



Environmental Audit Committee

House of Commons, London SW1A 0AA

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Rt Hon Kwasi Kwarteng MP
Secretary of State for Business, Energy and Industrial Strategy
Department for Business, Energy and Industrial Strategy
1 Victoria Street
London SW1H 0ET

Sent by email only

31st May 2022

Dear Secretary of State,

Technological Innovations and Climate Change inquiry: Green Steel

The Environmental Audit Committee has been examining the readiness of green steel technologies and the necessary policy environment required for their deployment in industry, as part of the Committee's inquiry into *Technological Innovations and Climate Change*.

Our call for evidence, issued in February 2022, resulted in 25 responses, including a response from your Department. We also held two oral evidence sessions on this topic, on 20th and 27th April 2022, at which we heard from seven witnesses, including academic researchers, industry representatives and trade associations.¹ We have also drawn on the work undertaken by the Business, Energy and Industrial Strategy Committee in the course of its recent inquiry into Liberty Steel and the future of the UK steel industry.²

The wide range of evidence provided to us suggests that decarbonisation presents an opportunity for the UK steel industry to compete in the global market. This opportunity depends on the creation of the right policy framework and Government support.

I am now writing to indicate a number of issues raised in the evidence that we have received, on which the Committee seeks clarification as to the Government's approach.

¹ The oral and written evidence taken by the Committee is published at [Technological Innovations and Climate Change: Green Steel](#).

² The Business, Energy and Industrial Strategy Committee's report and evidence is published at [Liberty Steel and the Future of the UK Steel Industry](#).

A. The contribution of a decarbonised steel industry to net zero targets

Steel emissions currently contribute up to 14 % of UK industrial emissions³. The Climate Change Committee has recommended setting a target for steel emissions to reach near-zero emissions by 2035.⁴ In its Industrial Decarbonisation Strategy, the Government has set out plans to “consider the implications of the CCC recommendations” in 2021/22, but has not set out actionable points for the industry to decarbonise. The Industrial Decarbonisation Strategy paper also states that the Government is exploring the establishment of a mandatory requirement for current carbon-intensive equipment to be upgraded to “low-carbon ready” equipment in preparation for the establishment of hydrogen and carbon capture infrastructure.

1. Please set out:

(i) what consideration the Government has given to creating a specific strategy for the steel industry in addition to relevant strategies such as the Industrial Decarbonisation Strategy and the Hydrogen Strategy, and

(ii) the Government’s progress in setting mandatory targets for the steel industry in the 14 months to May 2022.

B. Examination of the available technologies

As your Department is already aware, the technologies available for partially or fully reducing carbon emissions from steel production include:

- (1) Hydrogen-based production i.e. hydrogen-Direct reduced iron (DRI) or direct injection of hydrogen into existing blast furnaces;
- (2) greater reliance on the recycling of scrap steel with electric-arc furnace technology (secondary production);
- (3) carbon capture and storage, and
- (4) partial substitution of coking coal with biomass feedstocks.

The Committee examined the potential of these applications in the UK steel industry and heard that the limitations to adopting these technologies are economic rather than technological.

Carbon capture technologies

The Committee welcomes the October 2021 announcement of the East Coast and HyNet industrial clusters as track-1 CCUS-clusters to benefit from the establishment of carbon capture and storage and hydrogen infrastructure.⁵ The Committee also welcomes the Minister for Energy’s response to its recent letter on Negative Emission Technologies, in which he set out plans to provide, by early summer, a shortlist of individual projects (phase 2) to connect to the track-1 clusters.⁶

Of the UK’s total steel emissions, 95% arise from operations at Scunthorpe and Port Talbot.⁷ Scunthorpe is located within the East Coast Industrial Cluster and British Steel has assured us that they plan to utilise CCS technologies to capture emissions from one of their two blast

³ ONS (2021) [Atmospheric emissions: greenhouse gases by industry and gas - Office for National Statistics](#)

