial Cluster
- Solent Cluster
- Humber Zero plans.

SAF:

UKPIA members are investing significantly in UK SAF production facilities:

- Fulcrum Bioenergy announced £600m plant on Essar site by end 2026
- P66 supplying BA with SAF (co-processed waste oils) in 2022
- Air bp and Esso are also supplying Neste-produced SAFs at scale to UK airports

[79] https://online.flippingbook.com/view/111037/6/

[80] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1068444/ccus-roadmap.pdf

11. What challenges has the net zero transition presented to your business?

The refining sector has always managed change since it began, and the Net Zero transition is a part of that change. For example, UK refineries have managed the significant transition to diesel for passenger cars[81] and the introduction of ultra-low sulphur petrol and diesel in recent years[82]. As we articulate in our UKPIA Future Vision report[83], the transition presents opportunities to evolve and adapt to provide the energy that society needs in a sustainable manner.

We articulate the challenges presented by the transition to Net Zero in more detail in our responses to Q2 and Q9. The areas of challenge include high UK infrastructure costs, consistency in hydrogen support across decarbonisation schemes, the SAF Mandate, and HSE / planning approvals.

Finally, we note that public perception will be key to acceptance of the significant societal shifts required over the coming years. We welcome the 2021 study conducted by researchers in BEIS and Defra as well as Cardiff University[84] where there was significant support for the Net Zero transition from around 4 out of 5 respondents.

Companies in the downstream sector are ready and willing to rise to the challenge in helping the UK meet its Net-Zero target. To do so, it is necessary for a joined-up UK Government to work together with the sector, to deliver the policy framework which enables businesses to transform and deliver an orderly transition. The downstream sector is well-established with a history of delivering major projects with its highly skilled workforce, but such is the ambition in reaching the Net-Zero target that it cannot be done alone.

12. What impacts have changing consumer choices/demand had on your business?

There are significant changes occurring in demand for refined products within the UK as part of the transition to net zero. The passenger car parc continues to electrify at pace, with just under 30% of new vehicles sold being Battery Electric (BEV) in September 2022[85]. Over time, this will trend will reduce demand for conventional fuels in the road transport sector. This trend has been recognised by UKPIA for some time, with significant growth in the EV charging infrastructure proceeding by UKPIA members such as bp[86] and Shell[87].

Hydrogen will also play an important part of the net zero transition, particularly for larger passenger cars [88]and HGVs[89]. bp is active in this area, recently announcing a tie-up with

[81] https://www.eea.europa.eu/data-and-maps/data/external/european-automobile-vehicle-parc/
[82] https://theicct.org/publication/low-sulfur-gasoline-and-diesel-the-key-to-lower-vehicle-emissions/
[83] https://www.ukpia.com/media/2230/ukpia-vision-july-2019.pdf
[84] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/996575/Climate_change_and_net_zero_public_awareness_and_perceptions_summary_report.pdf
[85] https://www.zap-map.com/ev-market-statistics/
[86] https://www.bppulse.co.uk/
[87] https://www.shell.co.uk/a-cleaner-energy-future/cleaner-transport/electric-vehicle-charging-solutions.html
[88] https://www.whatcar.com/news/why-more-uk-drivers-could-soon-be-choosing-hydrogen-powered-cars/n23385
[89] https://www.gov.uk/government/news/200-million-boost-to-rollout-of-hundreds-more-zero-emission-hgvs

Daimler to accelerate the uptake in infrastructure required.[90]. UKPIA welcomes the government support for this to accelerate decarbonisation in this sector.

UKPIA is a member and active participant in the work of the Zemo partnership[91], accelerating transport to zero emissions as we believe that this is an excellent network enabling Net Zero delivery. We have supported work carried out by them investigating potential duty incentives to encourage higher blends of low carbon fuels in captive fleets such as HGVs and buses[92], and would encourage the UK Government to support this initiative in a hard to decarbonise sector.

13. What impacts have decarbonisation/net zero measures had on your business?

Decarbonisation and net zero have a significant impact on the business of UKPIA members. However, as we have articulated in our response to Q11, the refining sector has successfully managed change since it began and is already working towards the net zero transition. This includes changes to business models and plans, away from fossil fuel manufacture and into low carbon fuels that society needs in order to be able to continue in a sustainable manner.