⁴ HM Government (2021) [Industrial Decarbonisation Strategy \(publishing.service.gov.uk\)](#)

⁵ [October 2021 update: Track-1 clusters confirmed - GOV.UK \(www.gov.uk\)](#)

⁶ <https://committees.parliament.uk/publications/22056/documents/163746/default/>

⁷ HM Government (2021) [Industrial Decarbonisation Strategy \(publishing.service.gov.uk\)](#)

furnaces by 2035. Adoption of CCS technologies at Port Talbot appears to be more complex, as the site is located far away from offshore carbon storage: any CCS deployment therefore appears likely to require the shipping of carbon to geological stores under the North Sea and Irish Sea. The Welsh Government has recently released a report considering the feasibility of CCS from the South Wales Industrial Cluster and highlights the potential for a transportation hub to connect the cluster to the CCS network.⁸

2. Please provide further details of the Government's consideration of the Port Talbot steelworks as a phase 2 CCUS emitter. Should the steelworks not be selected as a phase 2 emitter, please set out how the Government will support the deployment of alternative green steel technologies at this site.

Due to the required transportation and storage infrastructure to support the adoption of CCS or hydrogen technologies, dispersed sites face limited options for decarbonisation via this method.

3. Please set out in response to this letter the Government's plans to support the adoption of green steel technologies in dispersed locations.

Further adoption of secondary production (steel recycling)

Secondary production refers to the recycling of scrap steel in an electric arc furnace. Witnesses frequently highlighted to the Committee that the adoption of green steel technologies is limited by current electricity prices in the UK, which are higher than those charged to European competitors.⁹ The Government previously provided support to the industry to mitigate the cost of energy, though several stakeholders regard this as a temporary solution. In July 2021 you indicated that Ministers were considering a potential sector deal to tackle the long-standing issues faced by the steel industry, to include addressing the cost of electricity.¹⁰ Since then the cost of electricity has soared for UK consumers and industrial users, as global supply chains revived following the pandemic with energy supplies disrupted from Russia's invasion of Ukraine.

4. Please provide an update on progress towards a decision on a sector deal, or an outline of any alternative support towards energy costs which may be under consideration.

The UK produces 11.3 million tonnes of scrap steel per year, using 2.6 Mt in domestic steel making and exporting 8.7 Mt.¹¹ The underlying reason behind the high percentage of scrap that is exported is the lack of domestic capacity to utilise more.¹² Some academic witnesses argued for a fundamental rethink towards how steel is produced and used, by improving construction efficiency to reduce steel demand, and by greater use of secondary production.¹³ Whilst the ability of secondary production to meet future global steel demand is disputed¹⁴, there appeared to be consensus across the evidence we received that the UK had the potential to make better use of its own domestic scrap.

⁸ Welsh Government (2021) [A Carbon Capture, Utilisation, and Storage Network for Wales \(gov.wales\)](#)

⁹ [HC1093](#), [GST0011](#), [GST0021](#), [GST0025](#)

¹⁰ [HC 118](#)

¹¹ Hall, R., Zhang, W., Li, Z. (2021) Domestic scrap steel recycling- economic, environmental and social opportunities. DEFRA Science and Research Projects. Available: <https://wrap.warwick.ac.uk/152270/>

¹² [HC1093](#)

¹³ [HC1093](#)

¹⁴ [GST0002](#), [GST0006](#), [GST0008](#), [GST0011](#), [GST0018](#), [POST-PB-0044.pdf \(parliament.uk\)](#), [STEEL-ARISING 2019.pdf \(cam.ac.uk\)](#), [Iron and Steel Technology Roadmap - Towards more sustainable steelmaking \(windows.net\)](#)

The Committee has also heard that the recycling industry is currently facing difficulties in connecting many operators to the grid following the loss of rights to the use of red diesel. Retaining recyclers is important to retain the potential to use more secondary production within the UK in future.

5. The Committee encourages the Government to adopt a whole-systems approach to increasing secondary production and support operators at each stage in the process. Please outline in response what plans the Government has to support further adoption of electric arc furnaces at steel sites in the UK.

Adoption of hydrogen-based technologies

Although it currently accounts for only a small percentage of global steel production, the Direct Reduced Iron (DRI) method is an established method of producing steel using natural gas in a shaft furnace followed by further processing in an electric arc furnace. The composition of the natural gas used can be adjusted to contain up to 30% hydrogen with existing DRI infrastructure, increasing to 100% hydrogen with some modification of infrastructure, eliminating direct CO₂ emissions from the process.¹⁵ It appears that early adoption of natural gas-DRI infrastructure can therefore allow transition to hydrogen-DRI as hydrogen infrastructure becomes established. Direct injection of hydrogen to existing blast furnaces only reduces emissions by up to 21.4 %¹⁶ and was not widely considered among the Committee's written evidence submissions.

The Committee notes the Government's recent work on the Hydrogen Strategy¹⁷ and establishment of the £240 million Net Zero Hydrogen Fund.¹⁸ Despite its location in an industrial cluster which will have hydrogen infrastructure available in future, British Steel is not considering adopting DRI technologies before 2035 because of high gas prices.¹⁹ TATA Steel told the Committee in its submission that, despite the Hydrogen Strategy, the uncertainty surrounding the abundance and affordability of future hydrogen supplies limits its confidence in investing in these technologies.²⁰ The production method of hydrogen must also be considered. Whilst blue hydrogen is expected to be more affordable than green hydrogen production, blue hydrogen production is affected by the volatility of gas prices.²¹ Blue hydrogen will also require access to CCS networks which, as previously mentioned, may not be easily accessible in some regions.

6. Please set out what steps the Government plans to take (i) to encourage the immediate adoption of DRI technologies in UK steelmaking, and (ii) to ensure the availability and affordability of blue and green hydrogen supplies to steelmakers.

¹⁵ [MIDREX H₂ - Midrex Technologies, Inc., Metals | Free Full-Text | Hydrogen Ironmaking: How It Works | HTML \(mdpi.com\)](#)

¹⁶ Yilmaz, C., Wendelstorf, J., Turek, T. (2017) [Modeling and simulation of hydrogen injection into a blast furnace to reduce carbon dioxide emissions](#)

¹⁷ [UK Hydrogen Strategy \(publishing.service.gov.uk\)](#)

¹⁸ [Designing the Net Zero Hydrogen Fund - GOV.UK \(www.gov.uk\)](#)

¹⁹ [HC1093](#)

²⁰ [GST0018](#)

²¹ [HC1093](#)

Biomass options and the need for coking coal

During the Committee's oral evidence sessions, witnesses highlighted that incorporating biomass to partially substitute pulverised coal in the blast furnace process²², which is known to reduce emissions by anything between 9 and 42%²³, is now technologically feasible. Members heard that this method is not typically considered by the industry, owing to uncertainty around the availability of suitable, sustainably-sourced biomass products and competition with other sectors.²⁴ British Steel indicated that, under electric arc furnace production, biomass might in future be used to adjust the carbon content of their products to meet requirements, highlighting another source of demand from the industry.²⁵

7. Please explain whether the Government plans to take steps to secure a sustainable biomass supply chain for the steel industry, given evidence of likely future demand.

With the exception of CCS, the main available green steel technologies provide the opportunity to reduce the demand for coking coal within the UK steel industry. Major steel industry producers have committed to reducing emissions dramatically by 2035 and achieving net zero by 2050.²⁶ British Steel assured the Committee that they planned to convert one of their existing blast furnaces to an electric arc furnace by 2035, but stressed the need to retain their existing primary production capacity, with carbon capture, for products with a low tolerance for copper contamination — for instance, long-rail structures.²⁷ Members have heard that with further development of new technologies, and improved collection and sorting of recycled materials, the issue of copper contamination can be overcome.²⁸

On the basis of the evidence presented to the Committee, it appears that the current demand for coking coal in steelmaking could be eliminated—using DRI or EAF technologies with further research and development—well before 2050. In practice, this aspect of decarbonisation would require policy and financial support. British Steel told the Committee that it would use domestically-sourced coking coal, such as that planned to be mined in West Cumbria, if it were priced to compete with imported coal. In January 2021 the Climate Change Committee highlighted to the Secretary of State for Housing, Communities and Local Government that 85 % of the coking coal produced from the mine is planned to be exported and that there may be no domestic use for coking coal beyond 2035.²⁹

8. Please set out the Government's policy on measures to reduce the requirement for coking coal in domestic steel production.