UKPIA supports a "just transition" to net zero, ensuring that the transition towards a climate-neutral economy happens in a fair way[93] that focusses on GHG reduction in a technology neutral way. We believe that this is critical to the effective and efficient delivery of net zero. This includes reskilling of the UK labour force, which will be vital to net zero delivery[94,95].

Finally, the sector is seeing increased protest action because of increased public focus on decarbonisation and net zero, including the Extinction Rebellion[96] and Just Stop Oil[97] groups. These actions have a significant adverse impact on the business operations of UKPIA members[98]. UKPIA does not condone the actions of these groups, however they show the levels of concern over net zero progress amongst some members of UK society.

14. What more could be done to support your business and/or sector to decarbonise?

As we articulate in our response to Q2, the announcement of detailed plans on the SAF Mandate will help provide investor certainty for investment in UK SAF manufacturing plants. This helps to meet the ambition of 5 UK SAF plants to be under construction in 2025 outlined in the UK Jet Strategy.

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[90] https://www.bp.com/en/global/corporate/news-and-insights/press-releases/bp-and-daimler-truck-ag-to-accelerate-the-deployment-of-hydrogen-infrastructure.html
[91] https://www.zemo.org.uk/
[92] https://www.zemo.org.uk/assets/reports/Decarbonising_Heavy_Duty_Vehicles_and_Machinery_Zemo_2022.pdf
[93] https://www.rff.org/publications/reports/regional-just-transitions-in-the-uk-insights-from-40-years-of-policy-experience/
[94] https://www.fenews.co.uk/skills/the-uk-s-road-to-net-zero-is-impossible-without-a-major-reskilling-programme/
[95] https://www.gov.scot/policies/climate-change/just-transition/
[96] https://extinctionrebellion.uk/
[97] https://juststopoil.org/
[98] https://www.bbc.co.uk/news/uk-england-60951403

We would strongly encourage the progression of support for low carbon hydrogen and CCUS business models as soon as possible. This includes progressing the 2022 Energy Bill, which has currently been paused[99] to put in place the legal framework for this support. Further we would urge the government to expand this support to include, for example, the Phase 2 CCUS clusters including Project Acorn in Scotland, as well as other appropriate schemes.

As we discuss in our response to Q12, we would also encourage the UK government to support fiscal incentives for higher low carbon fuel blends in captive fleets, following the work carried out by Zemo in this area.

Finally, the UK government should support and encourage the work on the UK HSE team, the Environmental Regulators, and the UK planning system to progress appropriate projects enabling the transition to Net Zero in the timeframes required. A failure to do so may lead to projects not being delivered in the timeframes required to meet the challenging targets that have been laid out.

15. Do you foresee a role for your business within an expanded UK supply of heat pumps, energy efficiency, electric vehicles, hydrogen economy or clean power?

UKPIA members are already the largest manufacturers and users of hydrogen in the UK today [100] and have significant experience in its safe handling and use. UKPIA members will play a substantial role in the UK transition and the hydrogen economy and are heavily involved in existing projects in this sector (please see our response to Q8 for more details).

UK refineries are in a prime position to incorporate CCUS technology and help support growth in this sector. This includes investment in low carbon process technologies such as hydrogen fired process furnaces[101].

17. How many green jobs do you estimate will be created in your sector by 2030?

The downstream oil sector has a significant contribution to the UK economy, supporting more than 120,000 jobs and enabling other key areas of the economy (from chemicals and other manufacturing to almost all transport related business)[102].

UKPIA recently commissioned Cogent Skills to produce a report[103] on the skills development in the sector to enable it to meet the Net Zero transition. This report identifies four themes that will be particularly important in the downstream sector's efforts to continue to attract and retain the skills it needs: the role of apprentices; addressing perceptions of the industry; understanding skills gaps; and promoting industrial clusters.

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[99] https://www.ft.com/content/5abde541-3f5d-463e-8b10-683016d10a3b
[100] https://www.ukpia.com/media/2763/ukpia-lchs-response.pdf
[101] https://www.hydrocarbonprocessing.com/news/2022/02/essar-to-build-the-uk-s-first-refinery-based-hydrogen-furnace
[102] https://www.ukpia.com/media/1013/oxford-economics-ukpia-summary-report.pdf
[103] https://online.flippingbook.com/view/861718875/4/