²² [HC 1093](#)

²³ [Exploring the role of forest biomass in abating fossil CO2 emissions in the iron and steel industry – The case of Sweden - ScienceDirect](#)

²⁴ [HC1093](#)

²⁵ [HC1093](#)

²⁶ [Low-Carbon Roadmap | British Steel, 9207 Celsa 2021 Net Zero Document Additional P4a.pdf \(celsauk.com\)](#), [9207 Celsa 2021 Net Zero Document Additional P4a.pdf \(celsauk.com\)](#), [GST0018](#)

²⁷ [HC1093](#)

²⁸ [HC1093](#), [HC1093](#)

²⁹ [Letter: Deep Coal Mining in the UK - Climate Change Committee \(theccc.org.uk\)](#)

C. Examination of Government policy and funding

Supporting the transition by stimulating market demand

The Government has previously supported creating a demand for UK steel through the Steel Procurement Pipeline.³⁰ This sets out upcoming national infrastructure projects that present an opportunity to use UK steel and includes projects from construction to shipbuilding.³¹ The Procurement Bill, recently introduced in the House of Lords, presents an opportunity to revise current public procurement practices. The Government has noted that the steel public procurement pipeline has previously failed to yield the significant results the industry had hoped for: the Steel Procurement Taskforce was established in 2021 to address this.³² The Committee heard that the UK Steel Council has previously played a role in addressing issues faced by the industry but is only active when there is a crisis. Use of UK produced steel in shipbuilding, for example, is constrained by the cessation of steel plate manufacturing.

The Committee recently published its report *Building to Net Zero: Costing Carbon in construction*, which recommend the introduction of mandatory whole-life carbon assessments for buildings as the most effective way to encourage the development and use of low-carbon and recycled products in the built environment.³³ Witnesses have highlighted to us that mandating the requirement for green steel in public infrastructure will help to stimulate market demand for green steel and instil confidence in the industry to invest in green steel technologies.³⁴

9. Please indicate the Government’s policy on promoting the use of green steel in public procurement. Please also indicate whether the Government plans to use existing bodies, such as the UK Steel Council, to promote its policies on the decarbonisation of steel production, or whether it plans to establish a new body.

The Committee has previously published a report on the potential adoption of a UK Carbon Border Adjustment Mechanism (CBAM).³⁵ Witnesses and written evidence submissions frequently cited the adoption of a UK CBAM as a necessity to ensure green steel, associated with higher production costs, can compete with high-carbon steel both within the UK and the global market. During the Committee’s oral evidence sessions, the consultation on the UK ETS was cited as an opportunity to make targeted changes to support the transition to green steel production. Product standards were also highlighted as a mechanism to favour the use of low-carbon steel products where possible.³⁶ Organisations such as SteelZero and Responsible Steel already support this.³⁷

10. Please set out the Government’s policy on (i) the implementation of product standards to encourage the adoption of low carbon steel and (ii) any changes to the UK ETS that will support the transition to green steel production.

³⁰ [steel-pipeline-data.ods \(live.com\)](https://steel-pipeline-data.ods.live.com)

³¹ [CP 605 – National Shipbuilding Strategy Refresh Web Accessible.cdr \(publishing.service.gov.uk\)](https://publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/100000/CP_605_-_National_Shipbuilding_Strategy_Refresh_Web_Accessible.cdr)

³² [HC 118, Steel Procurement Taskforce: final report - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/100000/HC_118_Steel_Procurement_Taskforce_final_report.pdf)

³³ [Sustainability of the built environment \(parliament.uk\)](https://parliament.uk/committees/hc-subcommittees/industry-subs/industry-subs-reports/sustainability-of-the-built-environment)

³⁴ [GST0004](#), [GST0008](#), [GST0011](#), [GST0015](#), [GST0021](#), [GST0023](#), [HC1093](#)

³⁵ [Carbon border adjustment mechanisms \(parliament.uk\)](https://parliament.uk/committees/hc-subcommittees/industry-subs/industry-subs-reports/carbon-border-adjustment-mechanisms)

³⁶ [HC1093](#), [HC1093](#)

³⁷ [SteelZero members | Climate Group \(theclimategroup.org\)](https://theclimategroup.org/), [Responsible Steel](https://responsiblesteel.com/)

Availability of Government funding

The UK steel industry is expected to benefit from Government funds such as the Industrial Energy Transformation Fund³⁸, the Net Zero Hydrogen Fund³⁹ and the Carbon Capture, Usage and Storage Infrastructure Fund.⁴⁰ During the Committee's evidence sessions, witnesses highlighted the opportunity to support both operational and capital costs during the transition and that greater initial investments in capital can lower future operational costs.⁴¹

11. Please clarify what proportion of each of the the funds established to support industrial transition will be made available for *direct* support to the steel industry for its (i) operational and (ii) capital costs during the transition.

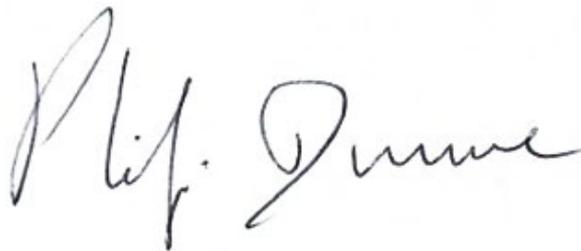
In 2019, the Government announced the £250 million Clean Steel Fund.⁴² In 2020 it was announced that this will not be made available to industry until 2023, while the Government works to understand the industry's decarbonisation plans.⁴³ During the Committee's oral evidence sessions, witnesses strongly supported earlier release of the fund and highlighted that the industry already has established plans on how to allocate the funding. Witnesses also highlighted that, compared to other countries, the Government funding available for the decarbonisation of the UK steel industry lacks ambition.⁴⁴

12. Please set out in response (i) the Government's rationale for the decision to withhold the Clean Steel Fund until 2023, when industry players are prepared to set out their decarbonisation plans now, and (ii) what plans the Government has to review the ambition of the Clean Steel Fund.

The Committee is concerned that unless investment is forthcoming in clean steel technologies and facilities in the UK, there is a real risk of further contraction of the industry in the UK, with increased dependency on imported steel in future.

I am copying this letter to the Chairs of the Business, Energy and Industrial Strategy Committee and the Science and Technology Committee.

Yours sincerely,



Rt Hon Philip Dunne MP
Chairman of the Environmental Audit Committee

³⁸ [Industrial Energy Transformation Fund - GOV.UK \(www.gov.uk\)](https://www.gov.uk)

³⁹ [Designing the Net Zero Hydrogen Fund - GOV.UK \(www.gov.uk\)](https://www.gov.uk)

⁴⁰ [The Carbon Capture and Storage Infrastructure Fund: an update on its design \(accessible webpage\) - GOV.UK \(www.gov.uk\)](https://www.gov.uk)

⁴¹ [HC1093](https://www.gov.uk)

⁴² [Clean Steel Fund: call for evidence \(publishing.service.gov.uk\)](https://publishing.service.gov.uk)

⁴³ [Creating a Clean Steel Fund: call for evidence - GOV.UK \(www.gov.uk\)](https://www.gov.uk)

⁴⁴ [HC1093](https://www.gov.uk), [HC1093](https://www.gov.uk)